

# FRONTIER OFF ROAD

## Power Wheelchair

### Owners Manual



Please read this manual carefully as it contains important maintenance, safety and warranty information.

The FRONTIER Power Wheelchair series may be custom made to measure and may vary in detail from chair to chair however they should all comply to the enclosed basic specifications

#### **SAFETY WARNINGS**

DO NOT operate on roads, streets or highways.

DO NOT climb, go up or down ramps or traverse slopes **greater than 15°**.

DO NOT attempt to move up or down an incline with water, ice or oil film.

TAKE GREAT CARE when driving over curbs or obstacles greater than **4 inches in height**.

Doing so may cause your wheelchair to turn over and cause bodily harm or damage to the chair.

ALWAYS stop before climbing an obstacle. Approach slowly until castors contact the obstacle. Apply power and the action of the **AST Suspension** will lift the casters over the obstacle. Weight is transferred to the drive wheels providing traction and motor strength to power the chair over the obstacle.

DO NOT use parts, accessories, or adapters other than those authorized by Magic Mobility.

DO NOT leave the power button ON when entering or exiting your wheelchair.

DO NOT stand on the frame of the wheelchair.

DO NOT use the footplates as a platform. When getting in or out of the wheelchair, make sure that the footplates are in the upward position or swing footrests towards the outside of the chair.

ALWAYS wear your seat positioning strap (if fitted)

DO NOT use your wheelchair unless it has the proper tire pressure (P.S.I.).

DO NOT over inflate the tires. Failure to follow these recommendations may cause the tire to explode and cause bodily harm.

DO NOT leave power wheelchair in rain or a storm of any kind.

DO NOT use power wheelchair in a shower or leave it in a damp bathroom while taking a shower.

DO NOT leave power wheelchair in a damp area or outdoors for any length of time.

Direct exposure to rain or dampness will cause the chair to malfunction electrically and mechanically; may cause the chair to prematurely rust.

Check to ensure that the battery covers are secured in place.

ENSURE joystick boot is NOT torn or cracked where water can enter and that all electrical connections are secure at all times.

DO NOT use the joystick if the boot is torn or cracked. If the joystick boot becomes torn or cracked, replace IMMEDIATELY.

DO NOT carry passengers or heavy weights.

SHOULD the wheelchair begin to behave erratically or make abnormal noise discontinue use immediately otherwise significant damage not covered by warranty may occur.

## **WARRANTY**

This wheelchair is provided with a 12 month Limited Warranty on the parts and workmanship contained within. This warranty does not cover wearing items such as Tires, batteries, upholstery etc. The warranty does not cover freight to or from the manufacturer, that is the chair must be returned to the factory or agent for all warranty repairs.

The warranty on the Frontier does not cover breakages / damage to either the motors, gearboxes, or axle shafts caused by use of the wheelchair. Warranty will not cover these items as Magic Mobility has no control over the severity of use that this all terrain wheelchair may encounter. We will, at our discretion, repair / replace items that we consider were faulty at time of manufacture. All warranties are detailed in "Terms & Conditions of Sale - Magic Mobility" (available upon request)

Upon acceptance of goods at delivery the purchaser accepts the "Terms & Conditions of Sale"

## **Manufacturer**

This wheelchair has been manufactured in Australia.

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## **Joystick Controls**

The joystick controls as with other items on the chair may be customized and may be one of a number of different models depending upon users requirements. Detailed information on the standard joystick control is contained within this manual on a separate page.

The joystick hand control unit IS NOT WATERPROOF so care must be exercised so as not to get caught outdoors in the rain. We recommend the carrying of a small plastic bag large enough to cover the joystick module and the user's hand, in case of rain. The joystick module is splashproof but may be permanently damaged if water transgresses the rubber seals (this damage is not covered under warranty). If for any reason, the joystick lead is disconnected take care when reconnecting, do not force the plug into the socket. The lead is polarized and should only be fitted one way. Forcing the plug into the socket the wrong way can permanently damage the electronics system.

## **WHEELCHAIR TIE-DOWN RESTRAINTS AND SEAT BELTS (Pelvic Straps)**

Magic Mobility is aware that there are a large number of wheelchair vehicle restraint systems available and in use around the world. Magic Mobility cannot, and does not, at this time, recommend any particular wheelchair transportation systems.

AS REGARDS TO RESTRAINTS - SEAT BELTS (Pelvic Straps) - IT IS THE OBLIGATION OF THE CONSULTING THERAPIST AND OTHER HEALTHCARE PROFESSIONALS TO DETERMINE IF A SEAT BELT IS REQUIRED TO ENSURE THE SAFE OPERATION OF THIS EQUIPMENT BY THE USER. SERIOUS INJURY CAN OCCUR IN THE EVENT OF A FALL FROM A WHEELCHAIR.

## **Batteries and Battery Charger**

We recommend using only a high quality dual rate intelligent battery charger with your Frontier Power Chair. All Frontier chairs are supplied with sealed, no maintenance, gell cell batteries as standard.

The following are the minimum sizes and brands of batteries and charger that we recommend.  
Batteries: 38 or 56 A/Hr (Sonnenschein A500C), 50, 60 or 73 A/Hr MK Batteries (Gell Tech)  
Charger: 24Volt 8Amp (These products may not be available in all countries-contact your dealer for an equivalent)

## **Charger Operation**

Battery charging is via a socket within the joystick module. When a charger is plugged in, the joystick unit recognizes the unit is plugged in and chair driving is inhibited.

\* The following procedure is valid for the recommended charger brand - consult your separate charger instructions if supplied with an alternative charger.

- 1) Ensure the wheelchair is turned off.
- 2) Always make sure that the charger is turned OFF before plugging it into the wheelchair.
- 3) Plug the charger into the wheelchair charging-socket.
- 4) The empty battery connected light on the charger will come on. If this light does not illuminate check all connections. (240V - 110V - 115V)
- 5) Turn the charger on at the main power point. The bottom POWER indicator on the charger will come on.
- 6) The 100% Battery Full light on the charger will come on when the chair is fully charged. It is OK to leave the charger connected to the chair, it will not overcharge.

**7) The wheelchair will require charging for 6 to 10 hours for a full charge.**

### **PLEASE NOTE THE FOLLOWING:**

Do not put the charger on the seat of the wheelchair when charging as the charger can become quite warm. Always put the charger on the floor near the chair when in use.

## Maintenance



It is important to regularly (every month) have such items as tires, castors, wheels and control systems inspected for wear or damage. These inspections can be carried out by anybody familiar with the wheelchair but **we recommend that every 12 months the chair should be inspected by a factory authorised service facility**. Repairs or replacements should only be carried out with manufacturer approved components to assure proper performance.

## Batteries



The batteries used in the Frontier Power Chairs are all sealed, no maintenance gell cells and require only correct charging procedures - see Battery Charger section. Typically these batteries would last 6 months to 2 years depending upon type of usage.

## Tires



We recommend that the tire pressures be checked weekly as running under inflated tires may be dangerous and can leave the tires prone to punctures. Failure to use the correct inflation pressure can result in reduced performance or cause an unsafe situation to occur.

**MAIN – MID DRIVE TIRES** - There are two main sizes of tires used on the Frontier range of wheelchairs.

- Black knobby low pressure high traction tires - these should be inflated to 3.5 psi for general use. (Do not exceed 10psi.) inflated on a WEEKLY basis.
- Grey standard road tread tires - these should be inflated to 40-45psi for general use. (Do not exceed 50psi)

**TIRE INFLATION** - All pneumatic Frontier tires are fitted with automotive type valves and can be inflated using most typical automotive hand and foot type pumps as well as service station air outlets. All tires should be checked weekly for correct inflation to the specifications given above.

**TIRE WEAR** - Tire wear varies greatly depending on usage (from months to years), but no matter what sort of time your tires last this is mostly governed by your typical daily requirements. To achieve the most from your tires it is important to have them correctly inflated. Always use manufacturer recommended parts. Replace tires when the tread pattern wears to less than 1/16" in depth as tires will start to lose safe traction and can be more prone to puncture.

## Castors



There are two sizes of castors used on the Frontier range of wheelchairs.

- 8" MCP "solid" castors.
- 2.50-4 Pneumatic Castors

Both of these castor types can require regular maintenance to ensure correct performance otherwise damage can occur and place the user in a potentially dangerous situation.

The castors should be checked (weekly is recommended) for correct swivel tension. Failure to have the castors adjusted to the correct tension can cause excessive castor flutter.

## Upholstery

The upholstery and frame of the wheelchair may be cleaned using mild soap and water. Avoid getting water into any electric components.

Upholstery life may be affected by skin oils and human sweat particularly that caused by particular medications. It is recommended that should cracking or significant wearing of the upholstery occur, it should be replaced at more regular intervals. Worn upholstery is not covered under warranty.

## **MANUAL FREEWHEELING - PUSHING THE CHAIR**

The built-in brakes and electric drive may be easily disengaged for manually pushing the chair as follows:

Located on each of the front castor bogey mounting arms, just in front of each drive wheel is a freewheeling lever. To disengage the built-in brakes simply pull out the levers on each side.

The wheelchair controls will not function and the “status” light on the joystick will flash when the chair is in free-wheel mode. This feature has been intentionally incorporated to protect the user from unsafe situations.

Don't forget to push the levers back in again when finished pushing the chair.



# EUROPA JOYSTICK – DXREMG90



## *The Display Area*

All G90 variants contain an identical display area consisting of:



- 1. Actuator Icons**  
When illuminated, the remote is in Seat Mode. The selected actuator is indicated by a flashing icon. Only enabled actuators are illuminated.
- 2. ECU Mode Indicator**  
When illuminated, the remote is in ECU Mode.
- 3. Hazard Light Indicator**  
Shows the status of the hazard lights. When flashing, the hazard lights are on.
- 4. Left Turn Indicator**  
Shows the status of the left indicator. When flashing, the left indicator light is on.
- 5. Battery Gauge**  
6 multi-coloured LEDs depict charge state of the battery. All 6 LEDs on indicate a full charge.

**6. 7 Segment Display**

Displays current Drive Profile, and Lighting Menu if enabled. Attendant control mode is shown by 'A'. Inhibit mode is shown by '-'. Other symbols are used in 'Head control', refer Section 8.2.

**7. Right Turn Indicator**






Shows the status of the right indicator. When flashing, the right indicator light is on.

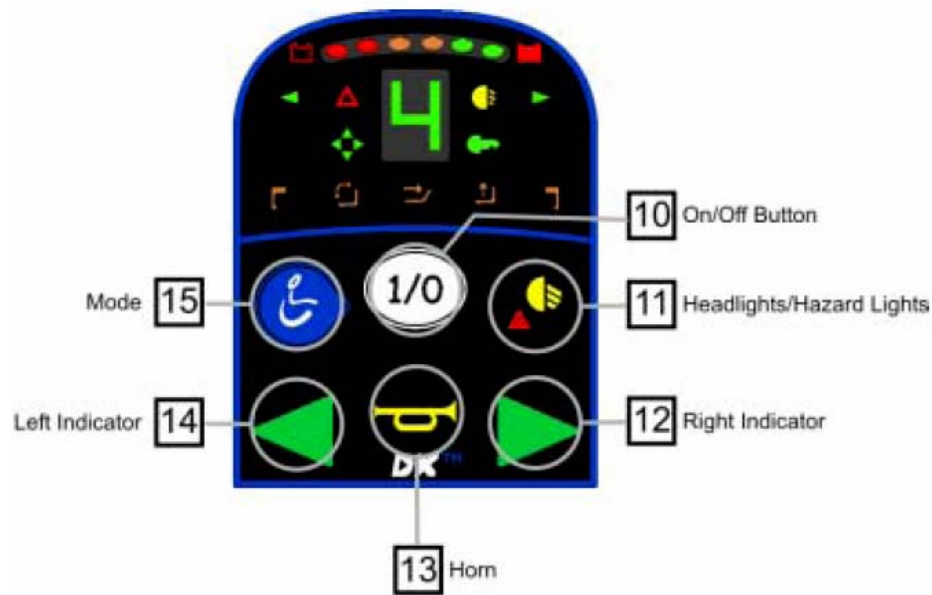
**8. Headlight Indicator**

Shows the status of the headlights. When illuminated, the headlights are on.

**9. Lock/System Status LED**

Red flashing LED indicates the keypad is locked. Green LED denotes the status of the system: on steady indicates no system faults, flashing indicates a fault. Refer Section 6.3.

LED Icon	Description	DX-CLAMB Output
	Left Foot Rest	3
	Seat Tilt-In-Space	1
	Back Recline	2
	Seat Height	5
	Right Foot Rest	4



#### 10. On/Off Button

To turn the power on press the On/Off button. The current battery charge will be indicated and the System Status LED will illuminate and not flash. Press the On/Off button again to turn the power off.

#### 11. Headlights/Hazard Lights

To turn the Headlights on/off, press and release ('short press') the Headlight/Hazard Light button. **Hazard Lights** To toggle the Hazard Lights on/off, press and hold ('long press') the Headlight/Hazard Light button.

#### 12. Right Indicator

Press the Right Indicator button to activate the right indicators. Press again to turn off.

#### 13. Horn

Pressing the Horn button will sound the horn for as long as the button is pressed.

#### 14. Left Indicator

Press the Left Indicator button to activate the left indicators. Press again to turn off.

#### 15. Mode

Each press of the Mode button will increment the drive profile, up to the maximum configured value and then back to profile 1. The current drive profile will be shown in the 7 Segment Display. If accessory functions are present, further presses of the Mode button will select these modes in turn. If accessories are enabled but not present a '0' will be displayed.

### SPECIAL ITEMS TO NOTE

If the chair is driving and the Mode button is pressed, the drive profile will increase by a single increment with each press until the maximum configured value is reached. While driving, Mode will not enter any available accessory modes.

The programmable parameter **Change Profile While Driving** can be used to select if changes to drive profile whilst driving are required.

The programmable parameter **Wrap Profiles** is not used for this product variant.

The programmable parameter **Allow non-driving Profile** should be used to access accessory options.

# DOLPHIN JOYSTICK – DXREM34 *When Fitted*



## 1. Battery Fuel Gauge

All 10 lights on	=	100% Full
5 lights on	=	50% Full
2 lights on and flashing	=	5% Full
1 light on and flashing	=	Empty -Needs recharging as soon as possible

## 2. I/O Power Switch

Indicator -Denotes that the wheelchair is turned ON  
-When this light is flashing indicates an electronic system fault

## 3. Left Blinker

Operates the left flashing blinker (when optional full light system is fitted)

## 4. Right Blinker

Operates the right flashing blinker (when optional full light system is fitted)

## 5. Horn

Depress once to sound built-in horn.

## 6. Profile Select Switch

Depressing this button cycles through the drive programs – speeds (a maximum of 5 is generally available). See SPECIAL ITEMS TO NOTE section for further explanation.

## 7. Profile Display

The Profile Display is used to display a number of messages. The are as follows:

\*Currently Selected Drive Program (Usually 1 to 5)

\*Inhibit Status “-“ When the chair is inhibited from driving, normally during operation of actuators.

\*Remote Status. If the displayed number (or “-“) is flashing this indicates that the joystick unit is faulty.

## 8. Hazard Lights

Operates the hazard lights (when optional full light system is fitted)

## 9. Driving Lights

Operates the front and rear lights (when optional light system is fitted)

With the chair turned on swipe the supplied magnetic key across the key symbol and the chair will be locked. A small red indicator within the key symbol will flash if the chair is turned on again. To unlock the, chair simply swipe the key symbol again.

## 10. Seat Lift (optional)

Depressing this button once transfers the joystick function from driving the chair to actuating the seat lift function, indicated by a “-“ on the profile display. When in this mode the forward motion of the joystick causes the seat to rise and the rearward motion of the joystick causes the legrest to lower.

#### **11. Left Elevating Legrest (optional)**

Depressing this button once transfers the joystick function from driving the chair to actuating the right elevating legrest function, indicated by a “-“ on the profile display. When in this mode the forward motion of the joystick causes the legrest to rise and the rearward motion of the joystick causes the legrest to lower.

#### **12. Backrest Recline (optional)**

Depressing this button once transfers the joystick function from driving the chair to actuating the backrest recline function, indicated by a “-“ on the profile display. When in this mode the backward motion of the joystick causes the backrest to recline and the forward motion causes the backrest to move forward.

#### **13. Seat Tilt-In-Space (optional)**

Depressing this button once transfers the joystick function from driving the chair to actuating the seat tilt-in-space function, indicated by a “-“ on the profile display. When in this mode the forward motion of the joystick causes the seat to tilt forward and the rearward motion of the joystick causes the seat to tilt back.

#### **14. Right Elevating Legrest (optional)**

Depressing this button once transfers the joystick function from driving the chair to actuating the right elevating legrest function, indicated by a “-“ on the profile display. When in this mode the forward motion of the joystick causes the legrest to rise and the rearward motion of the joystick causes the legrest to lower.

### **SPECIAL ITEMS TO NOTE**

#### **EXPLANATION OF DRIVE PROFILES**

A Drive Profile is a set of parameters, which together define the response, or feel of the driving of the chair. The parameters that make up a Drive Profile are:

- Maximum Forward Speed
- Forward Acceleration
- Forward Deceleration
- Maximum Reverse Speed
- Reverse Acceleration
- Reverse Deceleration
- Maximum Turning Speed
- Turning Acceleration
- Turning Deceleration
- Damping Factor

The chair may be programmed, by Innovation In Motion, or it's agent, for up to 5 different profiles.

These settings are stored in the memory of the joystick unit so if the joystick is changed for any reason the new one would have to be reprogrammed.

## **DRIVING TIPS – OFF ROAD**

### **Section DT1 Steep downwards slopes**

Before driving down a steep slope, if your chair is equipped with Tilt-In-Space, tilt the seat back to roughly the angle of the slope. This will assist you in going down the slope in a comfortable sitting position and will add grip to the rear of the chair.

If your chair is not equipped with Tilt-In-Space make sure you are sitting as far back in the seat as possible and that your upper body will not fall forward. Never try driving down a slope that you feel concerned about. Always drive straight down a slope, or at a very slight angle if necessary. Never try driving across a steep slope it is possible to tip the chair over in this situation. If at all possible have an attendant with you at the rear of the chair in case required.

### **Section DT2 Steep climbing slopes**

Before driving up a steep slope, if your chair is equipped with Tilt-In-Space or Power Recline Backrest ensure both are in the fully upright position. Always drive straight up a steep slope. Never, if possible, drive sideways up a steep slope. If possible shift your weight to the front of the chair as this will aid the front wheels in maintaining traction. If at all possible have an attendant with you at the rear of the chair in case required.

### **Section DT3 Climbing 90° curbs**

Before driving up a curb ensure that Power-Tilt-In-Space or Power Recline Backrest (if fitted) are in the fully upright position.

It is possible to climb 90° curbs up to a height of 100mm (4") however there is a correct technique to do so. It is necessary to drive the chair on speeds 4 or 5 and directly facing the curb, so that both front wheels start to climb at the same time.

Drive the chair at about ½ speed on Speed Number 4 or 5 until you are about 150 mm (6") from the curb. At about 6" from the curb give the chair full speed so that the front castors rise in the air to clear the curb edge. As the two front wheels go over the top of the curb start to lean forward (if possible) while holding full speed on the joystick control. Once the rear wheels have gone over the curb immediately slow down and continue your driving. If you or the chair hesitate or fail to climb the curb before the rear wheels go up, back up slightly and make another attempt.

Take care when climbing curbs it may not always be safe to do so. If at all possible have an attendant with you at the rear of the chair, in case required.

### **Section DT4 Descending 90° curbs**

Ensure that the curb height does not exceed 100mm (4") before attempting any descent. Drive slowly to the edge of the curb and make sure both front wheels are lined up to go down the curb at the same time. Adjust the speed to either 1,2 or 3 for safety. Drive the chair to the edge of the curb and with one smooth movement drive the front wheels slowly over the curb till they contact the bottom. Continue to drive forward until the rear wheels slowly go over the curb. If at all possible have an attendant with you at the rear of the chair in case required.

### **Section DT5   Driving on soft sand**

It is possible to drive the chair on many types of soft and hard sand, however the climbing ability of the chair may be reduced in some angles of very soft sand. It is important when driving on sand not to have too low a speed, we suggest that speeds lower than 3 are not used. Should any of the wheels start to skid or slip on sand continue driving as they will gain traction as the chair moves along. Please read sections DT1, DT@ and Tire inflation as these contain important information that will be useful when driving on sand. If at all possible have an attendant with you at the rear of the chair in case required.

### **SectionDT6   Driving through water or mud**

It is possible to drive the chair through limited depths of water or mud but great care must be taken to ensure that you do not become bogged or the chair damaged. We recommend that you do not drive the chair through more than 25mm (1") of water or mud. When driving through water keep the speed low (1 or 2) and if possible drive that chair slowly over a dry surface when exiting the water to limit the amount of moisture that may splash under the chair. Allowing water to enter the electronics, wiring, motors or Joystick will cause damage to these systems and should be absolutely avoided. When driving through mud keep the speed of the chair at a moderate pace so as not to allow the wheels to spin excessively or slow down too much. Should the chair ever be driven through salt water, great care must be taken to wipe down all wet parts with a cloth soaked in fresh water. Failure to clean off salt water will result in excessive corrosion and may eventually end in the need to replace effected components.

Driving through water or mud should only be done on flat areas. If at all possible have an attendant with you at the rear of the chair in case required.

### **Section DT7   Driving on snow**

Please read the sections DT1, DT2, DT6 and Tire Inflation before attempting to drive on snow covered surface.

It is possible to drive the chair on snow covered surfaces however this can be a most hazardous situation so great care must be taken. If at all possible have an attendant with you at the rear of the chair in case required.

Never drive the chair at an angle across a snow covered surface.  
Always drive the chair on speeds no more than speed 3.

### **Section DT8   Obstacle Climbing**

The chair will climb numerous obstacles but also has some self limiting functions to ensure some level of safety. The frame design intentionally limits steps, curbs and obstacles to a height of 100mm (4"). This does not mean that obstacle climbing is limited to these, only that obstacles greater than this cannot pass directly under the chair. When climbing obstacles take great care not to tip the chair over. Please read sections DT1, T2,DT3 and DT4

## **FAULT FINDING**

### **THE CHAIR WILL NOT DRIVE**

Should the chair fail to drive check the following items:

- \* Is the Battery Fuel Gauge in the RED section (batteries flat) or FLASHING ?
- \* Has the control lead to the joystick control module been damaged or dislodged from either end?
- \* Is the chair in free-wheel mode? If so, engage the free-wheel levers into drive mode and turn the chair on and off once to reset the control system.
- \* All FRONTIER model wheelchairs are fitted with a DX Series control system that disables driving should the built-in self test discover a fault in any of the driving components (motors, electronics, brakes). Each of the DX electronics modules is fitted with a STATUS indicator in the form of a small green LED, on the Joystick Hand Control this STATUS indicator is located in the center of the On/Off Button. Should any of the modules be faulty, the LED on the faulty module will flash. If this happens call your local Extreme 4X4 agent.

### **JOYSTICK OUT OF NEUTRAL AT POWER UP**

The Joystick Module features an “Out Of Neutral At Power Up“ detection. If the system is turned on with the joystick not in the neutral position (deflected), the Power Indicator will flash and the chair will be prevented from driving until the joystick is returned to neutral.

### **THE BATTERIES WILL NOT CHARGE**

Should the batteries not charge check the following items:

- \* Is the Battery Connected Indicator on the battery charger illuminated? If not check all plugs, sockets, leads and battery connections.
- \* Is the Main Power Indicator illuminated? Check main power point.
- \* Should the Charge Complete Indicator not be illuminated after a normal charging period, or no more than 12 hours the most likely cause is worn out or faulty batteries.
- \* On a full charge the batteries will generally provide a good 6 to 8 hours of typical daily use. As the batteries wear out this time will be reduced. When the chair is being used “off-road” or in “high load” applications such as hill climbing then the battery range will also be reduced.

## **DIAGNOSTICS AND FAULT FINDING**

RemG90 diagnostics can be examined from the Flash Codes signaled with the System Status LED of the RemG90. Your dealer or OEM can provide more detailed diagnostic and troubleshooting information.

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### **Flash Code**

Any fault condition on the DX system will cause the RemG90's System Status LED to flash. Flashing occurs in bursts of flashes separated by a two second pause. The number of flashes in each burst is referred to as the Flash Code and indicates the nature of the fault.

Faults that affect the safety of the chair will cause the chair to stop while less critical ones will be indicated but allow the chair to continue driving. Some faults will automatically clear when the fault condition is removed, in which case the System Status LED will become steady and the wheelchair may be driven normally. Other faults are latched and must be cleared by turning the DX System off, waiting for five seconds, and then turning it back on again.

<b>DX System Status LED Flash Code</b>	<b>Likely Cause of Condition and Probable Action</b>
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|----------|---|
| <b>1</b> | <b>DX Module Fault</b> (see Limp Mode below)<br>Cause: An Auto Download has occurred.<br>Action:• Turn the RemG90 off then on again.<br>Cause: Connection between DX Modules may be faulty, or there may be an internal fault in a Module.<br>Action:• Check DXBUS connections and replace where necessary. <ul style="list-style-type: none"><li>• If the Status LED on another Module is flashing, replace the Module.</li><li>• An expected module may not be present (e.g. the DX Lighting Module).</li></ul> |
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- |          |   |
|----------|---|
| <b>2</b> | <b>DX Accessory Fault</b><br>Cause: There is a fault in an accessory device attached to a DX Module (excluding the PM). Examples of faults in accessory devices may be: the clutch is, or has been, disengaged; a light bulb has a short or open circuit; an actuator terminal is shorted to Battery +.<br>Action:• Check all accessory devices connected to you DX System. |
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**DX System    Likely Cause of Condition and Probable Action**  
**Status LED**  
**Flash Code**

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**3    Left (M1) Motor Fault**

Cause: The connection from the PM left (M1) connector to its associated motor, or the motor itself, is defective. The connection is either open or has a short circuit.

Action:• Refer to dealer

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**4    Right (M2) Motor Fault**

Cause: The connection from the PM right (M2) connector to its associated motor, or the motor itself, is defective. The connection is either open or has a short circuit.

Action:• Refer to dealer

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**5    Left (M1) Park Brake Fault**

Cause: The M1 plug connection to its associated Park brake is either open or has a short circuit.

Action:• Refer to dealer

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**6    Left (M2) Park Brake Fault**

Cause: The M2 plug connection to its associated Park brake is either open or has a short circuit.

Action:• Refer to dealer

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**7    Low Battery Fault**

Cause: The battery charge is not sufficient to allow safe driving. It has fallen below 17V.

Action:• Check battery connection and terminals. The battery voltage should be similar when the battery is on charge, and when it isn't.

- Check that fuses have not blown, or circuit breakers tripped.
- Replace battery if worn out or if the capacity is insufficient for the user's needs.

**Note:** The wheelchair will behave sluggishly and the Battery Gauge will flash indicating low battery voltage prior to the display of this fault.

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**8    Over Voltage Fault**

Cause: The battery voltage has exceeded 32V.

Action:• If this fault occurs during battery charging, the battery charger is defective or incorrectly adjusted.

- Check the battery chargers open circuit voltage is in accordance with the battery manufactures limits, and is less than 32V.

Cause: The battery connector is making intermittent contact when the wheelchair is stopped, or traveling down a slope.

Action:• Check that the battery wiring and terminating is secure.

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**DX System Likely Cause of Condition and Probable Action**  
**Status LED**  
**Flash Code**

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- 9 CANL Fault** (See Limp Mode below)  
Cause: 1. An invalid voltage has been detected on the DXBUS CANL line.  
2. Communication is not possible using the CANL wire.  
Action: • Refer to dealer
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- 10 CANH Fault** (See Limp Mode below)  
Cause: 1. An invalid voltage has been detected on the DXBUS CANH line.  
2. Communication is not possible using the CANH wire, or the CANH and CANL wires are shorted together.  
3. Hazard lights were turned on when the DX System was turned on.  
4. The CANH is used to generate a Kill signal by any DX Module which detects an unsafe condition, or by an external device such as an emergency stop switch.  
The CANH wire is pulled to either Battery + or Battery – and causes the DX System to shut down.  
Action: • If the Hazard Lights were already switched on when the DX System was turned on, Flash Code 10 on Limp Mode (slow driving) may result.  
To clear this fault, turn the Hazard Lights off, then turn the DX System off then on again.  
• If generated by a Kill signal, the cause of the fault is severe. Refer to dealer.
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- 11 Stall Timeout Fault**  
Cause: The motor current has been at, or close to, current limit for longer than the Stall Timeout parameter value.  
Action: • Turn the DX System off then on again.  
Cause: Motor(s) are faulty. Wheel(s) may be rubbing on frame.  
Action: • Ensure wheels turn freely while under no load. Have motor(s) checked by a service technician or dealer.
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- 12 Module Mismatch**  
Cause: There is a compatibility problem between DX Modules in the System. The wheelchair will be disabled.  
Action: • Refer to dealer
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## **Limp Mode**

If the DX System detects some faults, it will revert to Limp Mode. This is a reduced speed mode which recognizes problems, but allows the wheelchair user to limp home, where the problem can be assessed.

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**Warning:** If the DX System is displaying a fault and the chair enters Limp Mode, do not operate except to reach a safe environment. Proceed with caution as the chair performance may be significantly altered. Have the chair serviced by a service agent or dealer.

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Caution: It is very important that you read this information regarding the possible effects of electromagnetic interference on your powered wheelchair.

## Electromagnetic Interference (EMI) From Radio Wave Sources

Powered Wheelchairs may be susceptible to electromagnetic interference (EMI), which is interfering electromagnetic energy (EM) emitted from sources such as radio stations, TV stations, amateur radio (HAM) transmitters, two-way radios and cellular phones. The interference (from radio wave sources) can cause the powered wheelchair to release its brakes, move by itself, or move in unintended directions. It can also permanently damage the powered wheelchair's control system. The intensity of the interfering EM energy can be measured in volts per meter (v/m). Each powered wheelchair can resist EMI up to a certain intensity. This is called its "immunity level" The higher the immunity level, the greater the protection. At this time, current technology is capable of achieving at least a 20 v/m immunity level, which would provide useful protection from the more common sources of radiated EMI. This powered wheelchair model as shipped, with no further modification, has an unknown immunity.

There are a number of sources of relatively intense electromagnetic fields in the everyday environment. Some of these sources are obvious and easy to avoid. Others are not apparent and exposure is unavoidable. However, we believe that by following the warnings listed below, your risk to EMI will be minimised.

The sources of radiated EMI can be broadly classified into three types:

- 1) Hand held portable transceivers (transmitters-receivers) with the antenna mounted directly on the transmitting unit. Examples include: citizens band (CB) radios, "walkie talkie," security, fire and police transceivers, cellular telephones, and other personal communication devices. \*\*NOTE: Some cellular telephones and similar devices transmit signals while they are ON, even when not being used;
- 2) Medium-range mobile transceivers, such as those used in police cars, fire trucks, ambulance, and taxis. These usually have the antenna mounted on the outside of the vehicle; and
- 3) Long range transmitters and transceivers, such as commercial broadcast transmitters (radio and TV broadcast antenna towers) and amateur (HAM) radios.

NOTE: Other types of hand-held devices, such as cordless phones, laptop computers, AM/FM radios, TV sets, CD players, and cassette players and small appliances such as electric shavers and hair dryers, so far as we know are not likely to cause EMI problems to your powered wheelchair.

## **Powered Wheelchair Electromagnetic Interference (EMI)**

Because EM energy rapidly becomes more intense as one moves closer to the transmitting antenna (source), the EM fields from hand-held radio wave sources (transceivers) are of special concern. It is possible to unintentionally bring high levels of EM energy very close to the powered wheelchair's control system while using these devices. This can affect powered wheelchair movement and braking. Therefore, the warnings listed below are recommended to prevent possible interference with the control system of the powered wheelchair.

### **WARNINGS**

Electromagnetic interference (EMI) from sources such as radio and TV stations, amateur radio (HAM) transmitters, two way radios and cellular phones can affect powered wheelchairs. Following the warnings listed below should reduce the chance of unintended brake release or powered wheelchair movement which could result in serious injury.

- 1) Do not operate hand held transceivers (transmitter-receivers), such as citizens band (CB) radios, or turn ON personal communication devices, such as cellular phones, while the powered wheelchair is turned ON.
- 2) Be aware of nearby transmitters, such as radio or TV stations, and try to avoid coming close to them;
- 3) If unintended movement or brake release occurs, turn the powered wheelchair OFF as soon as it is safe.
- 4) Be aware that adding accessories or components, or modifying the powered wheelchair, may make it more susceptible to EMI (note: There is no easy way to evaluate their effect on the overall immunity of the powered wheelchair); and
- 5) Report all incidents of unintended movement or brake release to the powered wheelchair manufacturer, and note whether there is a source of EMI nearby.

### **Important Information**

- 1) 20 volts per meter (v/m) is a generally achievable and useful immunity level against EMI (as of May 1994) (the higher the level the greater the protection)
- 2) This product has an unknown immunity.

United States of America (ONLY)

Caution: Federal law restricts this device to sale by or on the order of a practitioner licensed by the law of the State in which he/she practices.