ADVANCED SPECIALTY CONTROL





DX-REMG91 / DX-REMG91S DISPLAY MASTER REMOTES

INSTALLATION MANUAL



About this Manual

This manual has been designed to help you install and configure a Dynamic DX-REMG91/DX-REMG91S powerchair control unit for a 'generic' brand powerchair. For this reason there are no guidelines for specific applications. If there is a specific requirement for your application, please contact Dynamic Controls or one of the sales and service agents, to assist you.

This manual should be read in conjunction with all other relevant DX-System manuals.

Throughout this manual there are a few symbols that will help you quickly identify the purpose of the paragraph that follows:



Notes & Precautions:

Notes provide supporting information for the previous paragraph or section that **should** be followed in order to install, configure, and use the product safely and efficiently.



Warnings:

Warnings provide important information for the previous paragraph or section that **must** be followed in order to install, configure, and use the product safely and efficiently.

The term **'programming'** used throughout this manual refers to adjusting parameters and configuring options to suit an application. 'Programming' does not change or alter any software within the controller and is performed using a controlled programming tool available only to authorised personnel.

The term **'accessory'** used throughout this manual refers to equipment that is ancillary to the main functioning of the control system. It does not refer to an accessory of the wheelchair. The control system is a component of the wheelchair.

DX is not user serviceable. Specialized tools are necessary for the repair of any component.

Do not install, maintain or operate this equipment without reading, understanding and following this manual – including the Safety and Misuse Warnings – otherwise injury or damage may result.

Due to continuous product improvement Dynamic reserves the right to update this manual. This manual supersedes all previous issues, which must no longer be used.

Dynamic reserves the right to change the product without notification.

Any attempt to gain access to or in any way abuse the electronic components and associated assemblies that make up the powerchair system renders the manufacturer's warranty void and the manufacturer free from liability.

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1 Introducing DX

DX is a modular, expandable power wheelchair control system. This modularity allows the system to be expanded and customized to particular end-user needs and handles the requirements from driving to full environmental control. A power module and secondary remote are required along with two DXBUS cables to form the base of a G91 DX system. A variety of modules are available to access additional functions and features.

Example DX System





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2 Introducing the G91

The DX-G91 is a DX master remote with many new features and enhancements including:

- Multiple control methods and highly configurable
 - Head control, 3 Quadrant RIM Switched
 - Head control, 3 Quadrant RIM Proportional
 - o Joystick Only operation
 - Direct Access buttons
 - Single Switch Scanning (G91S)
- Improved drive performance, including front wheel drive options
- A large, Super Bright Display for enhanced visibility in bright sunlight
- 3 Switch Inputs
- Multi-Colour Icon based displays for intuitive operation
- Two Environmental Control Unit (ECU) modes
- Latched and BI directional Actuator options
- High power horn output
- Full range of audible feedback options, including reversing beeper
- Programmable Mode/ 'Reset' Timing
- Mechanically protected switch inputs

Two G91 variants are available:

DX-REMG91

Featuring three jack sockets for external switches

DX-REMG91S

Building on the functionality of the DX-REMG91 by adding single switch scanning.



A DX wheelchair control system comprises of two or more compatible modules. Each module has its own installation manual.

This manual describes the G91 and its variants only and therefore must be read in conjunction with the other DX Modules to be used in your application.



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3 G91 Operation

3.1 Display Area

The G91 display area is a sophisticated means of providing information and feedback about the system and functionality.

The display consists of functional groups of icons and indicators, all shown illuminated below.

3.1.1 Drive Mode Display



Drive Mode Display			
No.	Item	Description	
1	7 Segment Display	Displays the oursent Drive Brefile	
		Displays the current Drive Profile.	
		It also displays the Lighting Menu and Horn Menu if enabled. Attendant control mode is shown by 'A'.	
		Inhibit mode is shown by '-'.	
2	Reverse Mode Indicator	Flashes to display that a reverse driving mode has been selected. Refer to Section 3.8 - 3 Quadrant RIM Modes	

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3.1.2 Actuator Mode Display



Actuator Mode Display			
No.	Item	Description	
3	Actuator Mode Indicator	Displays that actuator mo modes	de is selected. Used in all
4	Actuator Icons	The selected actuator is indicated by a flashing icon. Only enabled actuators are illuminated.	
	Г	Left Foot Rest	DX-CLAMB output 3
	ţ,	Seat Tilt-In-Space	DX-CLAMB output 1
	⇒ ∕	Back Recline	DX-CLAMB output 2
	_	Seat Raise	DX-CLAMB output 5
	٦	Right Foot Rest	DX-CLAMB output 4
5	Extend Actuator	When illuminated, operati extend the selected actua 3 Quadrant RIM Mode .	ng the input device will ator/seat function. Used in
6	Retract Actuator	When illuminated, operati retract the selected actua 3 Quadrant RIM Mode .	ng the input device will ator/seat function. Used in



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Note:

To ensure wiring compatibility with existing DX products such as the DX-REMG90A and DX-REM34, the DX-CLAMB outputs above should be used.

3.1.3 ECU Modes



ECU Mode		
No.	ltem	Description
7	ECU Mode Indicator	Displays that ECU mode is selected .
8	ECU2 Indicators	Displays that ECU2 mode is selected.

3.1.4 Lighting Mode



Lighting Mode		
No.	Item	Description
9	Headlight Indicator	Shows the status of the headlights. When illuminated, the headlights are on.
10	Left Turn Indicator	Shows the status of the left indicator. When flashing, the left indicator light is on.
11	Right Turn Indicator	Shows the status of the right indicator. When flashing, the right indicator light is on.
12	Hazard Light Indicators	Shows the status of the hazard lights. When flashing, the hazard lights are on.

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3.1.5 Status Information



Status Information Display		
No.	Item	Description
13	System Status LED	Green LED denotes the status of the system: on steady indicates no system faults, flashing indicates a fault. Refer Section 7.3 - Flash Codes
14	Battery Gauge	6 multi-coloured LEDs indicate charge state of the battery. All 6 LEDs illuminated indicate a full charge.



3.2 Keypad

The G91 has the following keypad layout:



1. On/Off Button

	Press the On/Off button to turn the power on.
1/0	The current battery charge will be indicated and the System Status LED will illuminate.
	Press the On/Off button again to turn the power off.

2. Horn



3. Drive 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 or ECU functions are being operated, a press of the Mode button will return to the last used drive profile.



Note:

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

Note:

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

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



Note:

If the profile up button must be fail safe in a specific installation use the REMG91/S mode input.

If the power button must be fail safe in a specific installation use the REMG91/S power input instead.



4. ESK (Environmental Shortcut Key)

Pressing the ESK will navigate you to the last used ECU mode, e.g. ECU1 mode. If you are already in ECU Mode, a press of ESK will take you to the next available ECU mode, e.g. ECU2.
To return to Driving, simply press the Drive Mode button.
To return to Accessories, simply press ASK. This feature significantly reduces the complexity and number of key presses to access ECU features.

5. ASK (Accessory Shortcut Key)

Pressing the ASK button will navigate you to the last used accessory function, e.g. actuator control. If you are already in an Accessory Mode, further presses of ASK will take you to the next available accessory mode, e.g. lighting or horn, if these menus are enabled. To return to Driving, simply press the Drive Mode button. To return to Accessories, press the ESK button.
This feature significantly reduces the complexity and number of key presses to access actuator features.



Note:

If the chair is driving and the ASK or ESK button is pressed, the command is ignored until the chair has stopped to help prevent inadvertent selection of accessory options



Note:

The programmable parameter **Allow non-driving Profile** must be set to 'Yes' to access accessory options, this is set to 'yes' as a default.

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3.3 Jack Sockets



Jack Socket Position and labelling

Jack sockets are provided on the G91 for accessing functions via 3rd party switches. These connections are protected by a screw down cover and are clearly labelled inside the cover.

Maximum tightening torque for the M3 cover screw is 0.6 Nm.



When the 3rd party switches are connected, ensure the wiring is routed suitably and exits from the cable outlet in the cover as shown below.



1. On/Off Jack Socket

	The function of the switch connected to this jack socket is identical to the On/Off button.
(1/0)	Press the On/Off switch to turn power on.
Ŭ	Press the On/Off button again to turn the power off.

2. Mode Jack Socket

	The function of the Mode jack socket is different to the keypad's Drive Mode Button.
<i>с</i>	Available Accessory and ECU modes can be entered using the Mode Jack when not driving. This is to help prevent accidental(inadvertent) selection of accessory options.
	If the chair is driving and the Mode Jack is used, the drive profile will increase by a single increment with each press until the maximum configured value is reached. Subsequent presses will then cycle through the available drive profiles.
	In 3 Quadrant RIM Mode the function of the Mode jack socket can be selected with the parameter Mode Press Time .





3. AUX Jack Socket

'AUX'	The AUX jack socket has a different feature in each mode to maximise the usability.
	Drive Mode.
	Sounds the horn for as long as the button is pressed.
	ECU1 Mode.
	Operates ECU1 channel 5, to give a 5 th ECU function, typically for a 'Mouse mover' application.
	ECU2 Mode.
	Operates ECU2 channel 5,6,7,and 8 depending on which ECU2 icon is lit.
	3 Quadrant Switched Mode.
	Operates the Hazard lights when in Lighting Mode.
	Scanner (G91S only).
	Select desired function. Refer to Section 4 – 'G91S Operation' for further information



Warning:

Do not operate any G91 without the cover installed correctly. The cover is an essential part of the ingress protection.



Warning:

The cables must be adequately routed and secured to prevent cutting, crushing, chaffing or other physical damage or abuse. This includes the prevention of the cables being caught or snagged on external objects. The wheelchair user maintenance schedule and service instructions should include appropriate inspection and maintenance requirements for connectors, cables and wiring. dynamic" 🕞

3.4 Jack Socket Switch Monitoring

The installer needs to carefully consider the implications of failure of either the 'Mode' or 'Aux' switches plugged into the G91 jack sockets or equivalent functions within the system installation such as DX-ARC-SWB. This is especially true of 'Aux' switch with the G91S when set up as a single switch scanning device. Failure of the switch, severing or damage to the switch wiring, or the inadvertent unplugging at the G91 can all render the switch function ineffective and each need to be assessed for risk.

The G91 offers switch monitoring options for the 'Mode' and 'Aux' inputs that can be used to partially mitigate risk due to switch failure. These options can be enabled using Wizard (See Programming section 6.3.1).

3.4.1 Unmonitored switch circuit with a Standard Switch

Allows the use of a standard Normally Open or Normally Closed switch but will **NOT** detect a failure in any part of the switch circuit.

3.4.2 Monitored circuit with a modified switch

This option is the most secure and is the recommended option for safety critical applications, it provides detection for disconnection and failed switches. To use this option the switch must be modified by adding 2 resistors as shown below.



These resistors allow the switch wiring to be continuously monitored and will ideally be as close to the actual switch as possible (e.g. inside the switch assembly).

To enable this option set the Switch Monitoring to 'yes' within Wizard (See Programming section 6.3.1).

A specific buddy button (purple in colour) is available with this circuit built in. Part no. SWTA9993.

3.5 Actuator Options

The G91 has a number of actuator options to maximize flexibility and simplicity of operation.

The programmed **Joystick Switch Threshold** will determine the joystick deflection required to operate any Actuator functions.

The programmable option **Both Leg Rests Enable** allows extra flexibility by simultaneous operation of DX- CLAMB channels 3 and 4, refer Section 5.3.

3.5.1 Conventional Actuators

This is the default configuration for G91 actuator control.



3.5.2 Latched Actuators

The programmable option **Latched Actuators** allows actuator channels/seat movements to be latched. A user input will cause the actuator to start moving and will continue to move.

When an actuator is moving, any user input will stop the actuator.



Options are: None/All/Seat Raise Only/Tilt In Space Only.

Actuators that are not latched will operate in Momentary mode, as 3.4.1.

When using Latched Actuators, if the actuator is required to travel along its full length without interruption the parameter **Actuator Timeout** should be set to a value(seconds) slightly higher than the maximum travel time of the actuators.

3.5.3 Bi directional actuators

The programmable option **Bi directional Actuators** allows both actuator extend and retract to be achieved using the same input. The direction of the actuator is toggled with each user input.





3.5.4 Latched & Bi directional actuators

Latched Actuators can be combined with **Bi directional Actuators** to give a sophisticated solution.

When an actuator is moving, any user input will stop the actuator.





Note:

When using Latched Actuators, if the actuator is required to travel along its full length without interruption the parameter **Actuator Timeout** should be set to a value(seconds) slightly higher than the maximum travel time of the actuators.

3.5.5 3 Quadrant RIM Mode Actuators

In **3 Quadrant RIM Modes** all actuator functions are controlled with only two user inputs, left and right. This gives extra flexibility for head control applications.

In **3 Quadrant RIM Modes**, actuator control is always bi directional and the parameter **Bi directional Actuators** is ignored.

Latched Actuators can be selected as required, and operates as defined in 3.4.4.

The **Extend** and **Retract Indicators** are used to clearly display the direction the actuator will move in when selected.



3 Quadrant RIM Mode Latched



3 Quadrant RIM Mode Momentary



3.6 ECU Modes

ECU Modes enable the G91 to be used with DX-ECU Modules to interface to 3rd party devices, such as environmental controls and communication aids.

The G91 can support two ECU modes using two separate DX-ECU modules.

Each DX-ECU is configured as either ECU1 or ECU2 using the 'Molex jumper' connector provided. Inserting the connector will configure an ECU as ECU2. Removing the connector will configure the unit as ECU1. The DX-ECU status LED will indicate which option has been selected. Refer to DX-ECU installation manual (GBK64227) for further details.

ECU modes are completely 'plug and play' - no programming is required. Simply connect a DX-ECU module and cycle the power.

The programmed **Joystick Switch Threshold** will determine the joystick deflection required to operate the ECU functions.

3.6.1 ECU 1 Mode



3.6.2 ECU 2 Mode

		ECU2 uses dedicated icons to assist pattern recognition and user familiarisation.		
		When ECU2 mode is first selected the ECU indicator and the diamond shaped icon will illuminate.		
Operate Select		The ECU outputs to be operated are selected by scrolling through the four symbols using the left and right direction of the joystick (or input device) Once the relevant outputs have been selected the forward direction will operate channels 1 to 4 as shown in the table below. A 3 rd party switch connected to the 'AUX' jack socket will operate DX-ECU channels 5 to 8 as shown in the table below. ECU2 can be programmed to give latched functions. When latched operation has been selected each selection of the forward direction or Aux switch will togale the state of the chosen output		
ICON	Name	Joystick Forward	'AUX' Jack	
	Diamond	ECU2-1	ECU2-5	
A	Triangle	ECU2-2	ECU2-6	
	Circle	ECU2-3	ECU2-7	
	Square	ECU2-4	ECU2-8	



3.7 Lighting Mode



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3.8 3 Quadrant RIM Modes

To provide maximum versatility and flexibility, there are two modes of operating G91 with a 3 Quadrant RIM input device, such as a head-control.

Refer to Programming Section 6.3.1 – 'Input'. This enable the desired drive input to be selected.

3.8.1 3 Quadrant RIM Proportional Mode

This is primarily used with a proportional 3 Quadrant head-control where the user can not provide a 'reverse' command. Equally, it can be used where a traditional joystick can not be moved in the forward direction. In this mode, the reverse command is always ignored.

This could be a DX-RJM, or similar.





3.8.2 3 Quadrant RIM Switch Mode

This is typically used with a switch based head control where the user can operate three direction commands, forward, left and right.



A fourth switch is used to change mode and to 'toggle' forward to reverse direction using long and short presses.

The fourth switch can be connected directly to the 'reverse' DX switch interface module or can be connected to the G91 mode jack. The keypad Mode button can also be used to enter reverse mode.

Short Press. In drive mode, a switch press will toggle the forward to reverse and illuminates the **Reverse Mode Indicator** and gives a double beep audible output. Pressing the switch again gives a single beep audible output and cancels the **Reverse Mode Indicator**. If the parameter **Change Profile While Driving** is set to 'No', a short press stops the wheelchair.

Long Press. In drive mode, a long press will change mode, including available accessory modes.

This is achieved by a programmable short or long press time. Short press is a switch closure for less than the programmed **Mode Switch Press Time.** Long press is a switch closure for greater than the programmed **Mode Switch Press Time.**

Refer to parameters **Mode Switch Press** Time and **Mode Change Beep** for further details

3.9 Joystick Only Operating Mode

This mode allows all functions to be controlled with a 4 quadrant joystick.

Refer to Programming Section 6.3.1 – 'Input'. This enable the desired drive input to be selected.

This mode can be operated by any joystick source where the user can operate all four direction commands.

When the 7- segment display flashes moving the joystick forwards and backwards will move through the modes available. A right deflection of the joystick selects the desired mode.

Once the desired mode has been selected the operation is via the normal joystick inputs described in the relevant section.

The currently selected mode will flash after a period of inactivity as set by the 'joystick only timeout' parameter. For example if the 'joystick only timeout' parameter is set to 3 seconds after that time the G91 will return to the home level. Another mode can now be selected by moving the joystick forwards and backwards.

Note: Joystick Only Timeout parameter must be set to a value greater than 0. See programming section for further details.

ASK button always returns to Home Level.

Mode button toggles between Home Level and Drive.



3.9.1 Joystick Only Menu Map



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3.10 The Joystick

	The joystick for the G91 is always provided in the form of a secondary remote such as a DX-RJM.
	Moving the joystick will cause the powerchair to drive in that direction. The amount of joystick movement will determine the speed that the powerchair will move in that direction.
	The programmable parameter Short Throw Travel allows the amount of movement required to drive the chair in any direction at full speed to be customized. For details on correct use of this parameter please refer to Section 6.5 - Programmable Joystick Throw/Shape
-	The programmable parameter Joystick Switch Threshold determines the amount of joystick movement to operate accessory modes, such as actuators.
	Joystick Out of Neutral at Power up (OONAPU) occurs if the joystick is out of neutral when switched on. If this happens the System Status LED will flash constantly. Releasing the joystick within a few seconds will cancel the indication otherwise a 'latching fault' will occur. If the user has difficulties switching the power on without moving the joystick, use the parameter Disable OONAPU Faults .



3.11 Charging



Warning:



Before connecting the battery charger ensure that it is compatible with the G91. The configuration of the G91 is:

Pin 1 Battery Positive (B+)

Pin 2 Battery Negative (B-)

Pin 3 Inhibit

The inhibit signal must be provided from pin 2 to pin 3 of the battery charger plug. Dynamic Controls recommends the use of suitable Neutral plugs only.



Warning:

The charger plug must be removed by applying force in the direction of the pins.



Warning:

Do not disconnect batteries or open circuit breaker during charging. This is dangerous to both people and equipment..

4 G91S Operation

As described within the operation of the G91 unless otherwise stated.

4.1 Scanning

- Aimed at users who can only reliably press one button "Aux".
- The use of 2 button scanning is supported. The use of a mode button enables the user to return to the home level without waiting for the complete scan cycle.
- A choice of 4 pre-defined scan patterns can be selected via the Wizard.


4.2 Mode Selection (Home Level)

With the G91S powered press the AUX button to start the G91S scanning through the modes of operation that are available.

The G91S will scan through at the programmed scan rate for the number of cycles set before returning to standby mode if no operation is selected.

After every selection the G91S returns to the home mode before continuing to scan through the available modes of operation for the selected number of cycles.



ECU 2 Mode

Horn Mode

Lighting Mode

4.3 Driving

During mode selection pressing the AUX button when the 7-Segment display is illuminated will enter drive mode.

The Display will then scan through the drive profiles available, 1, 2, n ...



Press AUX when desired drive profile is lit to select the profile.

The scan pattern will start.



The G91S will return to the home level after the programmed number of scan cycles is reached.

To drive press the AUX button when the desired direction indicator is illuminated.

Example

Pressing the AUX button now would result in the chair turning right





4.3.1 Scan Pattern Selection

The G91S offers a range of scan patterns which can be selected using the Wizard software. The LED's 1-6 shown on the right are scanned according to the patterns listed below.

The desired pattern is selected using the 'Scan Pattern' parameter in Wizard



Available Scan Pattern sequences are:

Pattern 1:

 $1 - 2 - 3 - 4 \dots$



Pattern 2:

1-5-6-2-3-4



Pattern 3:



Pattern 4:

 $1 - 5 - 1 - 6 - 1 - 2 - 1 - 3 - 1 - 4 \dots$



4.4 Actuator Scanning Mode

- Press the Aux button when the actuator LED is lit to enter actuator mode.
- The G91S will scan through the available actuators



Press Aux button to select an actuator when its symbol is illuminated.

The Extend LED (5) will flash, pressing the AUX button will drive the actuator. The operation can be either Momentary or Latched, this is programmable via Wizard.

If in momentary mode releasing the AUX button will stop actuator drive and the extend/retract LED's will cycle.

If Latched the AUX button must be pressed to stop actuator drive and to start the extend/retract scan cycle.

If the Aux button is not pressed the G91S will scan through the actuators for the programmed number of cycles and return to Home Level.

4.5 ECU Scanning Modes

4.5.1 ECU1 Mode

When using the scanner function ECU1 Mode only provides a momentary output on Channel 1 (ECU1-1) (Pin 1) Pressing the AUX button when only the ECU Mode LED is illuminated will 'activate' the Channel 1 output. Once the switch is released the G91S will continue to scan through the available modes.

4.5.2 ECU2 Mode

To configure a DX-ECU as ECU2 the Molex jumper connector should be inserted.. Refer to DX-ECU installation manual (GBK64227) for further details.

ECU2 can be operated in either latched mode or linked mode. For more information on Latched mode see the programming section.

Linked Mode:

To enter ECU2 press 'AUX' when both ECU mode indicator and ECU2-1 (diamond symbol) are lit.

The G91S will scan through the 4 ECU2 outputs. Pressing the AUX button when the desired LED is lit will link the output on the selected channel. The output will be 'active' momentarily whilst the AUX button is pressed. The selected ECU2 output symbol will continue to flash. Every press of 'AUX' will cause an 'active' output. The G91S will remain flashing on the selected output until the AUX button is pressed for greater than 3 times the **Scan Rate**. The G91S will return to Home Level.

Latched Mode:

In Latched mode when the selected ECU2 output is selected the output will remain 'active' until the AUX button is pressed again. Set **ECU2 is Latched** to enable, refer to programming section.

To enter ECU2 latched press 'AUX' when both ECU mode indicator and ECU2-1 (diamond symbol) are lit.

The G91S will scan through the 4 ECU2 outputs. Pressing the AUX button when the desired LED is lit will latch the output on the selected channel. The selected ECU2 channel will remain 'active' until the 'AUX' button is pressed again. The output channel symbol will remain lit whilst the output is 'active'.

The G91S will remain on the selected ECU2 output channel with the LED symbol flashing. To return to the Home Level press and hold the 'AUX' button for greater than 3 times the **Scan Rate**.



4.6 Lighting Scanning Mode

To access the Lighting menu the relevant parameters need to be enabled within Wizard (See section 6.3).

To activate the Lights press 'Aux' when the Lights symbol is displayed.



The scan sequence for the lights is shown below. Pressing 'Aux' will enable the relevant lights. The G91S will complete the cycle shown below for the number of scan patterns enabled before returning to the main scan routine after the 'AUX' button has been pressed.



4.7 Horn Scanning Mode

To access the Horn menu the relevant parameters need to be enabled within Wizard (See section 6.3).

To Activate the horn press 'Aux' when the Horn symbol is displayed.





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5 Installation and Testing

5.1 Mounting



All Dimensions in mm

The G91 can be mounted on either side of the wheelchair to accommodate users preference.

G91 must be mounted using both M5 fixing screws. The selected screw is to provide at least 4mm, best 6mm thread engagement and must not allow penetration of more than 7mm into the case. Maximum tightening torque of the screws is 2Nm.

If the G91 is tray mounted, particular care must be taken to prevent direct collision of the product into immovable objects, such as a desk.

Water ingress should be prevented by putting a seal between the G91 and the tray. If the G91 is designed to rotate then the housing should be designed to cover and seal the cables entering the G91.

A plastic insert is available to cover the programming socket and is recommended in a tray mount. RS part no. 225-899

5.2 Mounting Accessories

DX-GNK-KIT2



Also available is the GME63626



Warning:

For safe installation, select a screw length that protrudes no more than 7 mm into the case. Do not over-tighten.



Warning:

All G91 variants are not waterproof and must be protected from wate ingress as appropriate.



Note:

If the programmer socket needs to be accessible when the DX Remot is mounted, make allowance for this prior to fitting

5.3 G91 Connection with the DX System

The G91 has a single DXBUS connector that enables a suitable length DXBUS cable to be used to interconnect to the remainder of the DX system.

DXBUS cables are available in a variety of lengths.





Warning:

Care should be taken if DXBUS cables are disconnected.

Any protruding screws should be either plastic or plastic coated to prevent short circuits occurring with the DXBUS cable pins.



Warning:

The cables must be adequately routed and secured to prevent cutting, crushing, chaffing or other physical damage or abuse. This includes the prevention of the cables being caught or snagged on external objects. The wheelchair user maintenance schedule and service instructions should include appropriate inspection and maintenance requirements for connectors, cables and wiring.



Note:

The DX-REMG91 does not support certain modules such as DX-PCMR or DX-IRIS. In addition, the DX-REMG91S is not recommended for use with the DX-RJM-5SW; DX-RJM-SNP and DX-SLM. Should any clarification be required, please contact Dynamic Controls.



5.4 Testing

Ensure that all DX Modules used in your DX System have been installed as specified in their respective Installation Manuals. The G91 needs to be correctly programmed for the appropriate wheelchair application prior to testing.

A suitable DX secondary remote, input device must be connected to the DX system. Examples include the DX-RJM.

The G91 is a DX Master Remote. The Master Remote contains the complete wheelchair system set up, from which all DX Modules download their relevant information when the DX System is first turned on.

- 1. Raise the wheels off the ground using blocks under the power chair frame so that the wheels can turn freely.
- 2. Recheck all wiring, paying particular attention to polarities of batteries, motors and park brakes.
- 3. Make the final connection to the Battery Positive (+) terminal and close the circuit breakers.
- 4. Press the On/Off switch to power up the system. The correct response is a steady System Status LED, at least one of the battery LEDs will be on, and the Mode display will indicate a number from 1-5.
- 5. Press the Power button again to turn the system off. Ensure it turns off correctly. Press it again to turn it on.
- 6. Press the Mode button a number of times. Check that the display changes as expected.
- 7. Ensure the horn is functioning correctly by pressing the Horn button.
- 8. Check all other switches operate correctly.
- 9. Turn each drive wheel by hand to check that the park brakes are engaged. The wheels should not move.
- 10. Push the joystick slightly out of neutral and listen for the "click" as the park brakes disengage.
- 11. Move the joystick in all directions and ensure that the wheels respond smoothly and in the correct direction.
- 12. Release the joystick to neutral and listen for the click of the park brakes re-engaging.
- 13. Turn off the system and remove the blocks from under the power chair.
- 14. Turn G91 back on and ensure the mode is in a slow drive profile.
- 15. Sit in the power chair and drive in all directions slowly, checking for precise and smooth control.
- 16. Repeat at higher speeds.
- 17. Drive the wheelchair on a 1:6 ramp and check for normal power, smoothness and parking.



- 18. Perform the remainder of the tests as outlined in the Testing sections of the Installation Manuals of all other DX Modules used on the wheelchair.
- 19. Repeat testing as required until chair performance is as expected.

Note:

The first time the G91 is turned on, the System Status LED will flash a fault. This is because the G91 must download its information to the DX Power Module. Turn the remote off, then back on to clear this fault.



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6 Programming G91

	Warning:
	Performance adjustments should only be made by professionals in the health care field or by persons fully conversant with the adjustment process and the user's capabilities.
	Incorrect settings, or programming in an unsafe location, could cause injury to the operator or bystanders, or damage to the vehicle or surrounding property.
	After the vehicle has been configured, check to make sure the vehicle performs to the specifications entered in the programming procedure. If the vehicle does not perform to specifications, reprogram it. Repeat this procedure until the vehicle performs to specifications. If the intended operation cannot be achieved, contact your service agent.
	Ensure that deceleration parameters are always higher than acceleration parameters for a safe response.
	It is the health care professionals responsibility to ensure that the user is capable both of cognitively understanding and physically operating the programmed features and functions.
	With inappropriate programming settings, certain features and options may not be accessible or perform as expected.

6.1 Introduction

DX is a fully programmable system, which can be optimised for particular chair types and to suit the driving environment and preferences of individual users.

The driving performance of the DX System is dependent on its programming with the DX Remote and Power Module being the modules most responsible for defining the driving performance of the DX System.

DX can be programmed at 3 points:

During manufacturer by Dynamic – Default Programs

Prior to shipping, each module is loaded with appropriate default settings.

By the Wheelchair Manufacturer (OEM)

OEMs use the PC based "Wizard" programming tool to develop programs optimised for particular wheelchair models. Each program defines the technical attributes necessary to match the controller to the chair (current limits etc), as well as a drive performance that suits the typical user. The resulting programs may be copied into each DX System as part of the chair production process.

The G91 range of controllers are programmable via Wizard version 5.03 and later.



In the field by the Dealer or Therapist

A Hand Held Programmer (HHP) is used to tune the typical driving performance to a drive performance optimised for the individual chair user, including selection of the input device.

Chair Speed is a new feature that can simplify the dealer customisation of a chair with a single setting.

Existing DX Wizard programs can be converted into G91 compatible programs. Please contact your local Dynamic Representative for details.

6.2 Auto Download

The DX System has a feature called Auto Download. It is designed to minimize programming requirements associated with Module servicing by down loading the correct programming to a replacement DX Module.

If a DX Module is replaced, it is likely that the replacement module is programmed differently from the one that it replaces. This could leave the wheelchair in a dangerous condition. DX automatically detects that a DX Module swap has occurred and the programmed data from the old module is transferred to the replacement module. The Auto Download occurs immediately on power up after the Module has been replaced. This applies to all DX Modules except the DX Remote.



Warning:

When the G91 is replaced, it will perform an Auto Download to all DX Modules. This may result in incorrect and dangerous programming for a particular wheelchair system.

Program the suitable settings in the Remote by using the Wizard before you attempt to drive or test the DX System.

6.3 Programming with Wizard

Wheelchair manufacturers use Wizard to create standard wheelchair programs for different chairs. Wizard is an advanced and sophisticated tool and all parameter options are described within it. For a complete list of parameters and settings, refer to Wizard. The new parameters for DX and G91 are described here.

6.3.1 Wizard Section: REMG91(S) Specific Options

G91S Specific Options	
Parameter Name	Description
Remote Type Number	This not an adjustable Parameter. This is used by Dynamic during the manufacturing process.
Input	Select the input type for the remote. Normal, 3Q RIM Switched, 3Q RIM Proportional, Scanner, Joystick only. Refer to sections 3 and 4 for details. Normal means the G91 acts like a G90 with a secondary remote.
Joystick only Timeout	A mode escape is generated after the "Joystick Only Timeout" period has elapsed without user activity. This parameter only applies to the "Joystick Only" input type and is highly recommended. Set to 0 to disable this function .
Lighting Menu	If set to "Yes" Lighting will be offered in the Accessory control menu and can be controlled with the joystick. Set this to "No" for users without lights.
Horn Menu	If set to "Yes" a Horn option will be offered in the Accessory control menu and can be controlled with the joystick. Set to "No" for users who use the keypad buttons.
ECU2 is Latched	If set to "No" operation of ECU2 outputs will be momentary and operate for as long as input is operated. If set to "Yes", the operation is latched and ECU2 outputs will continue to operate after the input has operated.
LED Test Pattern	If set to 'Yes', the lights on the Remote will display a test pattern when the system is switched on. Note: when changed, this setting will not take effect until the power has been cycled twice.
Both leg rests Enable	Both Leg Rests Latched (Actuator 3&4) . Use to provide a unique combination of latched/momentary operation



Bi-directional Actuators	Set to "Yes" and actuators are operated in both directions with only one input direction; e.g. forward extends actuator, forward again retracts actuator. Can be combined with 'Latched Actuators' .	
Latched Actuators	Selects which actuators are latched: None, All, Seat raise only, Tilt in space only.	
Reversing Beeper	Set to "Yes" to sound the beeper when moving in reverse.	
Mode Change Beep	Set to "Yes" to sound the beeper when mode button is pressed or mode changes. Applies to all options.	
Mode Switch Press Time (S)	Sets the time the Mode switch(s) are pressed to give a second function.	
Scan Cycles	Selects the number of cycles to be scanned before exit. Applies to all options.	
Scan Time (S)	Sets the time each selection is scanned for. Applies to all options .	
Scan Pattern	Select desired scan pattern. Applies to driving only.	
Auxiliary Switch Monitoring	Set to "Yes" if the auxiliary switch has monitor resistor(s). This provides detection for disconnected and failed switches and is highly recommended. Set to "No" for switches without monitor resistor(s).	
Mode Switch Monitoring	Set to "Yes" if the mode switch has monitor resistor(s). This provides detection for disconnected and failed switches and is highly recommended. Set to "No" for switches without monitor resistor(s).	



Warning: Latched Actuators

When **Latched Actuators** are enabled, actuators will continue to move after the user releases the input device. This option should only be used by Healthcare Professionals for users capable of understanding the function and cancelling the operation of the latched actuators safely. The Healthcare Professional should also use an appropriate value for the parameter **Actuator Timeout** to set the maximum duration of the actuators.

6.3.2 Wizard Various Sections: Chair Speed Options

These are the associated parameters that can provide dramatically simplified dealer customisation of the powerchair.

Parameter Name	Description	
Chair Speed Enable	Enables the parameter Chair Speed and allows the HHP to be used to easily adjust it. Refer to parameter Chair Speed . The OEM enables this parameter if simplified dealer programming is required.	
Chair Speed	If Chair Speed is enabled, this adjusts the overall speed of the chair easily with the HHP. Setting of 10 allows 'Maximum' speed settings, 0 uses 'Minimum' speed settings. This is displayed on the HHP by the '#' symbols.	
Forward Speed @ Minimum	Defines the maximum speeds when the joystick is fully deflected in the stated direction while G91 is in the selected Drive Profile (1-5). Used if the Chair Speed adjustment is enabled or the speed pot (if fitted) is down.	
Reverse Speed @ Minimum	Defines the maximum speeds when the joystick is fully deflected in the stated direction while G91 is in the selected Drive Profile (1-5). Used if the Chair Speed adjustment is enabled or the speed pot (if fitted) is down.	
Turning Speed @ Minimum	Defines the maximum speeds when the joystick is fully deflected in the stated direction while G91 is in the selected Drive Profile (1-5). Used if the Chair Speed adjustment is enabled or the speed pot (if fitted) is down.	

Selecting Chair Speed Enable will change the screen display on the HHP.

When the HHP is plugged in, the initial screen will appear as below.





6.3.3 Wizard Section: Remote Control Settings

These parameters provide a new level of user customisation options and are very powerful for special adaptations.

Specific applications include 3rd party switch control of Mode up, Mode down, Horn and lighting functions.

Parameter Name	Description	
ARC always drives Actuators	This provides an option for what the actuator 1 and 2 switches of the DX-ARC5 or DX-ARC-SWB switchbox are used for.	
	Yes means they always control actuators 1 and 2.	
	No allows them to be a switch joystick.	
	To allow driving, also set the Joystick Source to ARC in the selected profile.	
ARC drives	Used in conjunction with ARC Always Drives Actuators .	
Actuators 1&2	Profile 0 is the accessory profile.	
	Yes allows the DX-ARC5 or DX-ARC-SWB to control actuator 1 and 2 in accessory mode but allows the same buttons to control driving in other profiles.	
	No allows them to be used for driving only.	
	To allow driving also set the Joystick Source to ARC in the selected profile.	
ARC drives Actuator 3	This provides an option for what the actuator 3 switches of the DX-ARC5 or DX-ARC-SWB switchbox are used for.	
	Yes enables control of actuator 3.	
	No enables these switches to control the left and right indicators. Press both switches to operate hazard lights.	
ARC drives Actuator 4	This provides an option for what the actuator 4 switches of the DX-ARC5 or DX-ARC-SWB switchbox are used for.	
	Yes allows control of actuator 4.	
	No allows these switches to control the horn and headlights.	
ARC drives Actuator 5	This provides an option for what the actuator 5 switches of the DX-ARC5 or DX-ARC-SWB switchbox are used for.	
	Yes allows control of actuator 5.	
	No allows these switches to control Mode up and Mode down. These mode controls do not allow access to accessory menus on the G91. This ensures there is always a flexible solution.	

Refer to DX-ARC-SWB installation manual (GBK62297) for further details.

6.4 Optimising Chair Stability & Controllability

The G91 features an advanced set of parameters to provide improved powerchair stability and are particularly useful for FWD/MWD applications.

Wizard Section: Drive Profiles

Parameter Name	Description
Grip	Defines the level of assistance G91 will provide in an effort to improve chair stability. Grip of 100% means no assist is given, while 0% means maximum assistance is given to user requests.
Speed X Turn for Grip	The absolute maximum speed/turn product for which the chair is unconditionally stable. G91 will assist a user to ensure this value is not exceeded, to a degree dependant on the Grip programmed for the response in use. The optimum value of Speed X Turn for Grip is determined experimentally for each chair design.
Accel out of a Turn for Grip	A temporary modifier of Speed X Turn for Grip when a user requests fast acceleration forward while the chair is turning. A value of 0 does not affect Speed X Turn for Grip at all, up to a value of 100% , which causes a progressive temporary reduction in Speed X Turn for Grip under these acceleration conditions.
Accel into a Turn for Grip	A temporary modifier of Speed X Turn for Grip when a user requests fast sideways acceleration while the chair is moving forward. A value of 0 does not effect Speed X Turn for Grip at all, up to a value of 100% which causes a progressive temporary reduction in Speed X Turn for Grip under these acceleration conditions.
Turning @ Full Speed	A modifier of Turning Speed @ Maximum when the joystick is pushed full forward. A value of 100% has no effect, a value of 50% will reduce steering (at full speed) by a factor of 50%.
Turning Accel @ full Speed	Used in conjunction with Turning @ Full Speed to achieve a less sensitive but more responsive turn characteristic at high speed.

These options are set by the wheelchair manufacturer to obtain optimal drive performance, safety and control for each particular chair design. They are best derived from experimental adjustment as individual chair geometry has a significant effect.

Grip should not be utilised by the OEM to control the stability of the wheelchair as it is a Dealer accessible parameter.



Preventing Front Wheel Drive Chairs From Spinning

The 3 options for **Speed X Turn for Grip**, **Accel out of a Turn for Grip** and **Accel into a Turn for Grip** are a set of parameters that define a Virtual Restrictor Plate (VRP) specifically designed to improve the safety and controllability of Front and Mid-Wheel Drive chairs.

These 3 "Speed X Turn" parameters together define the mechanical properties that affect the stability of the chair and are set by the manufacturer for each particular chair design.

They are NOT designed to be tuned for specific users.

Chair stability is defined by the ability of the chair to make a turn at speed without losing control. A chair may be stable turning slightly while moving at a high speed forward, or it may be stable making a fast turn on the spot, but it may be unstable making a sharp turn at a high speed. For any chair design, there is a maximum combined value of Speed and Turn for which the chair will not lose control. Loss of control means the chair's inertia and turn component are such that the tyres skid, rendering any action from the controller ineffective. The chair design, the state and inflation of the tyres, the friction of the driving surface, and the position of the user affect skidding.

Possible starting point for FWD wheelchairs could include:

Parameter Name	Potential Setting
Speed X Turn for Grip	60%
Accel out of a Turn for Grip	150%
Accel into a Turn for Grip	150%
Turning @ Full Speed	65%
Turning Accel @ full Speed	200%

Note:

These settings are to be used as a guide only. It is the responsibility of the wheelchair manufacturer to ensure the program is safe and suitable for their particular chair configuration.

6.5 Programmable Joystick Throw/Shape

The G91 features a **Programmable Joystick Throw** and **Shape**. These options can be set by the dealer or therapist to reduce the amount of joystick movement required to suit the physical abilities of specific users.

Reducing the Pressure or Movement to Operate a Joystick

The **Short Throw Travel** and **Short Throw Shape** parameters are used together to create custom VRPs on a user by user basis. These are solely for making the joystick more sensitive.

As supplied, the G91 will reach full speed only when the joystick is pushed as far as it can mechanically go (i.e. when it hits the restrictor plate).

For some users, it may be difficult if not impossible to provide either the force or deflection to move the joystick this far, in one or more directions. In these cases it may be useful to use the **Short Throw Travel** parameter to reduce the amount of deflection (and therefore pressure) required.

However, as the **Short Throw Travel** is reduced, the shape of the overall restrictor plate changes. This may have the negative effect of eliminating the turn/speed interlock by producing a restrictor plate shape that allows full forward speed and full turn which can be dangerous. Using the **Short Throw Shape** parameter it is possible to "knock the corners off" an undesirable VRP to help maintain chair stability.

Possible settings for a user with limited hand movement/strength could include:

Parameter Name	Wizard 5 Section	Potential Setting
Short Throw Travel	Drive Profiles	150%
Short Throw Shape	Drive Profiles	150%
Joystick Switch Threshold (This is not used for driving but for control of accessory functions e.g. actuator control)	System Settings	30%

Note:

These settings are to be used as a guide only. It is the responsibility of the wheelchair manufacturer to ensure the program is safe and suitable for their particular chair configuration.



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7 Diagnostics

7.1 Introduction

G91 diagnostics can be examined in two ways:

- From Flash Codes on the System Status LED on the G91 (and on the HHP)
- From Wizard which can provide detailed information about the fault

7.2 Diagnostics Tools

Hand Held Programmer

Plugging a hand held programmer into the G91 when an abnormal condition exists will cause the fault to be displayed. The HHP will display what the detected fault is.

DYNAMIC Wizard

Wizard is the preferred diagnostics tool in the workshop environment, providing a full fault history and shows any current faults.

If after analysing the data, the condition cannot be diagnosed, it is possible to print, save or e-mail a Status Report for further analysis or distribution to a service centre.

7.3 Flash Codes



Flash codes indicate the nature of an abnormal condition directly from the System Status LED. Without the use of any servicing tools, the condition can be simply diagnosed.

These flash codes are the same as existing DX products.

Flash Code	Description	Cause / Action
		C: An Auto Download has Occurred A: Turn the G91 off, then on again.
		C: The G91 is not correctly programmed A: Try reprogramming the G91
1	DX Module Fault	C: Connection between DX Modules may be faulty, or there may be an internal fault in a module
		A: Check DX Bus connections & replace where necessary
		A: If the Status LED on another Module is flashing, replace the Module.
		A: An expected critical module may not be present (i.e. the DX Lighting Module)
2	DX Accessory Fault	 C: There is a fault in an accessory device attached to a DX Module (excluding the PM). Examples include: a disengaged clutch; a light bulb is short or open circuit; an actuator terminal is shorted to Battery +. A: Check all accessory devices connected to your DX System.
		 C: A DX module with a Slow/stop input (e.g. CLAMB) is set to slow or stop. This may not be a fault, it is likely to be caused by the seat position being out of neutral and is used to signify that the chair may go slower than expected. A: Move seat back to neutral position.
3	Left (M1) Motor Fault	 C: The connection from the PM left (M1) connector to its associated motor, or the motor itself, is defective. The connection is either open or short circuit. A: Disconnect the left motor plug & check continuity between the motor pins on M1. A: Ensure there is no continuity between motor & park brake terminals.



4	Right (M2) Motor Fault	 C: The connection from the PM right (M2) connector to its associated motor, or the motor itself, is defective. The connection is either open or short circuit. A: Disconnect the left motor plug & check continuity between the motor pins on M2. A: Ensure there is no continuity between motor & park brake terminals.
5	Left (M1) Park Brake Fault	 C: The M1 plug connection to its associated Park brake is either open or short circuit. A: Disconnect M1 plug & check continuity between the 2 Positronic park brake pins. A: Ensure there is no continuity between motor & park brake terminals.
6	Right (M2) Park Brake Fault	 C: The M2 plug connection to its associated Park brake is either open or short circuit. A: Disconnect M2 plug & check continuity between the 2 Positronic park brake pins. A: Ensure there is no continuity between motor & park brake terminals.
7	Low Battery Fault	 C: The battery charge is not sufficient to allow safe driving. It has fallen below 17V. A: Check battery connection & terminals. The battery voltage should be similar when then battery is on charge, and when it isn't. A: Check that fuses have not blown, or circuit breakers tripped. A: Replace battery if worn out or if capacity is insufficient for the user's needs.
8	Over Voltage Fault	 C: The battery voltage has exceeded 32V. A: If this fault occurs during battery charging, the battery charger is defective or incorrectly adjusted. A: Check the battery chargers open circuit voltage is in accordance with the battery manufacturers limits, and is less than 32V. C: The battery connector is making intermittent contact when the wheelchair is stopped, or travelling down a slope. A: Check that the battery wiring and terminating is secure.



-		
9	CANL Fault (see Limp Mode below)	 C: An invalid voltage has been detected on the DXBUS CANL line. A: Check the continuity of the DXBUS cable. A: Check for shorts between DXBUS pins. An open or short circuit on another DX Module can cause this fault.
10	CANH Fault (see Limp Mode below)	 C: An invalid voltage has been detected on the DXBUS CANH line. A: Check the continuity of the DXBUS cable. A: Check for shorts between DXBUS pins. An open or short circuit on another DX Module can cause this fault. C: Hazard lights were turned on when the DX System was turned on. A: If the Hazard Lights were already switched on when the DX System was turned on, Flash Code 10 and Limp Mode (slow driving) may result. To clear this fault, turn the Hazard Lights off, the turn the DX System off then on again.
11	Stall Timeout Fault	 C: The motor current has been at, or close to, current limit for longer than the Stall Timeout parameter value. A: Turn the DX System off then on again. C: Motor(s) are faulty. Wheel(s) may be rubbing on frame. A: Ensure wheels turn freely while under no load. Have motor(s) checked by a service technician.
12	Module Mismatch	 C: There is a compatibility problem between DX Modules in the System. The wheelchair will be disabled. A: Consult your Dynamic Service Centre. C: The data held by the G91 for another DX Module is corrupt or incompatible with that module. A: Reprogram the wheelchair system.

7.4 G91 Specific Indications

1. Incompatible Programs "F"

The G91 is not directly compatible with earlier versions of DX programs. If 'F' (Fault) is displayed on the 7 segment display, the G91 has been programmed with a incompatible version of program.

To rectify the issue, program the G91 with a compatible program.

2. Joystick Fault "J"

If a G91 is switched on without a selected joystick/input device connected and operational, the 7 segment display will show 'J'.

To rectify the issue, connect the selected input device and check the program.

Please contact your local Dynamic Representative for further details and assistance.

7.5 Limp Mode

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



Warning:

If the DX System is displaying a fault or 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 an authorized agent.



7.6 Battery Gauge

The Battery Gauge provides true, useable battery capacity information and also presents battery condition warnings. The number of flashing LEDs on the Battery Gauge shows the type of fault.

Flashing LEDS	Description	Cause / Action
6	Battery High Warning	C: The battery voltage has exceeded 28V, as measured by the PM. C: The wheelchair is on charge and/or the batteries are full or faulty. C: The wheelchair is travelling down a slope and/or the batteries are full or faulty. A: The warning will reset when the battery voltage drops below 28V. The wheelchair will drive during this fault.
2-6	Battery Low Warning	 C: The battery voltage has dropped below 23.3V, when the joystick is in neutral. C: The batteries and/or wiring is faulty. A: Recharge batteries and/or check wiring. Battery Low Warning's usually coincides with a Low Capacity Warning.
2	Low Capacity Warning	C: The calculated battery capacity is below 10%. A: The wheelchair will drive during this fault but the batteries are in reserve capacity range. Battery capacity will reduce rapidly. Recharge Batteries. Low Capacity Warning usually coincides with a Battery Low Warning.

8 Specifications

8.1 Electrical

Parameter	DX-REMG91(x)
Operating voltage range	18V – 32V dc
Charger rating	12A RMS Continuous, limited by DXBUS rating
Quiescent Current	<1mA Off, typically 100mA On

8.2 Mechanical

Parameter	DX-REMG91(x)				
Material	Plastic				
Protection Rating	IPx4				
Shipping Weight	275g				
	Min	Nominal	Max	Units	
Operating Temperature Range	-25		50	°C	
Storage Temperature Range	-40		65	°C	
Operating Humidity Range	0		90	%RH	



Warning:

Do not operate any G91 variant without the rear cover installed correctly. The cover is an essential part of the ingress protection.



8.3 External Dimensions



Bottom View

All dimensions in mm

9 Appendices

9.1 Programmable Parameters (details)

- Key: \checkmark Editable at this level
 - O Viewable at this level
 - Not available at this level

REMG91 Specific Parameters	Values	Units	HHP Hand Held Programmer	Wizard - Lite	Wizard – Advanced
Remote Type Number	N/A	-	\boxtimes	\boxtimes	-
Input	Normal/3Q RIM Switched/3Q RIM Proportional/Scanner/Joystick Only	-	X	X	~
Joystick Only Timeout	0 - 255	sec	\boxtimes	\boxtimes	~
Lighting Menu	Yes/No	-	\boxtimes	\boxtimes	~
Horn Menu	Yes/No	-	\boxtimes	\boxtimes	~
ECU2 is Latched	Yes/No	-	\boxtimes	\boxtimes	~
LED Test Pattern	Yes/No	-	\boxtimes	\boxtimes	~
Both Leg Rests Enable	Yes/No	-	\mathbf{X}	\boxtimes	~
Bi-directional Actuators	Yes/No	-	X	X	~
Latched Actuators	None/all/Seat raise only/tilt in space	-	X	X	~
Reversing Beeper	Yes/No	-	\mathbf{X}	\boxtimes	~
Mode Change Beep	Yes/No		\mathbf{X}	X	~
Mode Switch Press Time	0.0 - 3.1	sec	X	\boxtimes	~
Scan Cycle	1 - 5	sec	X	X	~
Scan Time	0.5 – 6.3	sec	\mathbf{X}	X	\checkmark
Scan Pattern	1/2/3/4	-	\boxtimes	\boxtimes	\checkmark
Auxiliary Switch Monitoring	Yes/No	-	\boxtimes	\boxtimes	\checkmark
Mode Switch Monitoring	Yes/No	-	X	\boxtimes	\checkmark



Note 1. Joystick Source.

The G91 does not have a 'local' or 'Master' joystick. Available selections are Master/ACU/RJM/Display/ARC/Ext-NV1/Ext-NV2/None.

The selections of Display/Ext-NV1/Ext-NV2 are reserved for future expansion and cannot be utilised today.

Note 2. HHP Selection of Joystick Source.

Selecting an alternative input device on the G91 with the HHP is different to existing DX master remotes, such as DX-REM34 and DX-REMG90. However, as described in note 1, the selection is the same with Wizard.

Connect the alternate input device, e.g. a DX-RJM etc.

Switch on the G91 and select the desired profile (1-5) with a Mode button. Insert the HHP and cycle through the available options, Speed/Acceleration etc.

The final option will be the Joystick Source, as shown below. Press Up/Down to select input device, Exit to confirm.



Note 3. Wrap Profiles.

The function of Wrap Profiles varies between the G91 variants and the way they are configured. The parameter is ignored in certain configurations. Ensure that the product functions as expected after making changes.

9.2 Programming Accessories

Dynamic DX Programming Accessories			
Part Description	DC Part #	Qty/Unit	
Wizard 5 Kit – Programming Kit Contains software, cables and adapter (no Dongle)	DWIZ5-KIT	1	release the magic
Wizard 5 – Software Only (CD)	DWIZ5-SW	1	WIZARD5
Wizard Dongle – OEM or Dealer version (Parallel Port)	DWD-OEM or DWD-DLR	1	
Wizard Dongle – OEM or Dealer version (USB)	DWD-OEM-U or DWD-DLR-U	1	
DX Hand Held Programmer	DX-HHP	1	
9.3 Intended Use and Regulatory Statement

Intended Use

The DX-REMG91 family are components of a DX system intended to allow powered wheelchair users interaction with the DX System. The DX-REMG91 offers flexibility in integrating compatible input and output devices, as configured and connected and provides extensive adaptability to meet specific user needs through optimal programmability.

The DX system is intended to operate powered wheelchairs utilizing 24V motors with integrated park-brakes.

The wheelchair manufacturers are provided with all the integration, set-up, operating environment, test and maintenance information needed in order to ensure reliable and safe use of the controller.

Device Classification

Europe

The DX Controller is a component of a Class I medical device as detailed in the Council Directive 93/42/EEC concerning Medical Devices.

USA

The DX Controller is a component of a Class II medical device (Powered Wheelchair) as detailed in 21 CFR § 890.3860.

Compliance and Conformance with Standards

In accordance with the device classification, the DX wheelchair controller is designed to comply with the requirements of the European Medical Device Directive 93/42/EEC and 21 CFR § 820.30.

The DX Controller has been designed such that the combination of the wheelchair and the DX Controller, along with accessories as applicable, complies with the requirements of the MDD Harmonized standards EN12184 and EN12182 and the FDA Consensus standard ISO 7176 for performance.

However, final compliance of the complete wheelchair system with international and national standards is the responsibility of the wheelchair manufacturer or installer.

9.4 Maintenance

- 1. All vehicle components should be regularly checked for loose, damaged or corroded connectors, terminals, or cabling. All cables should be restrained to protect them from damage. Damaged components should be replaced.
- 2. All switch able functions on the Dynamic electronics system should be regularly tested to ensure they function correctly.
- 3. All Dynamic electronic components should be kept free of dust, dirt and liquids. If necessary, wipe with a cloth dampened with warm water. Do not use solvents or abrasive cleaners.
- 4. There are no user-serviceable parts in any Dynamic electronic component. Do not attempt to open any case, or undertake any repairs, or warranty will be voided.
- 5. Where any doubts exist, consult your nearest service centre or agent.



Warning:

If any component is damaged in any way, or if internal damage may have occurred (for example by being dropped), have it checked by qualified personnel before operating.

9.5 Warranty

All equipment supplied by Dynamic Controls is warranted by the company to be free from faulty materials or workmanship. If any defect is found within the warranty period, the company will repair the equipment, or at its discretion, replace the equipment without charge for materials and labour.

This Warranty is subject to the provisions that the equipment:

- has been thoroughly checked upon completion of installation, and all programmable options correctly adjusted for safe operation prior to use.
- has been correctly installed.
- has been used solely in accordance with this manual.
- has been properly connected to a suitable power supply in accordance with this manual.
- has not been subjected to misuse or accident, or been modified or repaired by any person other than personnel authorized by Dynamic Controls.
- has been used solely for the driving of electrically powered wheelchairs in accordance with the wheelchair manufacturer's recommendations.

9.6 Safety and Misuse Warnings

Warnings to be included in the User Manual

The following warnings are applicable to the installer and must be passed on to the enduser before use of the product.

- Do not install, maintain or operate this equipment without reading, understanding and following the proper instructions and manuals, otherwise injury or damage can result.
- No user-serviceable parts inside.
- A warning must be conveyed to the operator that he or she has the responsibility to ensure that the vehicle is kept in a good safe operating condition, and to ensure that components, such as cables, are protected from damage by securing them in optimum positions.
- A warning must be conveyed to the operator that the controller could cause the vehicle to come to a sudden stop. In situations where this might affect the safety of the operator, the fitting and wearing of a seat belt is required.
- Performance adjustments should only be made by professionals in the health care field or by persons fully conversant with the adjustment process and the operator's capabilities. Incorrect settings, or programming in an unsafe location, could cause injury to the operator or bystanders, or damage to the vehicle or surrounding property.
- Performance adjustments should only be made indoors, or outdoors in dry conditions.
- The user should turn the system off before getting in and out of the vehicle.
- Do not operate the vehicle if it behaves erratically, or shows abnormal response, heating, smoke or arcing. Turn the system off at once and consult your service agent.
- If the vehicle drives without demand, press the Power button.
- Ensure that the battery charger used with DX is pin-compatible for drive inhibit. Consult your dealer or vehicle manufacturer.
- If the vehicle speed surges when going down hill, the common reason is the operation
 of an over-voltage protective device. When running down hill, the braking energy from
 the motor is sent to the battery, which charges it. However, if the battery is fully
 charged, it cannot accept the generated energy without dramatically increasing its
 voltage. If this over-voltage condition were allowed to continue, there would be a risk of
 damage to the battery or an explosion. To prevent these risks, the controller forces the
 vehicle to slow down until the battery voltage drops to a safe level, after which it allows
 the vehicle to speed up again. To prevent speed surging with charged batteries, we
 advise operators to descend hills slowly.
- No connector pins should be touched, because contamination or damage due to electrostatic discharge might result.
- The controller should not be stored or operated outside of the minimum or maximum temperature ranges specified in this manual.

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- Most electronic equipment is influenced by radio frequency interference (RFI). Caution should be exercised with regard to the use of portable communications equipment in the area around such equipment. While Dynamic Controls has made every effort to ensure that RFI does not cause problems, very strong signals could still cause a problem. It is the responsibility of the vehicle manufacturer to ensure that the vehicle is tested in accordance with local EMC regulations.
- If RFI causes erratic behaviour, turn the vehicle off immediately. Turn the vehicle off before using cell phones or portable communications devices.
- In the event of the system status LED/indicator flashing while driving, the operator must ensure that the system is behaving normally. If not, the system must be turned off and a service agent contacted.
- Report any malfunctions immediately to your service agent.

Service and Configuration Warnings

The following warnings are applicable to the installer only.

- It is the responsibility of the therapist/ installer to ensure the final set-up of the vehicle is appropriate for the specific abilities of the particular end-user in terms of safety and performance.
- After the vehicle has been configured, check to make sure the vehicle performs to the specifications entered in the programming procedure. If the vehicle does not perform to specifications, reprogram it. Repeat this procedure until the vehicle performs to specifications. If the intended operation cannot be achieved, contact your service agent.
- The completed installation must be thoroughly checked, and all programmable options correctly adjusted, for safe operation prior to use.



9.7 Electromagnetic Compatibility (EMC)

Dynamic Electronic Controllers have been tested on typical vehicles to confirm compliance with the following appropriate EMC standards:

USA: ANSI/RESNA WC/Vol:2 - 1998 Sec 21

Europe: EN12184:1999 Sec 9.8.1-3

National and international directives require confirmation of compliance on particular vehicles. Since EMC is dependent on a particular installation, each variation must be tested. The guidelines in this section are written to assist with meeting EMC requirements.

Minimizing Emissions

Motors: Motor brushes generate electromagnetic emissions. It may be necessary to fit capacitors between the brush holders and motor case. Ensure the leads are kept as short as possible.

A suitable capacitor is 4n7, 250V Polypropylene.

Wiring: Keep wire lengths as short as practical for a tidy layout.

Minimize any wire loops, particularly loops of single wires as opposed to wire pairs.

Endeavour to run wires in pairs or bunches.

Where practical, tie cables to wheelchair frame.

Immunity to Radiated Fields

Follow the wiring recommendations for minimizing emissions.

Immunity to ESD

Follow the wiring recommendations for minimizing emissions.

Ensure all vehicle sub-frames are electrically connected.

Do not leave connections unnecessarily exposed.

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9.8 Environmental Statement



This product has been supplied from an environmentally aware manufacturer.

Please be environmentally responsible and recycle this product at the end of its life through your local recycling facility.

This product may contain substances that could be harmful to the environment if disposed of into a landfill.



9.9 Contact Details

Dynamic has a global network of sales and service centres. Please contact your nearest Dynamic representative for Sales and/or Service advice, or visit our web site:

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