GYROSET LINK

MANUAL

Document identifier: NOW.Q.CE.M.EN–GL–0002–01
Revision: 01
Date of issue: 01 February 2019

European representative of the Manufacturer:
Now Technologies Ltd., 18. Reáltanoda street, Budapest, 1053 Hungary

www.nowtech.hu

Preliminary

Please review the user manual - this guide and the interactive Help - before using GyroSet Link. To view the Help in the Glory Tools application, click on the question mark icon in the upper right corner.

Information contained in this publication regarding device applications and the like is provided only for your convenience and may be superseded by updates. It is your responsibility to ensure that your application meets with your specifications. NOW TECHNOLOGIES MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL, STATUTORY OR OTHERWISE, RELATED TO THE INFORMATION, INCLUDING BUT NOT LIMITED TO ITS CONDITION, QUALITY, PERFORMANCE, MERCHANTABILITY OR FITNESS FOR PURPOSE. Now Technologies disclaims all liability arising from this information and its use. Use of Now Technologies devices in life support and/or safety applications is entirely at the buyer's risk, and the buyer agrees to defend, indemnify and hold harmless Now Technologies from any and all damages, claims, suits, or expenses resulting from such use. No licenses are conveyed, implicitly or otherwise, under any Now Technologies intellectual property rights.

The Now Technologies and GyroSet logo are registered trademarks of Now Technologies Ltd.

It is our intention to provide our valued customers with the best documentation possible to ensure successful use of your Now Technologies products. To this end, we will continue to improve our publications to better suit your needs. Our publications will be refined and enhanced as new volumes and updates are introduced. If you have any questions or comments regarding this publication, please contact our Help Desk via E-mail at info@nowtech.hu. We welcome your feedback.

This document must be read and understood by the healthcare professional who is installing and configuring the GyroSet Link and PGDT Omni.

MEDICAL DEVICE INTERFERENCE

GyroSet Link contains an IEEE 802.15.4 Standard compliant 2.4 GHz RF transceiver that emits electromagnetic radiation. This electromagnetic radiation may interfere with pacemakers, defibrillators, or other medical devices. Maintain a safe distance of separation between your medical device and the GyroSet Link. Consult your physician and medical device manufacturer for information specific to your medical device. If you suspect your GyroSet Link is interfering with your pacemaker, defibrillator, or any other medical device, stop using GyroSet Link.

Now Technologies Ltd. hereby declares that this wireless device is in compliance with the essential requirements and other relevant provisions of the RED Directive and Radio Equipment Directive 2014/53/EU, as applicable.

WARRANTY

Now Technologies Ltd. provides one year's full warranty on the products. This warranty covers any defects in materials or workmanship, with the exceptions stated below:

Faults resulting from the installation by an unqualified person. Any problem that is caused by abuse, misuse, extreme water damage or extreme weather are not covered. Also, consequential and incidental damages are not recoverable under this warranty.

MEDICAL DEVICE INTERFERENCE

GyroSet Glory contains components and radios that emit electromagnetic radiation. This electromagnetic radiation – although unlikely - may interfere with pacemakers, defibrillators, or other medical devices. Maintain a safe distance of separation between your medical device and the GyroSet Glory. Consult your physician and medical device manufacturer for information specific to your medical device. If you suspect your GyroSet Glory is interfering with your pacemaker, defibrillator, or any other medical device, stop using GyroSet Glory.

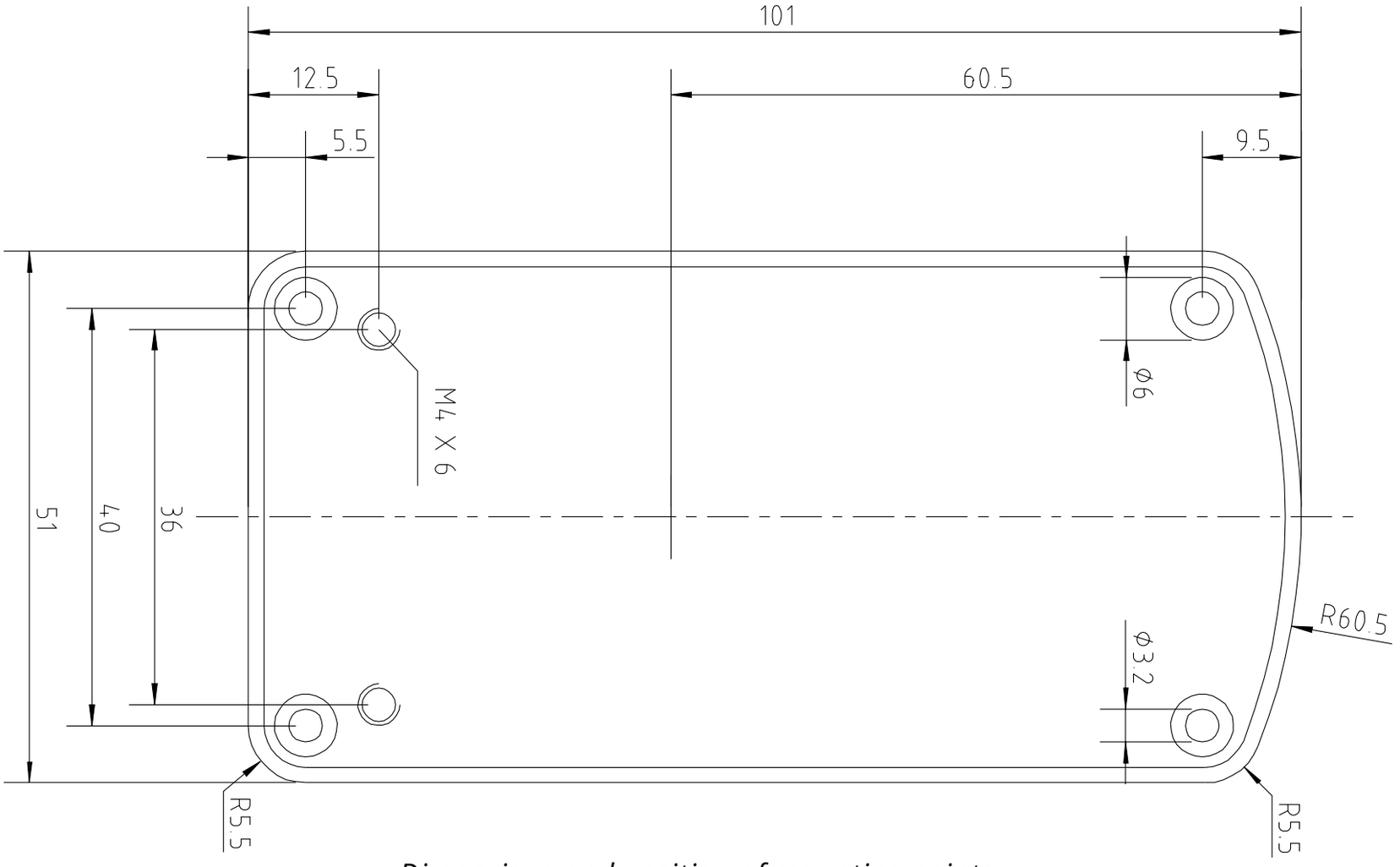
GyroSet Link installation instructions

GyroSet Link enables **GyroSet Glory** users to use their headset on a **PGDT Omni** or **IOM** equipped wheelchair as a specialty input device (SID). The Omni is a universal specialty controls interface that accepts signals from many different types of SIDs and translates them into commands compatible with the PG Drives Technology R-net control system.

Before proceeding please make sure that one of the compatible devices are already installed on the chair and working properly. For more information on how to set-up the Omni please follow the instructions of R-NET OMNI TECHNICAL MANUAL SK78813/7. It is possible to set up a control system so that it is unsuitable for some users or even some vehicles. Although this guide contains recommended settings for Omni for all of the above reasons it is important that you contact PG Drives Technology if you have the slightest doubt or if you need any advice on programming.

Mounting

The GyroSet Link enclosure has two M4 sized screw threads on the back of the device that is designed specifically for mounting. As every vehicle and user is unique there is no general mounting bracket available.



Dimensions and position of mounting points

Please make sure that the physical mounting meets the following criteria:

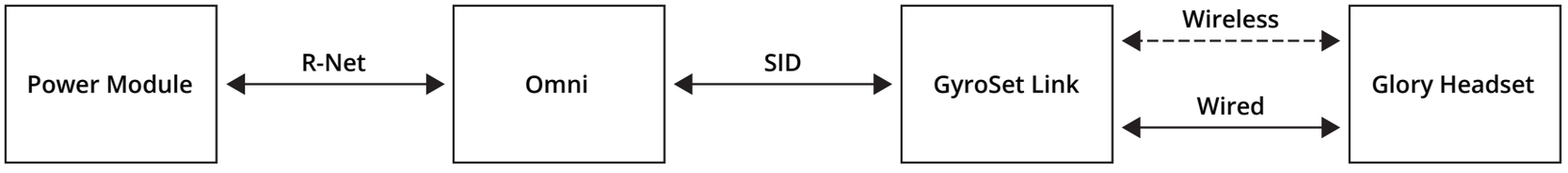
- Mounting should be removable as calibration of the sensors may be required from time to time.
- Mounting shall be solid to minimise vibration effects between the chair and the GyroSet Link unit. Vibrations and orientation of the chair are processed by the onboard inertial sensors and it is mandatory that these measurements represent the movement of the chair and not the movement of the mounting bracket on the chair.
- Non elastic mounting material is highly recommended, please avoid use of velcro or any other temporary tapes or cable ties.
- To take advantage of the IP34 protection of the casing, cables must face the ground to prevent rain from falling into the connector:
    - When there is no intention to use the wired interface please leave the connector's silicon cap in place.
- Placement shall avoid the closeness of any magnetic materials or large iron parts as they affect the orientation initialisation process and prevent the sensors to find the true magnetic north.
    - Magnetic materials such as active magnets shall be avoided, magnetic noise shall be less than 10μT.
    - Electromagnetic components such as motors, relays, actuators must be at a distance where magnetic noise is less than 10μT.
    - Ferromagnetic components such as wheelchair frame must be at a distance where their hard iron effect is minimal, usually more than 50mm depending on the composition of the frame.
- Placement shall allow the GyroSet Link a clear radio connection with the GyroSet Glory headset, that practically means:
    - A clear line of sight between the GyroSet Link and the GyroSet Glory headset must be provided.

- Devices that may produce radio interference, such as Smartphones, Pagers, Bluetooth devices must be kept out of the way and placed in a distance from the GyroSet Link.
- Large metal surfaces that may deflect radio signal must be placed relative to the GyroSet Link so that they don't block the signal.

- Placement is also important when wired connection is used, the distance between the headset and the GyroSet Link must be less than the length of the standard cable provided. (1.2m)
  - Mounting should in no way cause the connectors to tense or slip out. (In case of cables slipping out the GyroSet Link will automatically initiate radio connection.)
  - The connector interface for the headset data cable must be accessible to allow the caretaker to plug in or out the cable.
- GyroSet Link should be placed as such that the Status LED (logo) is visible for at least the caretaker, preferably for the user as well.
- GyroSet Link's mode selection touch interface (touch button with the logo) must be accessible for the caretaker.
  - Devices that may produce high capacity charges, such as ionisators must be at a safe distance from the touch interface to avoid accidental activation.
- The audible feedback of the GyroSet Link is of high importance for the user, placement should avoid blocking of the speaker.

WARNING Protection against water according to IP34 is guaranteed only in case the Link has been installed in a vertical position.

Wiring



Dimensions and position of mounting points

The **GyroSet Link** provides a proportional analogue signal compatible with PGDT Omni. The interface is the standard D-type connector, fitted with “detect link” and “fifth switch” functions. As there is no internal power source or auxiliary power input connector on the GyroSet Link the power for operation is provided by the Omni.

The limitation of Omni’s power output is 12V and 100mA distributed between the two SID connectors and the GyroSet Link consumes about 60-90mA typically when turned on.

Please make sure that there is no other device connected to the Omni that would surpass the power limitation and prevent the system from operation.

For the above reason if the Omni is configured with programmable parameter “Sleep 12V” to cut the power on SID connectors when turned off, GyroSet Link is going to be turned off as well. GyroSet Link doesn’t require a permanent power supply. For power saving reasons “Sleep 12V” parameter is advised to be set.

On the GyroSet Link there are two connector interfaces. One of which is an integrated cable with D-type connector on it to control the Omni (referred to as Omni cable) and another oval shaped interface to connect the GyroSet Glory cable into (referred to as Data cable).

Omni Port-1 D-type connector

The two interfaces of the GyroSet Link (on the left the oval shaped data connector)

The preferred SID port if there is only one input device connected to the Omni is Port 1 as shown on the picture below. In case of PGDT IOM there is only one INPUT port where the D-type connector can be connected:

Connecting the GyroSet Link to Omni

Connecting the GyroSet Link to IOM

In case of use of a wired GyroSet Glory to GyroSet Link connection please use the standard cable provided with the headset. The shape of the connectors are designed so that they seal the interfaces from water and are not interchangeable with each other:

Connecting the Data cable to the GyroSet Link

Connecting the Data cable to the GyroSet Glory

Please make sure that the wiring meets the following criteria:

- The GyroSet Link must be properly connected to PGDT Omni or IOM:
  - Cable that connects to the wheelchair controller must be secured with screws.
  - Cable that connects to the wheelchair must be tightened to the frame to avoid accidental crushing by the movement of actuators.
  - Cable placement shall not allow accidental crushing if the wheelchair hits an obstacle.
  - The analogue connector should be connected to Omni Port-1 or IOM INPUT only.

In case the D-type connector has become disconnected a screen will appear on the Omni with error code 0905:

WARNING Always make sure that the chair is configured in a way that the chair's on/off switch is available to the user, according to the manufacturer's guidance.

Setting up the Omni and the GyroSet Link

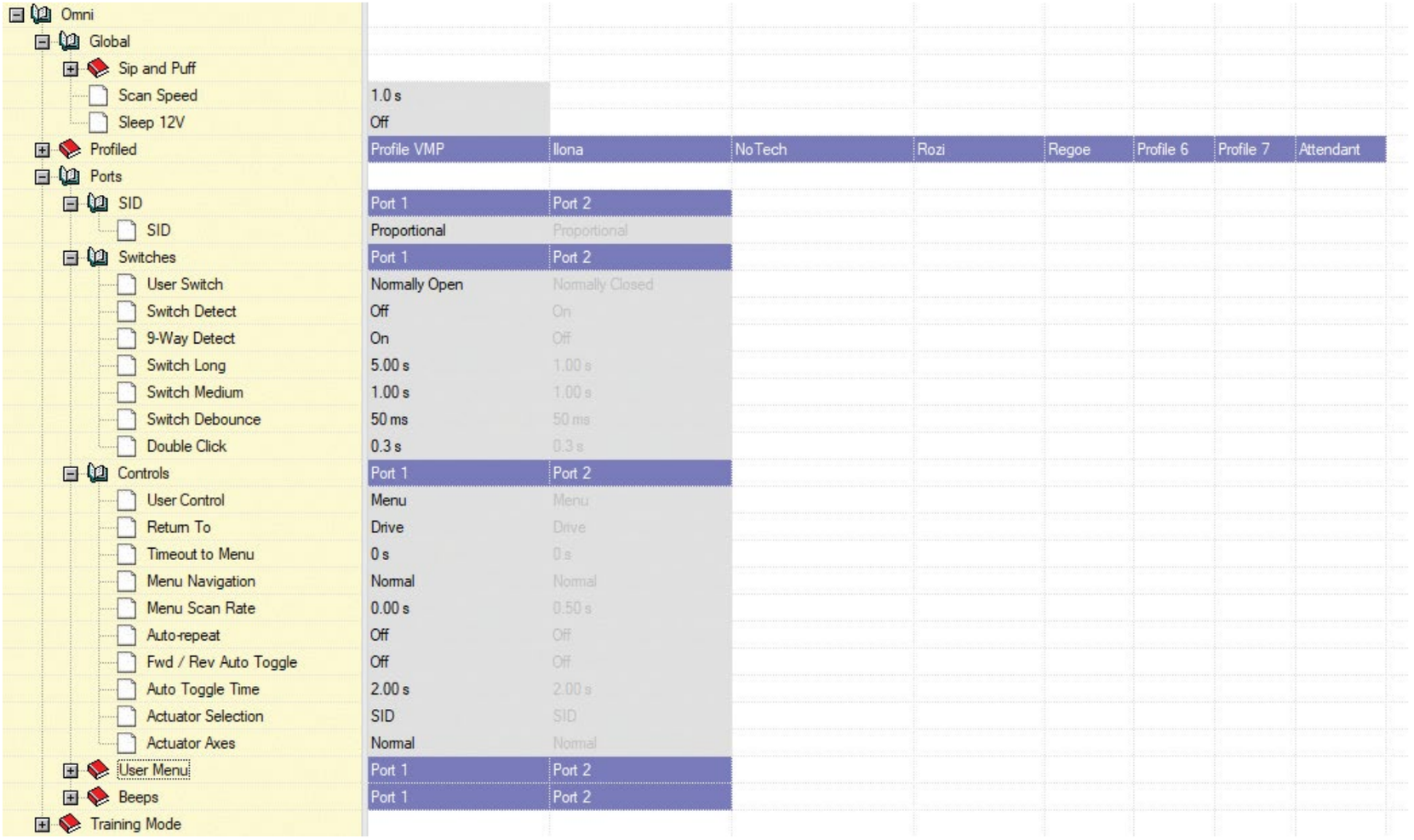
Pleas find our tutorial videos on https://www.nowtech.hu/tutorials/

Gyroset Link enables Gyroset Glory users to use their headset on a PGDT Omni or IOM equipped wheelchair as a specialty input device (SID). The Omni is a universal specialty controls interface that accepts signals from many different types of SIDs and translates them into commands compatible with the PG Drives Technology R-net control system.

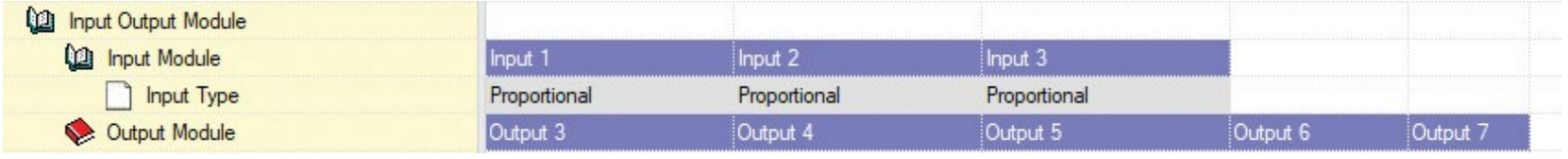
PROGRAMMING THE OMNI

For programming the Omni please follow the instructions provided by Penny and Giles Drive Technologies. There are three methods of programming the Omni. Details of the actual programmable parameters are given in the SK78813 Programming chapter. Ensure the R-net Control System's Drive, Acceleration and Deceleration settings are at a comfortable and safe level prior to attempting to program the Omni to suit the user.

Refer to the R-net Technical Manual SK77981 or the On-Board Programming Manual SK78571 for details of how to program the R-net Control System. Programming should only be conducted by professionals with in-depth knowledge of PG Drives Technology electronic control systems. Incorrect programming could result in an unsafe set-up of a wheelchair for a user. Now Technologies Ltd. accepts no liability for losses of any kind if these conditions are not met.



Using the R-Net PC programmer to configure Omni, Port 1 SID has to be set to **proportional.** To use the Click sensor of the headset to activate menu functions on the Omni, Port 1 User control has to be set to **Menu and Return To Drive.**



⚠ WARNING

The Omni can be put to sleep by selecting that option in the User Menu. To awaken the Omni, the following SID sequence is required: Left, Right, Left, Right. Note, this waking method only works if the Omni has been put to sleep via the User Menu. For that to work “Sleep 12V” parameter has to be turned off to allow the GyroSet Link to operate constantly. For a more safe operation of the chair Now Technologies doesn’t recommend the above described scenario, rather please install a separate User button in the reach of the User that can act as an emergency stop as well.

Please make sure that your R-Net configuration meets the following criteria:

- The correct SID port is configured as proportional.
- Sleep 12V parameter is set.
- User control is set.
- Drive, Acceleration and Deceleration settings are at a comfortable and safe level.

GYROSET LINK CONFIGURATION

In this document we presume that the user is already familiar with the usage of the GyroSet Glory headset, for detailed instructions on how to use the headset please follow the Headset’s User’s Manual.

The GyroSet Link translates the user’s head movements into analogue joystick sweeps. For that to function correctly all GyroSet Link parameters must be set according to the individual user’s needs. The configuration of the GyroSet Link can be achieved through the Glory Tools application - available for all users - that provides an interactive Help and settings Wizard, which you can find by clicking on the question mark icon in the top right corner of the application of any page. The headset can measure tilting of the head in the four main directions, forward, backward, left and right.

Using the head drive function

PREPARATIONS

1. Find a comfortable seating position for the user and adjust the headrest so that is always in the reach with the headset's mode button. It is recommended that there is a distance of 3-5 cm between the headset's button and the headrest.
2. Turn on the headset, and place it on the user's head, adjust the click sensor's flexible tube as described in Headset User's Manual. The sensor should be placed approximately 1 cm from the movable part of the user's face (corner of the eye, cheek, corner of the mouth etc.)
3. Turn on the Omni.
4. Select drive mode on the headset by a long press on the mode button.

DRIVING

1. Imagine that Your head will act like a regular joystick.
2. Press the headset's mode button shortly against the headrest then return Your head into a neutral position and keep it there until the countdown stops. This is necessary to measure Your personal neutral position and enables You to change the position from time to time.
3. The countdown will start, GyroSet Link will mark every second with a beep. Control starts when the countdown is at zero, marked with higher and longer beep tone.
4. Tilt your head to the direction You wish to go. The amount of tilt is proportional to the speed of the wheelchairs movement.
5. To come to a halt, move your head into the neutral position (into the dead-zone)
6. To stop driving press the headset's mode button against the headrest.

For each control session any new neutral position can be selected.

USING THE OMNI MENU

1. When the chair is not moving the headset's click sensor can be used to enter to the Omni Menu.
2. Press the headset's mode button shortly against the headrest to activate navigation through the Omni Menu
3. Your head will act as joystick to help You go through all the available preferences.
4. Select menu items with tilting Yout head right, like as a joystick
5. Press the headset's mode button shortly against the headrest to deactivate menu navigation
6. Use headset's click sensor to exit Omni Menu

Please make sure that the following criteria are met before trying to drive the wheelchair with the GyroSet Link:

- Understanding of the intended use of the headset by getting familiar with the GyroSet Glory Headset's User Manual
- The adjustment of the headrest:
    - The User must be able to reach the headrest with the headset's mode button at any times.
- Inertial sensors of the headset must be calibrated with Glory Tools
- Intended direction of movement must be set with Glory Tools
- Range of head movement must be set with Glory Tools
- Faint detection threshold must be set out of operation range with Glory Tools
- Tremor filter must be set with Glory Tools
- Click sensor functions and parameters must be set with Glory Tools.
    - Click sensor long press maximal timeout must be set with Glory Tools.

- Centre mode and parameters must be set with Glory Tools:
  - If the centre mode is on a countdown, timeout has to be set.
- The maximum speed, acceleration, deceleration of the head drive profile of the wheelchair controller must be adjusted:
  - Settings of the PGDT controller must be administered by PGDT trained and authorised personnel.
  - Acceleration and deceleration of the wheelchair shall not cause an inertia on the users head that the user cannot compensate.
  - Maximum speed must be always in correlation with the local regulations.
- The GyroSet Link shall be paired with the Users Personal Area Network.
- User password of the Personal Area Network must be changed frequently.
  - The password must be chosen carefully, it should contain lower and upper case letters, symbols and numbers.
  - The password must be minimum 8, ideally 16 characters long.
- Service network must be used only for the time when changes are made to the personal drive profile.
  - The wheelchair can be driven in Service mode to allow fine tuning of the parameters but Service mode shall not be used for regular drive.
  - User network protected with users unique password is more safe and doesn't allow parameter settings online.
- The user should avoid:
  - Environments with extreme radio interference when controlling the Link with the headset wirelessly.
  - Environments of extreme magnetic fields, such as MRI because these can damage the onboard sensors.
- The user shall be aware

- The usage of the headset's mode button.
- That the GyroSet Link must be selected for control with the headset.
- The mode of centre detection.
    - If the mode is on a countdown, the user shall be motionless in a neutral position after activating the drive function.
- That the headset acts as a joystick on the R-Net:
    - By programming the wheelchair controller, various functions can be tied to "fifth button" presses.
        - When fifth button's long press timeout is set smaller on the R-Net than on the GyroSet Link the click sensor can turn the chair into sleep mode
        - When fifth button function is programmed so that the User can access menus the headset will navigate.
        - When fifth button function is programmed so that the User can control actuators the headset will control.
            - If the GyroSet Link is mounted to a part that stays in level when the backrest is tilting it won't be able to compensate the change.
                - The GyroSet Link measures the head orientation relative to the GyroSet Link.
                - Tilting of the backrest will cause a change in the orientation of the User's head and will have a feedback effect on the actuator.
- After the drive mode is initiated a distinguishable audible feedback can be heard.
    - The chair will move according to the head movements and the profile settings of the GyroSet Link and the R-Net controller.
    - The chair will move as long as the function is deactivated or failure detected.
- That unpredictable changes in the environment can cause the sensors to drift and change the behaviour of the chair

    - If the centre of the head joystick is off when driving the user shall stop and reinitiate drive.drive.
- That depletion of the headset's battery will cause the chair to stop.
    - A distinguishable audible feedback is given during headset turn on when the charge reaches 30% of the headset's battery.
    - The headset's battery must be charged on a daily basis.
- The falling of the headset will cause the chair to stop.
- A sudden backward movement of the head inside the turning dead zone will force the system to execute an emergency break of the chair.
- If the Users head reaches the end of the range of operation the sweep of the head joystick is at maximum.
- If the Users head reaches the safety zone the chair will stop.
- If the Users head is in the range of the dead zone the chair won't move or will stop.
- If the headset is in a forbidden orientation it will deactivate the function or won't activate the function:
    - If the angle of headsets basis to the ground is more than 90 degrees in any direction it will detect forbidden orientation.
    - Upside-down corresponds to 180 degrees that is larger than 90 degrees.
- If the headset measures accelerations bigger than 1g it will deactivate the function.
    - Inertia that can not be compensated by healthy neck muscles will cause the chair to stop.

Setting up the IOM and the GyroSet Link

Setting up the IOM with the GyroSet Link should only be conducted by the seller.

Appendix

Colour codes of the status LED (Gyroset Logo):

Colour	Light patterb	Status
None	No	The device is turned off or in sleep.
White	Breathing: fade in - fade, out	The device is turned on, but there is no Headset.
Blue	Breathing: fade in - fade, out	Connection to the headset established through RADIO and IDLE
Blue	Blinking	Connection to the headset established through RADIO and ACTIVE
Green	Breathing: fade in - fade, out	Connection to the headset established through CABLE and IDLE
Green	Blinking	Connection to the headset established through CABLE and ACTIVE
Orange	Breathing: fade in - fade, out	GyroSet Link is in Service Mode
Red	1 short high sound signal	System halted due to an error. Driving is stopped.
		Waiting for centering the head.

Audible feedback:

	Description	Meaning
.-	one short low sound followed by a longer high pitch sound	Headset connected
.-	one short low sound followed by a longer high pitch sound	Headset connected
...- -	min. 1 to 5 lower beeps followed by a longer higher pitch sound	Drive initialisation countdown and drive control started
. . .	short bursts of very high pitch sounds	System halted

Software update

Currently there is no possibility for the end-user nor the distributor to update the firmware. To update the software on the Gyroset Link the device has to be disassembled and reprogrammed by one of our authorised partners.

WARNING The microcontroller is protecting the firmware with built in hardware fuses, any attempt on reading or modifying the content of the flash will fail. All user related variables are encrypted, any attempt on gaining access to secure data will erase the chip content.manufacturer's guidance.

EUROPEAN UNION – DISPOSAL INFORMATION

The symbol above means that according to local laws and regulations your product and/ or its battery shall be disposed of separately from household waste. When this product reaches its end of life, take it to a collection point designated by local authorities. The separate collection and recycling of your product and/or its battery at the time of disposal will help conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment.

EXPOSURE TO RADIO FREQUENCY

The GyroSet Glory has been tested and meets applicable limits for radio frequency (RF) exposure. Specific Absorption Rate (SAR) refers to the rate at which the body absorbs RF energy. The SAR limit is 1.6 watts per kilogram in countries that set the limit averaged over 1 gram of tissue and 2.0 watts per kilogram in countries that set the limit averaged over 10 grams of tissue. During testing, GyroSet Glory radios are set to their highest transmission levels and placed in positions that simulate uses against the head, with no separation, and when worn or carried against the torso of the body, with 5mm separation.

EU COMPLIANCE STATEMENT

Now Technologies Ltd. hereby declares that this wireless device is in compliance with the essential requirements and other relevant provisions of the R&TTE Directive and Radio Equipment Directive 2014/53/EU, as applicable. Now Technologies's EU representative is Now Technologies Ltd. 18. Reáltanoda street, Budapest, 1053 Hungary.

www.nowtech.hu

ROHS DECLARATION OF CONFORMITY

We hereby declare that our products are compliant to RoHS Directive 2011/65/EU of the European Parliament and the Council from 08/06/2011 on restriction of the use of certain hazardous substances in electrical and electronic appliances.

Following substances namely are involved: Lead (Pb), Cadmium (Cd), Hexavalent chromium (Cr), Polybrominated Biphenyls (PBB), Polybrominated diphenyl ethers (PentaBDE, OctaBDE; DecaBDE), Mercury (Hg)

Now Technologies Ltd. herewith declares that all of our products are manufactured in compliance with RoHS.