Delta DE212

GLOBAL

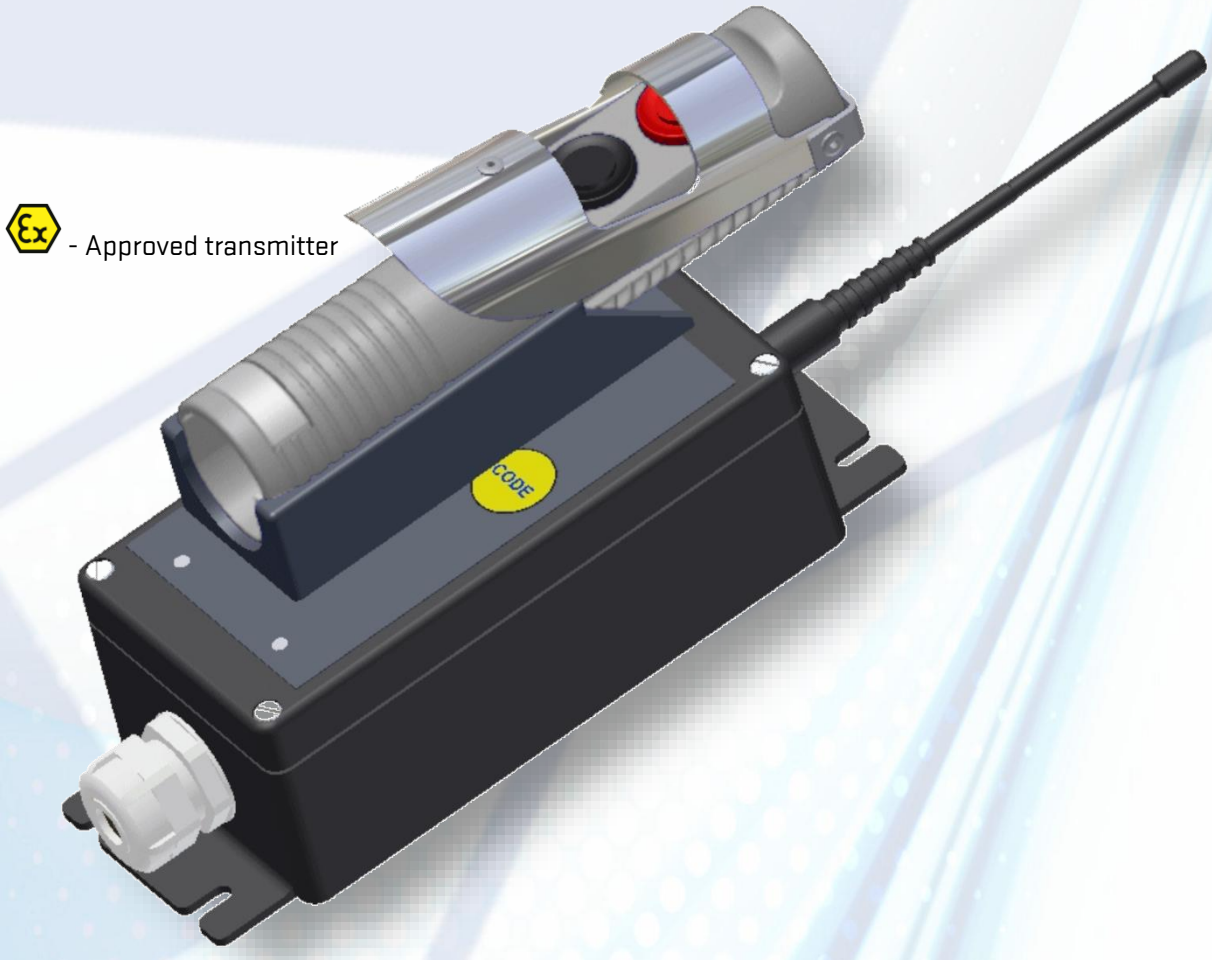
System # 03040.

Wireless Deadman System

for Aero Plane Refuelling Trucks and Dispensers

For license-free, global operation.

Installation and operation Manual



- Approved transmitter

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A	13.11.2020		ZB	Release #1
B	15.11.2020		ZB	Corrected EX certificate, section 9.1
C	11.12.2020		ZB	Added section 3.3.3
D	13.03.2021		ZB	Updated Distributors list

Content

1. INTRODUCTION

The DE212 Global is the third generation of the Delta wireless Deadman control system, designed for aero plane refuelling trucks, hydrant dispensers and road trucks.
The new system is designed with the latest technology to meet future demands and for trouble-free operation in an environment with heavy radio communication.
The previous DE212 systems can work with the new system with none or minor changes.
The hand-held Deadman transmitter is failsafe and Ex approved according to the ATEX and IECEx regulations.
NOTE: Due to changed Ex requirements for the hand-held transmitter, the new handset is made of a conductive grey material to prevent static electricity.

DE212 System, #03040

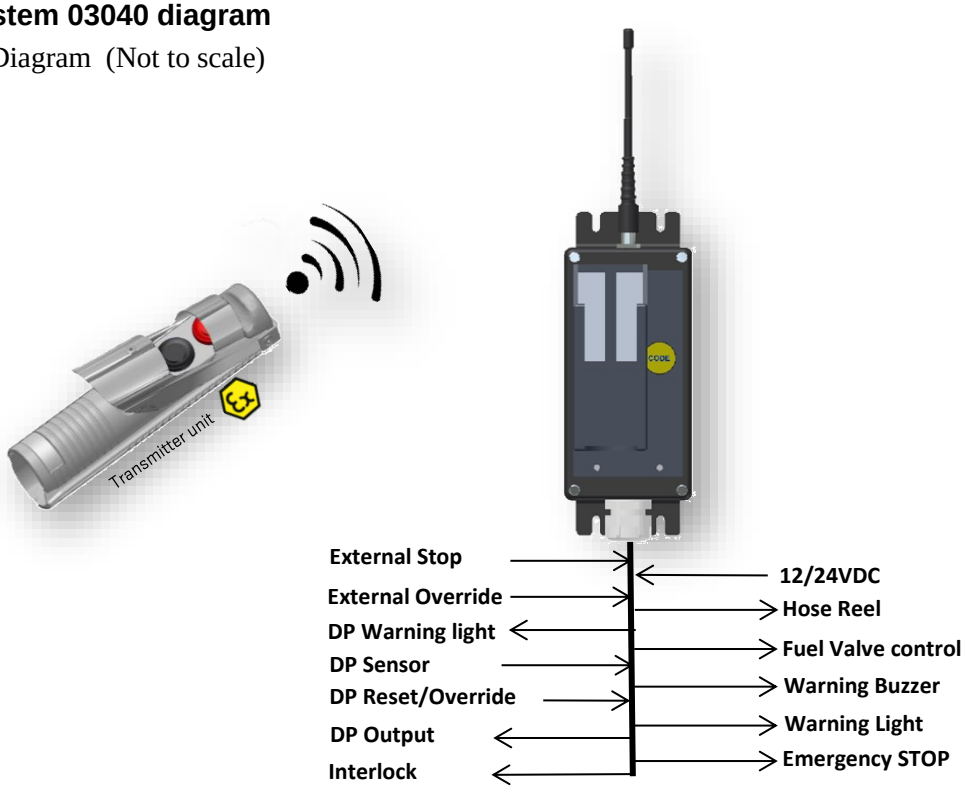
- Operates wireless up to approx. 30m from the refuelling vessel.
- Integrated system, all you need for a safe Deadman operation is included.
- Several Delta wireless systems can operate in the same area without disturbing each other.
- Integrated suppression of disturbing radio signals.
- Wireless operation improves efficiency and operational safety. No cable length limitations to move around in the refuelling operation area and no cable to brake.
- No risk for unwanted activation, failsafe system.
- Flexible and modular system, easy to operate and maintain.
- Built in timer, no risk for the operator to manipulate the handheld unit.
- Integrated output for timer warning light and beeper.
- Emergency stop is included.

1.1 System highlights

- External override functions.
- Integrated interlock, ensure safe operation.
- Long battery capacity, more than 12 hours. Battery lifetime is more than 3 years.
- Receiver with integrated intelligent charger.
- Unique coding system between handheld unit and receiver, easy maintenance.

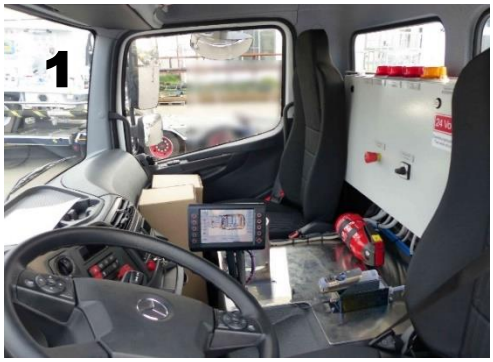
1.2 System 03040 diagram

System Diagram (Not to scale)



2. INSTALLATION

2.1 Typical Receiver Installations



The receiver unit is normally installed in the driver's cabin, out of EX defined area.
Before installing the receiver, it must be carefully considered the position inside the drivers cabin.
On dispensers the receiver is often installed in the front of the cabin, using the standard antenna, like on photo 2 and 3.
In cabins with windows on all 4 sides, it is a good possibility for sufficient radio signal unless if the windows are treated with materials to reduce direct sunshine, this may also reduce the radio signals.
If the receiver is installed in a lover position, like on photo 1, it is recommended to use the external antenna solution.

At the receiver front panel is the recharging and stow station for the transmitter. When stowed the integrated battery is automatically recharged. It is important that the installation of the receiver is done for easy access for the driver, in order to stow the transmitter for charging after every refuelling operation. The orientation of the receiver is not critical regarding the antenna. It must however be considered that a lot of metal close to the antenna could reduce the radio signal, and reduce operational range and also the operation stability.
On photo 2 and 3 the antenna is free to receive in all directions.
If an external antenna must be used, several options are available. See section 2.3 to 2.8.
The receiver must have connection to power supply/battery, 12 or 24VDC, the fuel valve, controlling the fuel filling of the aircraft and the warning indicting lamps.

NOTE: When installing the receiver unit, it should be considered to installed it in a place with temperature within 0 and +50ºC. This is vital since the transmitter battery, NiMH does not charge properly outside this temperature range.
If the temperature is outside these limits, it is recommended to use a mains transmitter charger, CH300 in a room with controlled temperature. See section 5.2.

2.2 Tank truck installation for easy access

Figure 2.2 shows the position of the receiver in a tank truck for easy access. Receiver installed in this position requires normally external antenna. See section 2.5

2.3 Receiver antenna installation

Introduction

During the last years, the wireless communication has increased very much. In general this does not influence the data communication of the DE212. However, the expansion of the 4G network has given several new Base stations to improve the 4G service for travellers entering or leaving the aircrafts at the gates.

These 4G Base stations operates at a different frequency than the DE212, but at short range the much higher power can disturb the receiver input so much that the operation stability is reduced.

In order to solve this challenge, Delta RC has done research and several tests at busy airports and have introduced at the DE212 #03040 system:

a) A more selective 2,4GHz receiver module. Integrated in the receiver unit.
b) A new and more selective standard antenna on top of the receiver
c) A new and more selective antenna for external installation
d) A new sector antenna solution for extreme and heavy radio disturbances.

With this solutions, Delta RC has found a safe and practical way to deal with disturbing radio signals.

In most cases, the solution a) will solve the disturbance problem and is standard for the 03040 model.

In cases where the base station is very close to the gate, 100 to 300m the sector antenna solution may be needed.

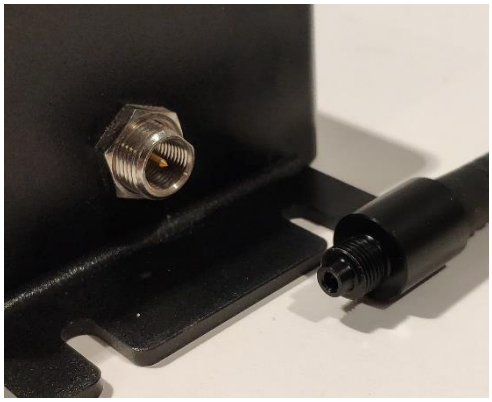
Also note that the disturbance problem is not a static situation. The wireless network is constantly expanded or changed. However, the new development with 5G is not expected to cause problems. The reason is that new network normally are at higher frequencies than the 2,4GHz.

2.4 New Antenna connector.

The DE212 set, item 03040, has a brand new receiver.
Please note that this unit, RX212 has a new antenna connector. The new connector, is type RP-SMA does not fit to the previous FME connector. This mean that old installations with FME connector must also change the antenna if an upgrade of the complete receiver unit is done.

The new RP-SMA connector
Valid from August 2020, at model 03040

The previous FME connector
Discontinued on standard deliveries



2.5 Antenna for external installation

The DE212 system is always delivered with a standard antenna, for installation direct on the antenna connector on top of the receiver unit in the drivers cab.
However if the standard solution does not give sufficient range and operational stability, an external antenna can be the solution.

Antenna, art.no 12396 have 360° receiving pattern. For outdoor installation.

Antenna head

Antenna cable, 3m long

See section 4, for ordering information.

2.6 External antenna position

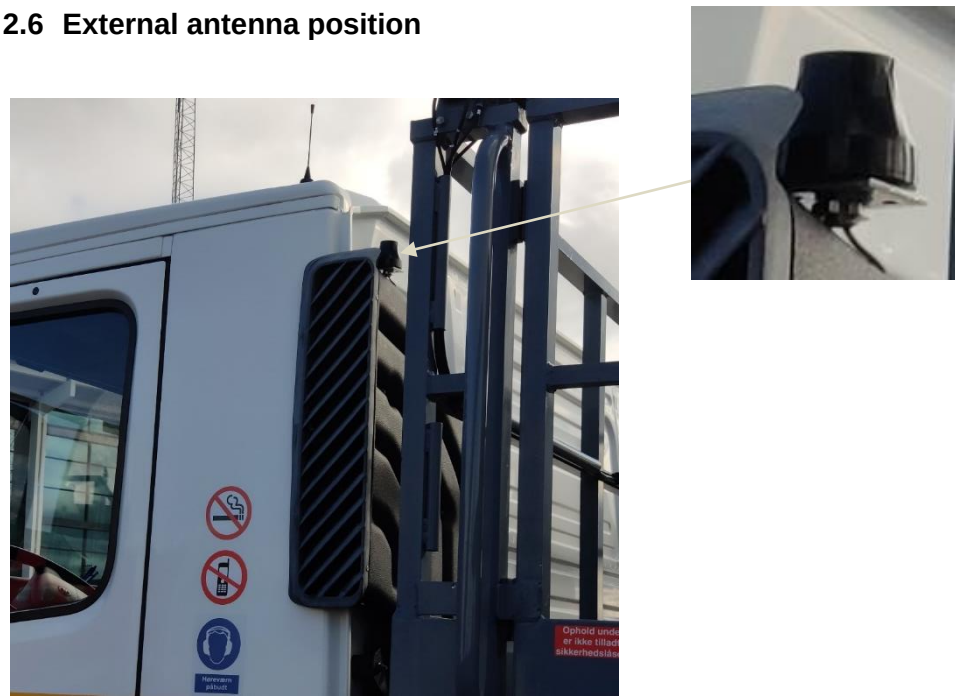
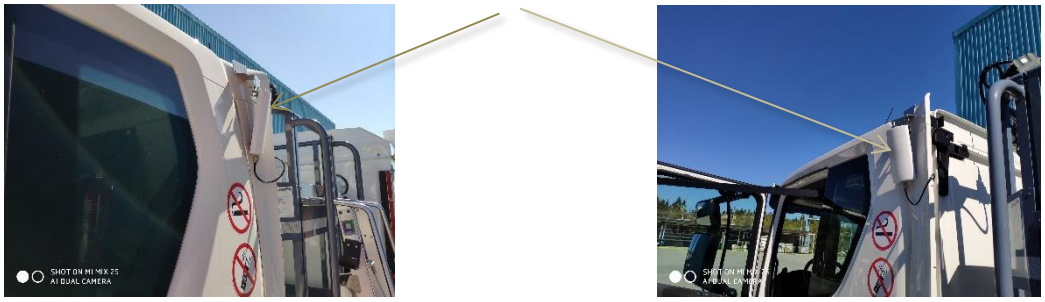


Figure 2.7 shows the position of the external 360° antenna behind the drivers cab. This position gives reduced sensitivity at the front part of the vehicle but good sensitivity behind the cab, where the operator normally is working.
In many cases the position of the external antenna can just be on top of the drivers cabin, or even inside the drivers cabin close to the rear window.

2.7 Sector antenna solution

In some areas of the airport the disturbing signals can be extremely strong, and a special antenna solution is needed. After several tests at different airports, Delta can offer a solution that is easy to install and effectively reduces the disturbing wireless signals and hence give the needed operational stability.

Sector antenna with installation bracket.



As shown at the photos, the sector antenna is installed at the working side of the vehicle and is tilted about 20° down. This is important, when tilted down it will normally not “see” the surrounding 4G base stations but will keep a good connection with the fuelling operator at the tarmac.

2.8 High gain sector antenna. Installation details.

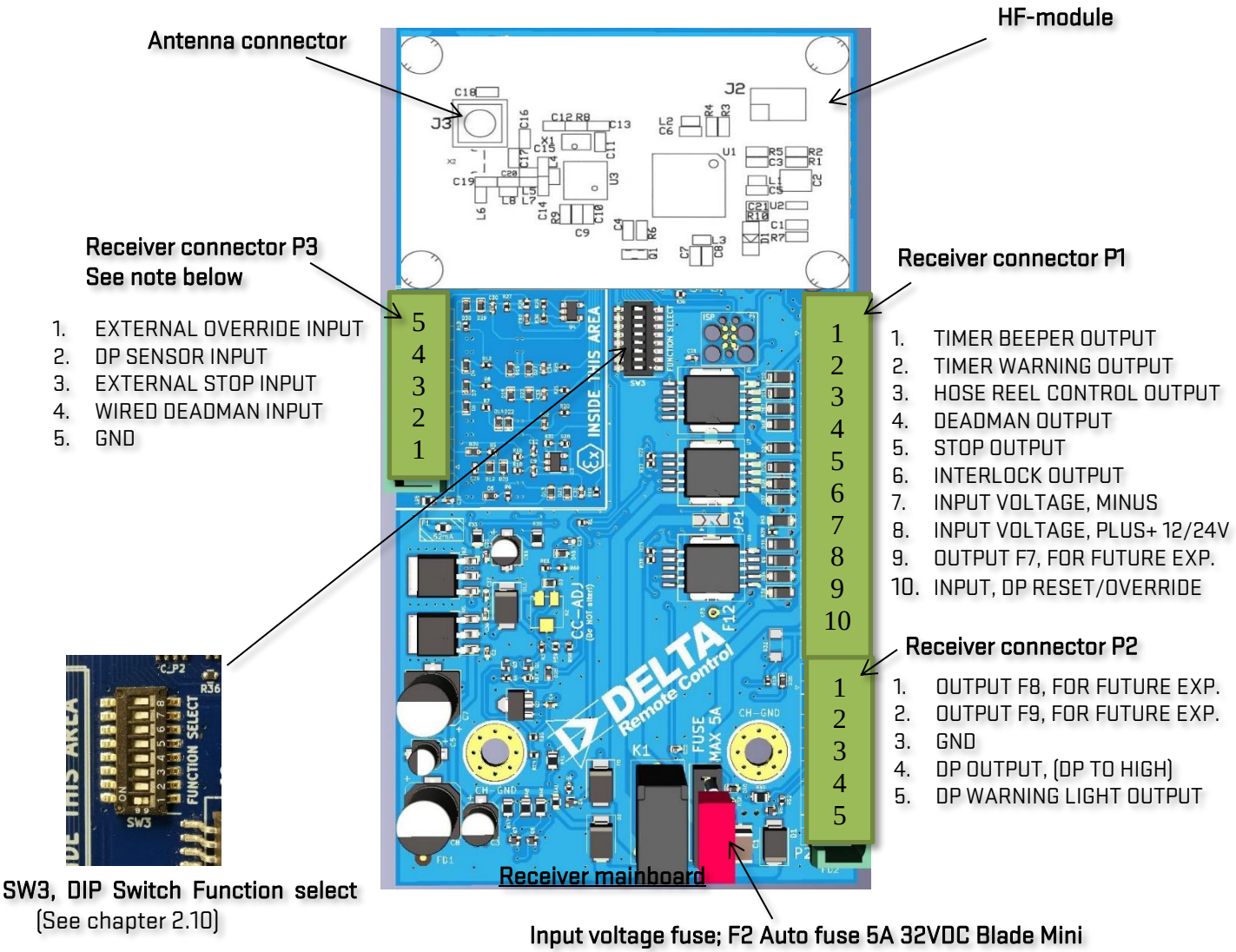
Mast mount

Wall mount

See section 4, for article numbers and order information for spare parts and optional equipment.
Note: Antenna and installation bracket may be adjusted due to developments.

2.9 Receiver unit connections

The new receiver mainboard with the added radio communication board, the HF-module.
All external connections to the Deadman system are in the receiver unit.
The in-and output signals are based on SW version: 02907.
Connecting the receiver to the power source of the vehicle must be carefully considered. Normally the transmitter is stowed at the receiver for recharging the integrated battery. If the vehicle is left for a longer period out of service, the transmitter battery will have reduced capacity. It should therefore be considered to connect the receiver directly to the vehicle battery. This will keep the battery capacity at a good level and ready for operation.



Note: The P3 connections are all input signals. All 4 inputs are prepared for connections to sensors or switches located in Ex-zone 1.
See section 8 for more technical information. Ex certification: Pending.

Abbreviations used in this document:
TX= transmitter, the handheld mobile unit controlling the receiver unit.
RX= receiver, the stationary unit located at the refuelling vehicle receiving radio signals from the transmitter

Receiver connections at P1 and functional selection by software-version; 02907

Connector P1 in receiver	Function	Comments Select SW3, see section 2.9
1	Output; buzzer or flash-light timer warning	Output is high during the last 30 sec of the timer period. To give an extra warning by sound or light.
2	Output; Timer warning	SW3-1 Deadman timer Active high when deadman output is active. When 30 sec. remains of the max 2min. period, the output goes OFF/ON with 1sec. intervals until the period is restarted or it times out and stops the fuelling.
3	Output; Extra function, for hose reel or pump speed control	SW3-2: Extra function. Simultaneous or no simultaneous operation with the Deadman function. ON = Simultaneous operation
4	Deadman output	Active high when deadman is activated. Timer limit without restarting is 120sec/2min.
5	STOP Ouput; Normally ON= high output Goes low when STOP at transmitter is active	Output for remote emergency stop of External units
6	Output; High output when transmitter is stowed for charging	Output for interlock of vehicle operation, to force operator to stow the transmitter for charging.
7	Minus-pole for input voltage	GND, normally connected to chassis.
8	Plus-pole for input voltage	Voltage range: 11-27VDC
9	Output, F7	For future expansions.
10	Input signal; DP Reset / Override	Low input, less than 0,3V resets DP and override the fuelling stop.

Note: High outputs are 12 or 24V when activated, same as the receiver supplied voltage.

Receiver connections, connector P3:
Functions installed with receiver software program: 02907

Conn. P3	Functional description	Functional settings
1	External override The Deadman function is active as long as this input is low, connected to GND	SW3-3 : External override ON= Ext. override enabled. OFF=Ext. override disabled
2	DP sensor input	SW3-4, see section 2.10
3	External STOP. Input signal. Stops all functions in the receiver when connected to GND	This function is always enabled
4	Wired Deadman input, ON/OFF deadman or Delta Failsafe	SW3-5. Optional. Contact distributor or Producer.
5	GND, ground or common terminal. Same as P1-7 and P2-3	

NOTES:

- The receiver works with supply voltage 11 to 35 V DC. All outputs give supply voltage out when activated.
- NOTE: Input voltage above 35V, will shut down the receiver.
- The timer warning output operates as follows: when the Deadman function is activated, the time warning output also go active, supplying 12/24V out. When 30 seconds are left of the 2 min. time period, the standard period, the output change from a steady output, to an off/on signal during the last 30 seconds of the time period. The output is intended for connection to an indicating lamp, visible for the operator. The on/off flashing lamp is intended to warn the operator to restart the time period.

2.10 Changing the function of the receiver unit by DIP SW3.

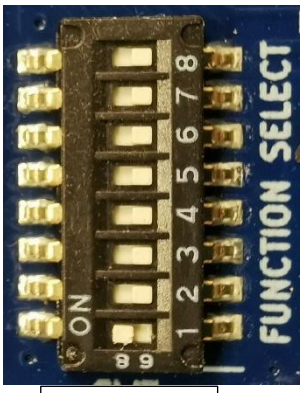
The function of the receiver unit can be changed according to operational requirements.

The following can be changed:

- SW3-1: Timed or no timed Deadman. **ON** is activated.
  With timer OFF, the deadman function will work as a normal ON-OFF switch with no time delay.
- SW3-2: Simultaneous or no simultaneous operation of the extra function at the handheld transmitter.
- SW3-3: External override, enabled or disabled.
- SW3-4: Differential Pressure Switch/ DP input at P3-2 enabled or disabled.
- SW3-5: Wired Deadman input, P3-4. ON/OFF Deadman or Faisafe Delta Deadman

Standard factory settings of SW3 switches:

Default settings are shown



SW3	Function	Comments
1	Deadman timer max 2min. In OFF, instant operation, no delays	ON=Active Default OFF= No timer
2	Function 2: OFF=Can not work simultaneous with the Deadman function ON= Can work simultaneous with the Deadman function	OFF=Default For Hose reel operation. ON: for pump speed control
3	Deadman external override	OFF= Default, not active
4	DP sensor input	OFF= Default, not active ON= DP sensor is read
5	Wired deadman input OFF=ON/OFF deadman switch ON= Delta Failsafe wired deadman	OFF=Default Optional
6	TBD	OFF= Default
7	TBD	OFF= Default
8	TBD	OFF= Default

To store the DIP SW3 settings in the receiver:

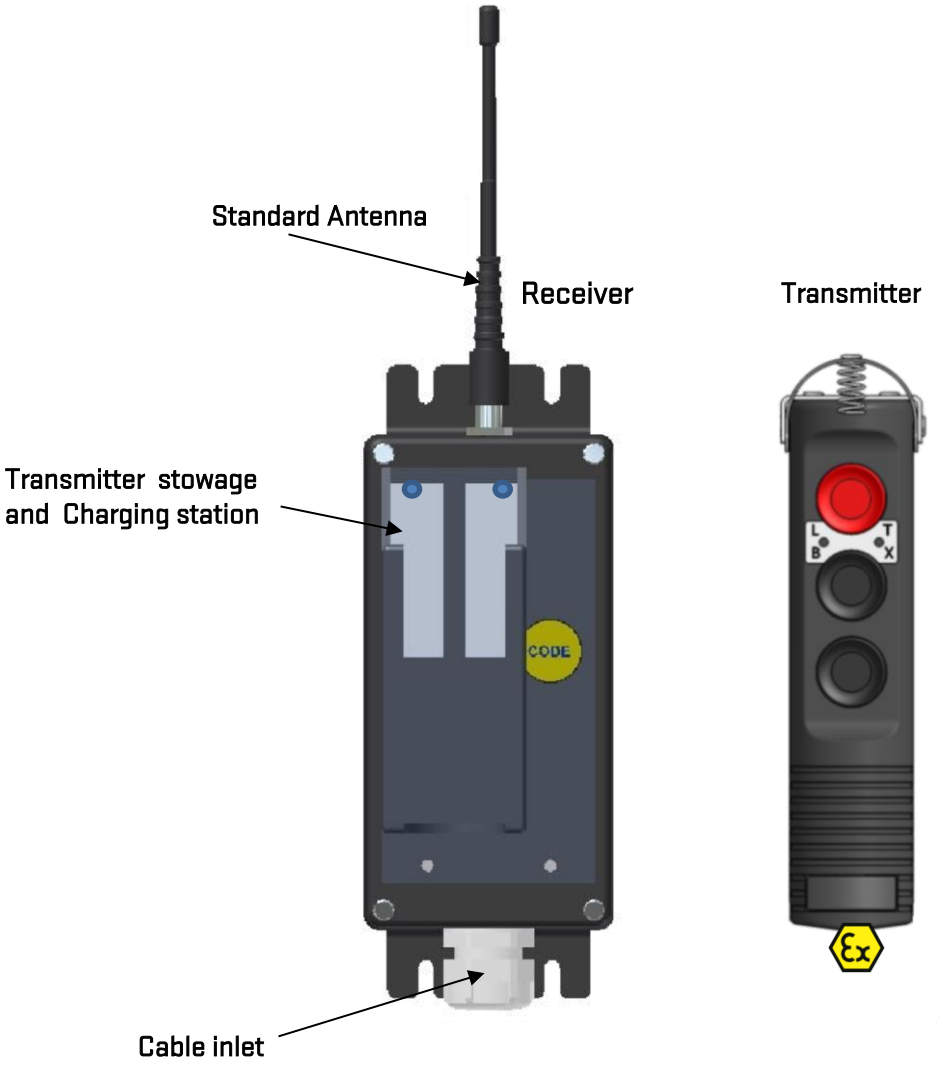
1. Set the function switch, SW3 to the desired positions.
2. Take out the fuse, F2 or switch OFF the power input.
3. Press the yellow CODE-button on the receiver front and keep it pressed. Replace the fuse, or switch ON the power of the receiver. Watch the green ON LED, keep the CODE-button pressed until the green ON LED turns on. Normally the time for reading the new settings of the SW3, takes about 3 secs.
   When the ON is green, it indicates that the new settings of SW3 are successfully stored, and the receiver is ready to operate.

2.11 DP-sensor connection

The receiver is prepared for connection of a DP-sensor, for Differential Pressure protection. This sensor can be of different types.
For further information, see document 03073 or contact Delta RC, hello@deltarc.no

3. OPERATION

3.1 DE212 System units



The 03040 system includes the following parts:
Standard:

Portable and ergonomic transmitter, with integrated battery and antenna.
Receiver for fixed installation, with antenna connector, and cable gland for connection cable.
Receiver antenna for installation on top of the receiver. RP-SMA connector

Optional:

Antenna for external installation, omnidirectional, 360°with 3m cable.
Sector antenna for installations with heavy radio disturbances
Delta CH300, 115/ 230V mains-powered battery charger for transmitter,

See section 4 for ordering information.

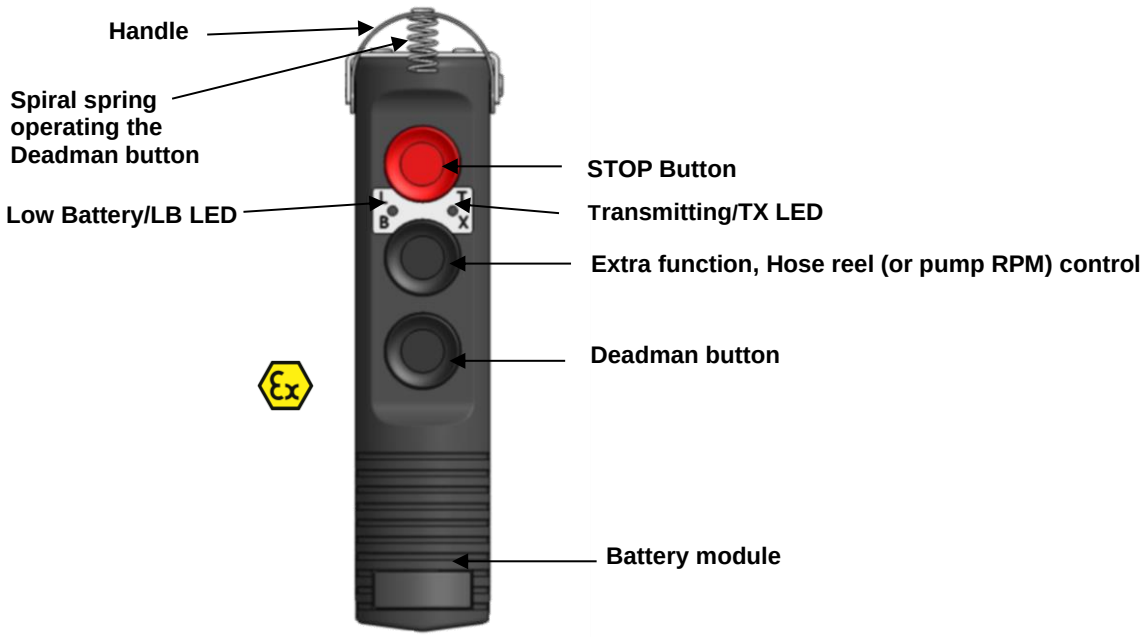
3.2 Functional Description

3.2.1 Introduction

The wireless connection between the handheld deadman control, the Transmitter unit and the control unit, the Receiver in the vehicle, gives the operator better working conditions, improved efficiency and a significant higher level of safety.
The limiting factor of a wired deadman is obvious since the cable length is normally 14m long and reduces the operators ability to freely check around the vehicle and the fuelling panel under the Aircraft fuselage.
The safety level is increased significantly by 3 factors:

a) The handheld deadman control is Ex-approved for Zone 1 operation.
b) Failsafe design. Very low risk for causing unwanted accident.
c) With the STOP button on the handheld control, the operator can remotely and instantly STOP the fuelling process in case of an emergency.

3.2.2 Transmitter unit



The transmitter is controlled by a small microprocessor. It is always turned on in a standby mode, and will therefore discharge the battery after 3 to 5 months, depending on the state of the battery, if it is not recharged during that period of time.
A fully charged battery has a capacity of at least 12 hours of continues operation. The long operating time is made possible by the Delta timeshare transmission system, WTT. Using transmitting power only in very short periods.
The battery is charged via the two stainless steel contacts at the back side of the transmitter. The transmitter must be charged on the charge station on the receiver front panel, or on a mains battery charger, CH300 delivered by Delta RC. The transmitter charging connections, are protected against discharging of the built-in battery.
The battery lifetime is normally 2-4 years.

The Deadman push-button is activated by a stainless steel handle as long as it is pressed.

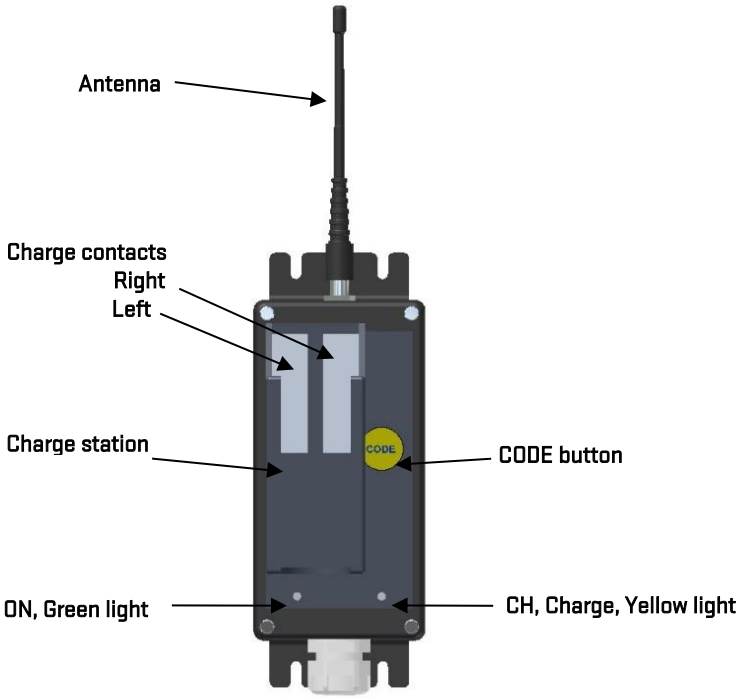
The radio signal activates an output circuit in the receiver, supplying the output or the Deadman function on the receiver's connector. This is the output for the Deadman button for refuelling. When the handle is released, the Deadman output is off after max 1,5 seconds.
If the STOP-button is pressed, all function stops instantly and the normally operated STOP output, used for emergency stop, in the receiver goes off as long as the button is pressed.
The third push-button called, extra function, is normally used for hose reel in control or this may also control pump RPM control. Note that this function is on the standard delivery not possible to operate simultaneously with the Deadman function. For simultaneously operation, the receiver must be reconfigured. See section 2.10.
There are two light diodes, LED's on the front panel marked "TX" and "LB".
The TX LED is yellow and is blinking when the transmission is active, and will continue to blink for a short time after the operative push-button is released, sending an active stop signal to the receiver.
The LB LED is a dual function LED. It flashes with a red light when the battery is at low capacity, and should be recharged. The transmitter can be used for about 15 min. after the red LED is turned on. When the TX LED is dark, turned off, the transmitter has stopped transmitting and the battery must be recharged.
During normal operation, the LB LED is flashing green, indication that the connection with the receiver is good. When the LB Green stops flashing, the receiver signal is weaker and the connection to the receiver may be lost if the distance increases.
The LB red LED is active only when the transmitter is activated. By pressing the STOP- button, the battery can be tested during active transmission.
The STOP button turns off the functions in the transmitter and sends an active STOP, turning instantly off all the functions activated in the receiver. If the Deadman button is stuck, and the STOP-button is pressed, the transmitter cannot be operated again before the damaged button or switch is repaired or changed.
Transmitter operation in low temperatures, lower than -20°C can be performed, but not for a long period of time. The transmitter must be warmed and charged at temperatures higher than 0°C when not in use.
Under normal operation, the battery lifetime is 2-4 years.

New solution for transmitter moving handle and strap connection.

01958, Delta strap

01958, Delta strap for transmitter

3.3 Receiver unit



NOTE: Drawings and Photos may differ slightly from reality.

The receiver front has a charging station for the transmitter unit, two LED indicators and one push button marked “CODE”.
The energy charged to the battery, is calculated according to the time the transmitter has been used.
This will ensure high capacity and reduced overcharging of the battery.
The CH LED has three stages when the transmitter is placed to charge:
1: CH is dark. No action.
2: CH burns continues. Full charge current.
3: CH flashes. Indicates trickle charging, battery is full according to the last duration of use.

The green LED, marked ON, indicates that a correct voltage is supplied and the receiver is ready for operation. When coding the receiver and transmitter, this green LED flashes three times when the code is accepted and stored in the receiver.
When the receiver is in operation, receiving an accepted telegram from transmitter, the yellow CH LED is flashing rapidly.

3.3.1 Hose rewind made easy with the DE212 wireless deadman

The DE212 system has an extra function. This can be used for additional functions, like hose rewind. This function is implemented in the system so it can NOT be activated simultaneously with the Deadman function, That means that when refuelling, the Hose rewind function is de-activated and can not start the rewind of the fuelling hose and Nozzle.
Remote rewind makes the operation goes faster with better control and reduces the physical stress of the operator and the hose and Nozzle. The operator walks back to the vehicle carrying the Nozzle, see photo.

3.3.2 Coding the transmitter and the receiver

In order to make the receiver execute a function, the code in the handheld unit, the transmitter, must be transmitted to the receiver and correspond with the code stored in the receiver.
The DE212 system has 65.536 different codes available. Each code and serial number of the unit is logged by the producer and used only once.
The transmitter is hard-coded from the factory, while the receiver must be coded by the user before the system goes into normal service.

Coding:

Press the yellow CODE button on the receiver front panel and keep it pressed simultaneously with the red transmitter STOP button until the Green ON-LED flashes three times, then release both buttons. The three flashes indicates that the code is stored. The system is now ready to operate. The old code is erased and the new code is stored in the receiver even if the power is turned off.

Erasing the code:

The stored code in the receiver is erased by pressing **first** the Deadman button on the transmitter then the CODE-button in the receiver, after some seconds, the green ON flashes 5 times, and the code is erased. To maintain normal operation again, the receiver must be re-coded.

4. SPECIAL CONDITIONS & OPERATIONAL REQUIREMENTS

Please observe the following. This is mandatory to maintain a safe operation and to keep compliance to the limitations of the Ex-requirements regarding the transmitter: TX212-2S Global DM (02705). Any operations of the equipment outside the specified instruction below will void the requirement for Ex-certification and warranty of this product.

1. The instruction manual must be observed.
2. The permissible ambient temperature range during operation is -20 C up to 50 °C.
3. The permissible ambient temperature range during charging is 0 °C up to 50 C.
4. The charging of the deadman transmitter type TX212-2S GLOBAL DM (02705) is only allowed with the associated charger Receiver RX212 Global, Order Number 03038, or with the Transmitter charger CH300-2, 11OV/230VAC, Order Number 03033.
5. The battery pack must be exchanged outside any potential explosive atmosphere. The battery pack shall be exchanged only with the battery pack 02465.

5. SYSTEM COMPONENTS

5.1 Standard delivery

Order number	Item Description
03040	Remote Control DE212 Global Complete set, containing: Transmitter 02705, Receiver 03038 and Antenna 12376

Note: The standard delivery of a system has these main functions:

- Timer controlled deadman. Running for 2 min. continuously. Warning light, or beeper tells operator 30 sec. before end of the 2 min. Restart timer by a short release of the deadman function.
- **Emergency STOP.** High output signal as long as power is on.
  The output is switched to **OFF**= low, as long as the STOP button on the transmitter is pressed.
- **External Override.** An input signal from an external unit, which overrides the deadman handset. Emergency STOP on the handset is still active, even if external override is used.
- **An interlock** output signal when the transmitter is placed in the charge station on the receiver front. Can be used to lock the vehicle from moving after refuelling.
  See section 2.9 for more information.

If the installation require more than the standard delivery, the following are available:

5.2 Additional equipment

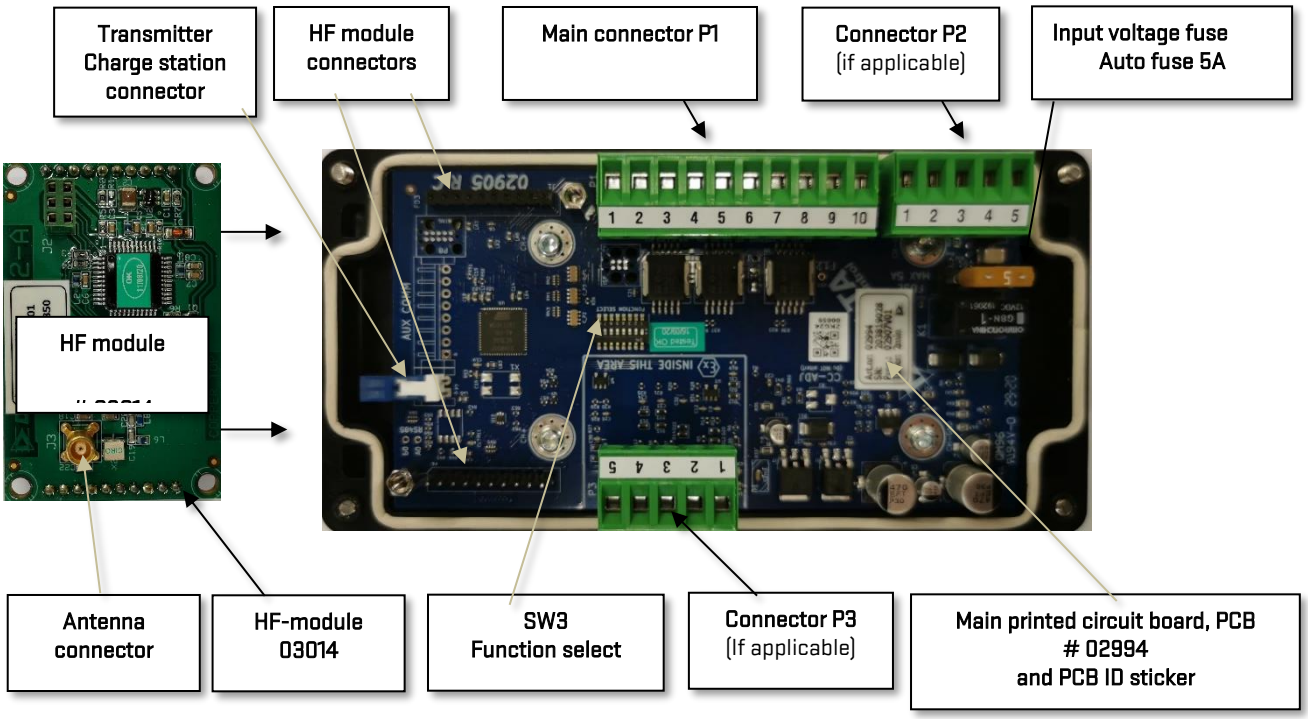
Order number	Item description
02705	Transmitter TX212-2S Global. ATEX/IECEx certified
03038	Receiver RX212 Global
03033	Charger CH300-2 110-230VAC. EU, TX212
12396	Antenna WiFi 2,4GHz 3dBi, RP-SMA(m) 3m cable
11682	High gain Sector antenna, without cable.
03017	Tilted and turnable installation bracket set for Sector antenna. For Mast and Wall
12380	Cable for connection of sector antenna, 5m long with connectors
02976	High gain Sector antenna set. Including 11682, 12380 and 03017
01958	Neck Strap, Blue Delta

5.3 Spare parts

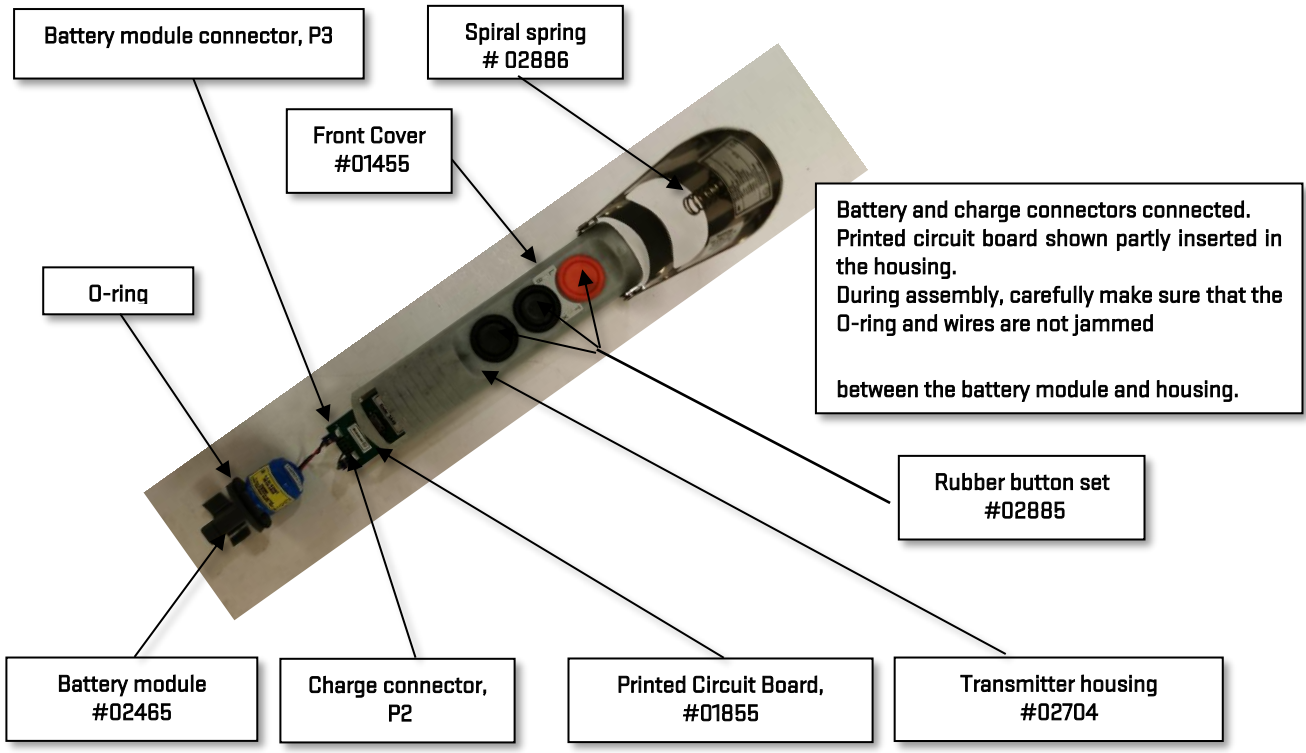
The following spare parts are available:

Order number	Item description
01855	PCB TX212-2S Global ATEX/IECEx certified
02704	Housing TX212-2S Global, ATEX/IECEx certified
02465	Battery module TX212 Global, ATEX/IECEx certified
02994	PCB RX212 Global mainboard G2
03014	PCB RX212 Global HF-module VX
01760	Housing RX212 Global Front
02999	Housing RX212 Global Bottom.
12375	Pigtail Cable RG316, 15cm. RP-SMA(f)- MCX(m) angle
12376	Antenna WiFi 2,4GHz 5dBi RP-SMA(m) 20cm long
01752	Charge contact RXA Global Left
02063	Charge contact RXA Global Right
02886	Spring Kit TX212
02885	Rubber button Set

5.4 Receiver front unit, part identification.



5.5 Transmitter part identification



6. MAINTENANCE

6.1 Introduction

It is important that the operator keeps the transmitter battery charged so that the system always are ready for operation. After a refuelling operation, always replace the transmitter in the charger at the receiver front. This will secure recharge of correct energy to the battery according to last operation.
If the transmitter is left at storage for more than 4 months with the battery connected, the battery will be at very low energy and may not be able to recharge. If so the battery module must be replaced.
The DE212 system should be kept as clean as possible at all times, this is vital for the transmitter.

Repair work
The transmitter, TX212 is an Ex, ATEX/IECEx classified unit, which can be used in hazard areas, zone 1. This classification needs a special attention from the owner and user.
The TX212 design, both the electronic- and the mechanical part, is designed and controlled to meet the Ex requirements. To keep the classification, and the security, the TX212 unit should be inspected regularly by the user.
In case of a damage of the TX212, it should be taken out of service send for repair to Delta RC AS or an appointed service station.
However the following parts can be replaced by a local skilled mechanic:

a) change the battery unit. See also section 5.3
b) change the spiral spring on moving handle
c) replace rubber buttons

NB: Due to Certification requirements point d) and e) are for distributers with service certification only

d) change the PCB
e) change the complete housing with the moving handle

Any mechanical or soldering work beyond this is not allowed.

Replacing the transmitter housing will require a new housing from Delta RC. In order to follow the strict requirements from the EX-certification, a new housing will require a new unit label, and this can only be issued if Delta RC gets a photo of the label of the defective housing. If this is not possible, the new housing must have a a new unit label. In addition Delta RC need the ser.no of the transmitter PCB and battery unit. This must be registered in Delta's database for TX212.

All services and repairs of the TX212 unit, will be stored at the repair station, and/or by Delta RC AS store. In case of an accident, it is possible to track the "history" of the unit.

Do not operate a TX212 which has a damaged housing.
A damaged unit must be taken out of service, and returned for repair.

Damages like cracks or holes in the cabinet plastic or rubber, are a safety risk and must be repaired before further use.

IMPORTANT NOTE:

Any unauthorized attempted repair, modification or other alterations of the product without prior written permission from Delta RC AS will render both ATEX/IECEx approvals and warranties invalid, and the responsible operator/owner will be held liable for any damages or injuries which may occur.

Delta RC AS shall not be liable for reimbursements, claims and damages that may result from the unauthorized repair, modifications or alterations of the product.

Do not open the TX212 housing except when replacing the battery module.

6.2 Battery Recharging

1. Before the transmitter is used for the first time, it should be recharged with continues charging for 3 hours. Place the transmitter in the charger on the receiver. Wait till the CH lamp start flashing, press the CODE button on the receiver for some seconds, and the CH lamp will be lit with a constant yellow light. constantly, indicating that the transmitter battery is charged with maximum current. If the transmitter is left in the charger, this state will last for 3 hours leaving a completely fully charged battery. Note, if the battery is not completely empty, two hours charging is normally sufficient to start operation. Do not repeat the 3-hour full charging unless the red LB lamp on the transmitter is flashing.

2. When the transmitter is placed on the receiver charge station, the transmitter battery will be recharged according to the duration the transmitter has been used. The recharging will replace the used battery energy actually used during operation. This type of charging will secure maximum battery capacity and lifetime. Every time the transmitter is placed in the charger, it charges for 30

seconds with full current. After 30 seconds, and if the transmitter is unused, the charge current is reduced to maintenance charging and the CH lamp will start flashing.
If the transmitter has been in operation longer than 5 minutes, the CH lamp will light constantly, indicating that charging is at full current. When the battery energy has been restored, charging is reduced to maintenance as long as the transmitter is in the charger. If the power of the receiver is switched off, stored information regarding transmitter operation time, is erased.

3. The charging of the transmitter battery is controlled by the software in the receiver, and it is recommended always to leave the transmitter for charging. The charging current is limited to 50mA during full charge, and the charging time is regulated by the receiver software. The battery temperature will never rise above +50°C and will not be a hazard for the EX environment. In case of a short circuit of the battery connections, an integrated temperature- and current fuse, will brake the internal connection to the battery cells, and will secure a temperature allowable in EX environment. With a fully recharged battery the operational time is more than 12 hours. This means that the Deadman button on the transmitter might be held operated for more than 12 hours before it stops transmitting.

   Note that operation of the transmitter in low temperatures reduces the capacity of the battery down to 30% of normal capacity at room temperature. At temperatures lower than -20°C, the battery may "freeze" and lose all its capacity.

4. **NOTE:** Charging the battery, should take place at temperatures not lower than 0°C and not higher than +50°C. Charging outside these limits will results in very low charging current, or no charging of the battery at all. The battery will however not be damaged.
   When operating at low temperatures, lower than 0°C, do not leave the transmitter in a cold driver's cabin overnight or for a long period of time. Take the transmitter inside to keep the battery warm. Charging of the transmitter will normally be finished before the car is back to the depot.

It is recommended to use a CH300-110/23VAC mains charger, if the receiver is installed in a place that has temperature often outside the recommended limits.

Use only Delta chargers for charging the transmitter, other chargers might overload the battery and the ATEX/IECEx certification is no longer valid.

5. The type of battery used is a 3,6V 300mAh NiMH. The battery is integrated and a part of the end section of the transmitter housing. The connection to the printed circuit board is by a small connector. Defective batteries must be disposed at a proper place, where batteries can be disposed. Please see chapter 10 for further information.
   A normal lifetime for a battery is approximately 500 recharging, or more that 3 years in normal operation.

   NOTE: After July 1. 2003, the new ATEX norms are activated. For the DE212 system, the battery module and the transmitter circuit board must be replaced with parts produced according to this norms. This means that repair of the TX212 must take place at Delta RC AS or by a Delta RC AS appointed dealer. Otherwise EX- certificate may no longer be valid.

6.3 Replacing the battery

Note: **The battery module 02465 and all replaceable parts of the transmitter, must be original parts delivered by Delta RC AS. Otherwise the Ex certifications are lost, and the customer has to take all responsibilities. The operator is only allowed to change the battery module, nothing else.**

From December 2013, the battery module is changed, in accordance with the IECEx certification. The new battery module for IECEx is 02465.
NOTE: Battery module 02465, cannot be replaced by the old 02166, but 02465 can replace the old 02166. Old 02166 battery modules are no longer valid for replacement and must be discarded.

WARNING:

The battery replacement operation must always take place outside Ex-area.

When the battery module has to be replaced, this procedure needs to be followed strictly:

- Verify that the old battery module 02166 is replaced by 02465.
  Battery module 02465 must be replaced by 02465 only.
- **Battery types other than specified must NEVER be used.**
- Open the bottom end of the transmitter, by pressing the two lock-sections in.
- Pull the battery module gently out of the housing without jamming the O-ring.
- Disconnect the battery from connector marked "P3" on the PCB, by lifting the connector up. See section 5.3.2
- Put a thin layer of non-corrosive, acid-free Vaseline on the new battery module O-ring
- Connect the new battery, and push the battery module back into the housing. Carefully make sure the O-ring and connecting wires are not jammed during this operation.
- When the operation is finished, charge the battery for 3 hours, and test all functions. See section 3.2.5

Defective batteries **must** be disposed at a proper recycling facility.
Please refer to chapter 10 for further information.

7. WARRANTY CONDITIONS

Complaints

When receiving the product the buyer must inspect it, and eventually complain any obvious faults or missing items within 8 days from reception. Acceptance of complaint will otherwise not be considered. Complaints of any faults that could only first be discovered after mounting and testing the product must be reported at once.

Warranty

The warranty covers only damages caused by material faults and manufacturing errors.
The guaranty ceases 12 months after the delivery date.
Delta RC AS or appointed repair workshop, is bound to repair and replace defect parts in its products, free of charge, in its main workshop during its normal working hours. Packages being sent to and from Delta RC AS are in the responsibility of the purchaser, as he is also economically responsible for paying the transportation charges, toll, insurance and other charges related.
Should the warranty repair be done at the customer's location, there will be charges for cost of travelling, accommodation and dieting, conforming to the government's assertions. There will also be an additional charge of 50% of travelling time by the current repair regulations.
The warranty is cancelled if:

a) There has been done any modification or attempts in the product without a prior written permission from Delta RC A/S.
b) The product has been handled wrongly or has not been maintained properly.
c) The product has been connected to antennas or equipment not delivered or approved by Delta RC.
d) The transmitter unit has been stored longer than 6 months without disconnected battery or recharged the battery.
e) The payment conditions have not been fulfilled.

8. DISTRIBUTORS

8.1 DISTRIBUTORS WITH APPROVED SERVICE SHOP

Norway

Delta RC AS
P.O.Box 1065
NO-3204 Sandefjord
Phone: +4733448390
E-mail: hello@deltarc.no

Germany

Henniger Electronics
Untere Dorfstrasse 24
DE-38304 Wolfenbüttel
Germany
Phone: +495331904103
Fax: +495331904115
E-mail: a.henniger@henniger-electronics.de

UK and Ireland

Aljac Fuelling Components Ltd
Pitfield House, Station Approach,
Shepperton
Middlesex TW17 8AN
U.K.
Phone: +441932269869
Fax: +441932269230
E-mail: sales@aljac.com

Sweden

BeWe Elektronik
P.O. Box 78
SE-43905 Åsa
Sweden
Phone: +46340655677
Fax +46340655677
E-mail: bewe@algonet.se

Denmark

Contact Delta RC for sales and service. E-mail: hello@deltarc.no

Mexico

Comantsup SA
Paseo San Isidro 301-B
Barrio de Santiaguito
CP 52140 Metepec,
Mexico
Phone : +52 722 600 8800
Email : comantsup_sadecv@hotmail.com

Peoples Republic of China

Xiamen XINZ Mechanical Technology Co.,Ltd
醒志（厦门）机械科技有限公司
Room 1401, No. 1, B Block
Hubian Garden Group 2

361011 XIAMEN
China
Phone: +86 158 5924 1578
E-mail: salesxinz19@163.com

8.2 Distributors

France

Marco Tech
5, Rue Jean Jaures
FR-33310 Lormont
France
Phone: +33557306300
Fax: +33557306301
E-mail: info@marcotech.eu

Canada/North America/South America/Caribbean Area

GoExport Ltd.
5795, avenue De Gaspé, bureau 214
Montréal (Québec) H2S 2X3
Canada
Phone: +1 514 227 8490
E-mail : info@goexport.ca

Australia and New Zealand

Fuelcraft T/A Liquip Victoria
476 Boundary Rd
Derrimut, Victoria 3026
Australia
Phone: +61 39311 7822
Fax: +61 39311 8784
E-mail: sales@liquipvictoria.com.au

Japan

J.Macdonald & Co., Ltd
1-2, Sawatari
Yokohama 221-0844
Japan
Phone: +81-45-313-3791
Fax: +81-45-313-3792
E-mail: main@j-macdonald.com

Thailand

Aviation Enterprise Co.
54/116 Soi3. Baranee Village
Klongsam. Klongluang, Pathum Thanee
12120 Bangkok
Thailand

Phone: +6628327253
Fax: +6625997662
E-mail: aviation_enterprise@yahoo.com

Russia

NSA Overseas LLC
Avtozavodskaya str. 20 build. 1
115280, Moscow,
Russia
Mobile phone + 7 909 943 08 98
web: www.nsa-overseas.com

Malaysia

OGCF Engineering SDN BHD
No. 65, Jalan TS 6/5
Taman Industri Subang
47510 Subang Jaya
Selangor Darul Ehsan
Malyasia
Phone: +603-5634 5444
+603-5638 3082
Fax: +603-56376193
E-mail: sales@ogcf-eng.com

Chile

Quality and Service
Bernardo O'Higgins 143
Barrio Industrial Los Libertadores
Santiago,
Chile
Phone : +56 2 23609710
E-mail: ventas@qys.cl
www.qys.cl

9. TECHNICAL DATA

9.1 General

This equipment complies with the following standards:

Europe/EU: ERC 70-03 EN 300-400. USA: FCC 15.249. Japan: STD-T66.
It is in accordance to EU's demands in order to label the equipment with CE.

Transmitters are ATEX/IECEx approved, according to: EN 50 014:1997+A1+A2. EN 50 020:2013 and
For the EU : II 2 G Ex ib IIC T4, EN 60079-0:2012 + A11:2013 and EN 60079-11:2012
IECEx: IEC 60079-0 Ed.6 and IEC 60079-11 :2011

ATEX certification number: ZELM 03 ATEX 0139x
IECEs certification: IECEx ZLM 13.005X

General Specification

- Frequency: 2,4 GHz, CH1
- Modulation: GFSK
- Coding: Digital coding, 65.536 different pre-set codes from manufacturer.
- Functions: Three functions, Deadman, STOP and one extra.
- *Temperature Range:*
  - Operation: -20 to +50º C. For lower temperature operation, contact manufacturer.
  - Storage: -40 to +65º C.
  - Charging: 0 to +50º C.
- Shock Resistance: 1 m free-fall on concrete floor.

9.2 Transmitter

ATEX/IECEx approved:

- Output Power: 0dBm/1mW.
- Antenna: Internal.
- Power Supply: Battery 3,6 V NiMH , 300mAh. Rechargeable by external contacts.
- Charging: Constant current charging, 50mA controlled by charging station on receiver front panel. Charging contacts protected against short circuit and overload The battery characteristics requires charging between 0 and +50ºC. Continues and trickle charging.
- Controls: Three push-buttons:
  -- Deadman button,
  -- STOP button.
  -- Extra function
  The deadman button is operated by a stainless steel handle with a spring return function.
- Indicators: TX: Yellow LED that indicates active transmission.
  LB: Dual colour LED
  -- Green LED, that indicates good connection with the receiver.
  -- Orange LED, indicates low battery, recharging is needed.
- Housing: Polyamide, PA6 B3L with 2% blend of "Beki Shield", Grey col colour
  Class IP65
- Dimensions: Length: 170 mm, diameter: 40 mm.
- Weight: 0.3 kg incl. Battery.

9.3 Receiver

Antenna: 2,4GHz 5dBi gain, RP-SMA male connector. 20cm long
Antenna connector: RP-SMA connector on receiver top.

Power Supply: 11 to 27 V DC. Voltage above 35VDC shuts down the receiver.
Power Consumption: Standby: 50mA. During max charging: 100mA.
Connections: Screw terminal on PCB connectors.

Connections

P1:

1. TIMER BEEPER OUTPUT
2. TIMER WARNING OUTPUT
3. HOSE REEL CONTROL OUTPUT
4. DEADMAN OUTPUT
5. STOP OUTPUT. NORMALLY HIGH, GOES LOW FOR STOP.
6. INTERLOCK OUTPUT
7. POWER INPUT, MINUS VOLTAGE, GND
8. POWER INPUT, PLUS+ 12/24V
9. OUTPUT F7, FOR FUTURE EXPANSION.
10. INPUT, DP RESET/OVERRIDE. LOW INPUT IS ACTIVE

P2:

1. OUTPUT F8, FOR FUTURE EXPANSION.
2. OUTPUT F9, FOR FUTURE EXPANSION.
3. GND
4. DP OUTPUT
5. DP WARNING LIGHT OUTPUT

P3:

1. EXTERNAL OVERRIDE INPUT
2. DP SENSOR INPUT
3. EXTERNAL STOP INPUT
4. WIRED DEADMAN INPUT
5. GND

Output Signals.
All outputs are Semiconductor, High side drivers. 1A, each output.
12/24 V DC output when active. Receiver max load at all outputs: **5A**

Input signals.
Low inputs are active inputs: max 0,3VDC.
High input: min 4VDC, max 30VDC

Transmitter charging: Front panel charging station for transmitter, constant current 50mA. Charging is performed according to operating time of the transmitter.

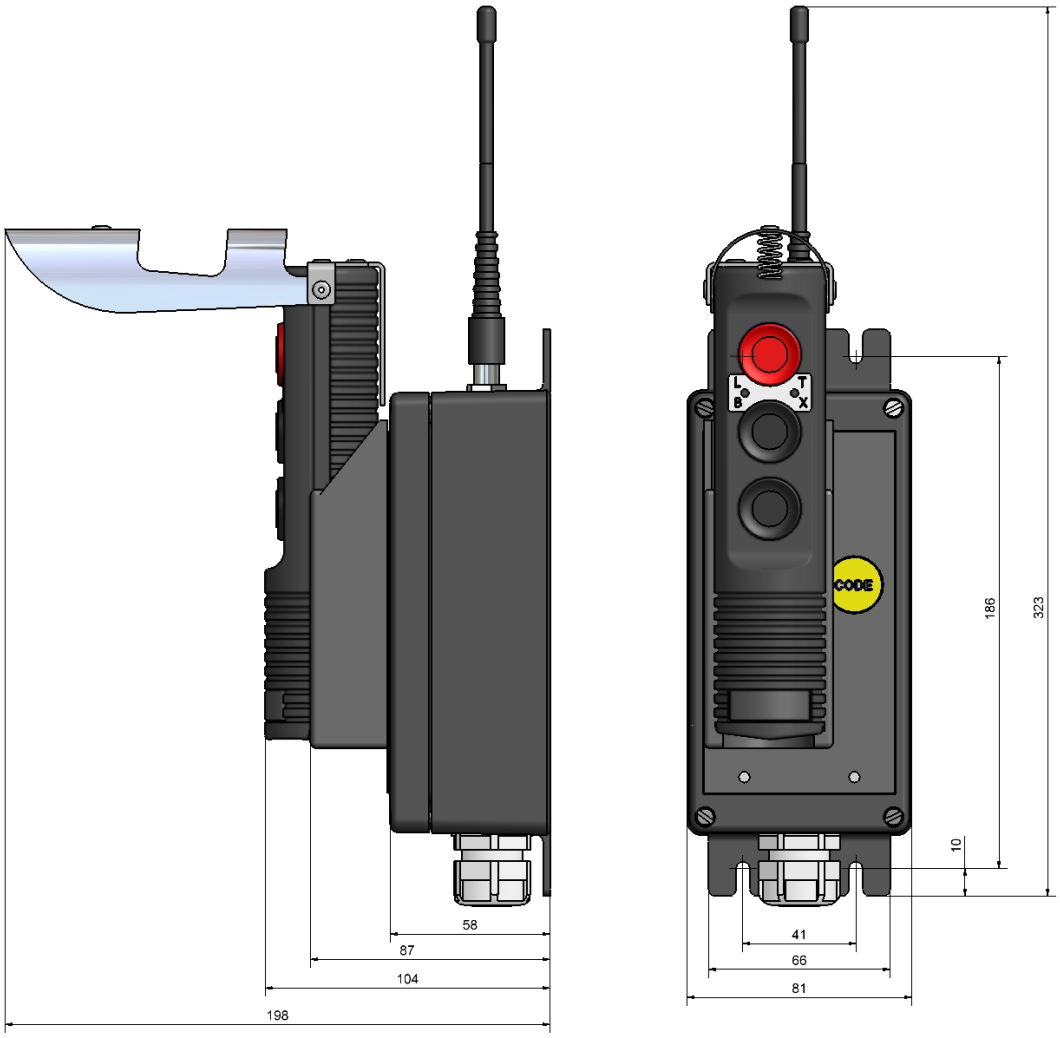
Controls: CODE, push-button, for coding to the transmitter.
Indicators: ON, Green LED that indicates power on.
CH, Yellow LED that indicates recharging and in operation.

Housing: ABS polycarbonate, class IP52.
Dimensions: L:160 mm, W: 80 mm, D: 60 mm.
Weight: 0.3 kg

See also section: 3. for operational information.

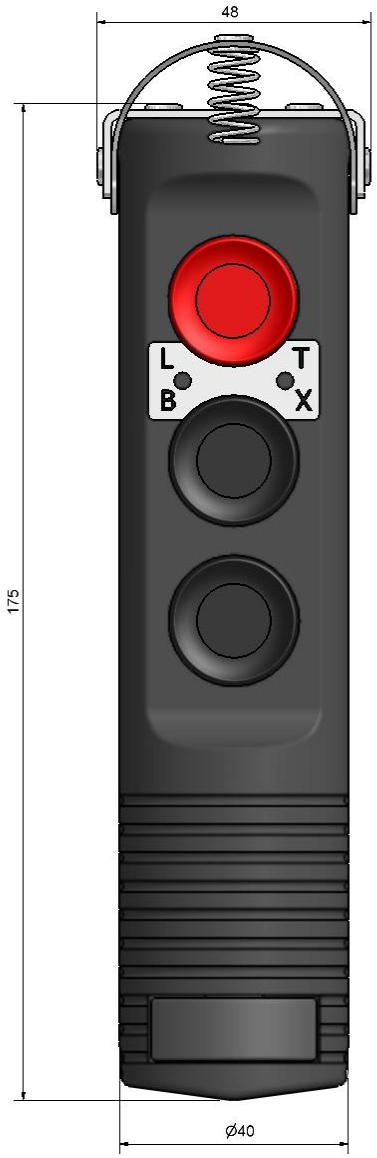
9.4 Dimensions

9.4.1 Receiver with transmitter stowed.



All dimensions in mm.
NOTE: The length of the antenna may change due to general development, and hence the total hight of the receiver.

9.4.2 Transmitter unit



All dimensions in mm.

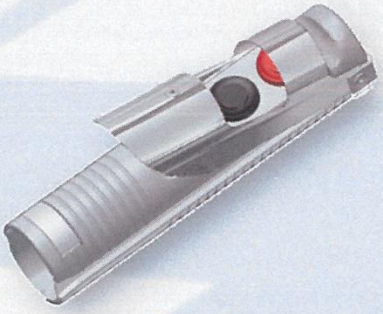
10. CERTIFICATES

10.1 Transmitter Ex Certificate

DELTA Remote Control

EU Declaration of conformity according to Atex

We, Delta Remote Control AS, declare that our product:
Art.no. 02705, TX212 Global Transmitter,



Conform with the ATEX guidelines in directive 2014/34/EU. Ex ib IIC T4 II 2 G

Relevant harmonisation standards used:
EN 60079-0:2012 + A11:2013
EN 60079-11:2012

Notified body:

Nemko 0470

x QA CERTIFICATE NUMBER:
ATEX QAN: 13ATEX4298Q, valid to 2021-12-31
IECEx QAR: NO/NEM/QAR 13.0014, valid to 2021-12-31

On behaf of; Delta Remote Control AS

Sandefjord, 04.11.2020. Zacharias Backer, CEO

Delta Remote Control AS, Søndre Kullerød 4A, NO-3241 Sandefjord
(+47) 33 44 83 90 - hello@deltarc.no - www.deltarc.no

Document No. 03075

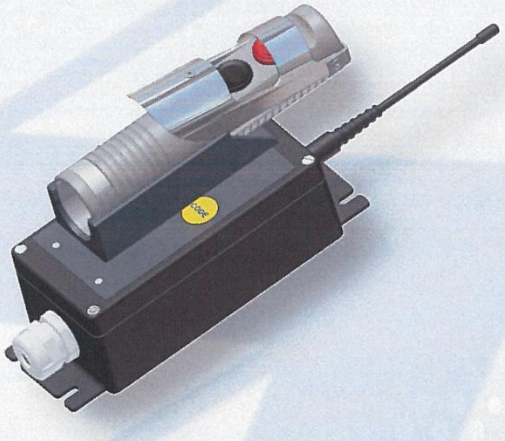
Wireless Technology

www.deltarc.no

10.2 Declaration of conformity

Declaration of conformity

We, Delta Remote Control AS, declare that our product:
Wireless Deadman system, DE212 art.no 03040, consisting of art.no 02705 and 03038,



Conforms with the following standards:

Europe/EU: ERC 70-03 EN 300-400.
USA: FCC 15.249.
Japan: STD-T66.
It is in accordance to EU's demands in order to label the equipment with CE.

Transmitter TX212 art.no 02705 is ATEX/IECEx approved, according to: EN 50 014:1997+A1+A2. EN 50 020:2013 and
For the EU : II 2 G Ex ib IIC T4, EN 60079-0:2012 + A11:2013 and EN 60079-11:2012
IECEx: IEC 60079-0 Ed.6 and IEC 60079-11 :2011

Transmitter TX212 art.no 02705:
ATEX certification number: ZELM 03 ATEX 0139x
IECEs certification: IECEx ZLM 13.005X

On behaf of; Delta Remote Control AS

Sandefjord, 04.11.2020. Zacharias Backer, CEO

Delta Remote Control AS, P.O.Box 1065, NO3204 Sandefjord
Tlf +47 33448300 hello@deltarc.no – www.deltarc.no
Document no. 03072
Wireless Technology

www.deltarc.no

For further information, please contact Delta RC: hello@deltarc.no

11. ENVIRONMENTAL INFORMATION

Care has been taken while producing this units, to ensure that all excess materials are disposed properly, and recycled accordingly. Please help us with this process in the future.

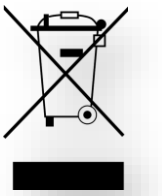
This means:
Do not dispose this devices into the trash when discarding.
To minimize pollution and ensure environment protection, please recycle properly, to ensure the smallest possible environmental footprint.

The PCB (Printed Circuit Board) in this units should be disposed as E-waste.
E-waste is electrical and electronic equipment of any kind that has been discarded. This includes practically anything powered by an electrical source (e.g., from a power socket or a battery).

The batteries should be disposed properly at a battery recycling facility.

The housings should be disposed as general waste.

Please look for these symbols at the recycling facility:



PCB's

Batteries

Housings

European Union (EU) Waste of Electrical and Electronic Equipment (WEEE) directive.
The European Union's WEEE directive requires that products sold into EU countries must have the crossed-out wheelie bin label on the product (or the package in some cases). As defined by the WEEE directive, this crossed-out wheelie bin label means that customers and end-users in EU should not dispose of electronic and electrical equipment or accessories as household waste. Customers and end-users in EU countries should contact their local equipment supplier or service centre for information on the waste collection system in their country.

Check our website for updates: www.deltarc.no

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This manual is printed on chlorine-free recyclable paper.

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