Invacare® LiNX

en Controls System Service Manual

PROVIDER: Keep this manual.
The procedures in this manual MUST be performed by a qualified technician.

Yes, you can.

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Contents

1 General 5
1.1 Introduction 5
1.2 General Information 5
1.3 Symbols in This Manual 5
1.4 Images in This Manual 6

2 Safety 7
2.1 Safety information 7
2.2 Safety notes on the electrical system 7

3 Assembly 8
3.1 Tightening Torques 8
3.2 Imperial to metric conversion chart 8
3.3 Overview Components 10
3.4 Power module mounting 16
3.5 Mounting positions on wheelchairs 17
3.6 Port pin-outs 18
3.7 Actuator Port Configurations (Factory Setup) 19
3.7.1 Port configurations for systems with DLX-REM2xx (EU-Version with Modulite seat) 20
3.7.2 Port configuration for non-expandable systems (US version) 21
3.7.3 Port configuration for systems with DLX-REM400 and DLX-REM500 (with Ultra Low Maxx seat) 22
3.7.4 Port Configurations for Functionkeys 23
3.8 Wiring Diagrams 23
3.8.1 Wiring for Modulite Seating System 24
3.8.2 Wiring for Modulite Seating System (Pronto M41 Only) 31
3.8.3 Wiring for Modulite Seating System (Fox Only) 32
3.8.4 Wiring for Ultra Low Maxx Seating System 35
3.9 Mounting the primary remotes 39
3.9.1 Mounting Remotes to Standard Remote Holder 39
3.9.2 Mounting Remotes to Swing-Away Remote Holder 40
3.9.3 Mounting Remotes to Quad Link Remote Holder 42
3.9.4 Mounting Remotes to Attendant Remote Holders 43
3.9.5 Mounting Toggle Switches on the DLX-REM400 46
3.10 Mounting Primary Remotes to Nucleus Midline Holder 46
3.11 Mounting the secondary remotes 48
3.11.1 Mounting KLICKfix Adapter for IDC 48
3.11.2 Mounting the DLX-ACU200 48
3.11.3 Mounting the DLX-CR400 51
3.11.4 Mounting the DLX-REM050 53
3.12 Mounting the ASL components 54
3.12.1 Mounting Interface Boxes 54
3.12.2 Mounting the Compact Single Switch Joystick 58
3.12.3 Mounting the Micro Extremity Control Joystick 62
3.12.4 Mounting the Pediatric Compact Joystick 65
3.12.5 Mounting the eclipse tray with proximity sensors 69
3.13 Mounting the 10 way switch 69
3.13.1 Mounting the 10 way switch for Modulite 70
3.13.2 Mounting the 10 way switch for Ultra Low Maxx 71
3.13.3 Changing Labeling 73

4 Replacing Wheelchair Components 74
4.1 General information on setup 74
4.2 Battery Synchronisation on New Batteries 74
4.3 Replacing Power Module as Spare Part 74
4.4 Setup Procedure After Power Module Replacement 74

5 LiNX Access Tools 76
5.1 The LiNX Access Key 76
5.1.1 Rename LiNX Access Key (only possible with LiNX Access PC tool) 76
5.2 Overview LiNX Access Tools 77
5.2.1 Overview Profiles 79
5.2.2 Overview User Preferences 80
5.2.3 Overview Display Settings 84
5.2.4 Overview Control Input / Output (Control IO) 84
5.2.5 Control Input Types and Options 88

6 Suggested programming procedure 91
6.1 Step 1 – Power-up test 91
6.2 Step 2 – Check Motor Orientation 92
6.3 Step 3 – Set Load Compensation 92
6.3.1 Calibrating Adaptive Load Compensation (iOS Tool) 93
6.3.2 Calibrating Adaptive Load Compensation (PC tool) 94
6.4 Step 4 – Adjust Speed Settings 96
6.5 Step 5 – Adjust acceleration settings 98

7 Using the LiNX Access iOS tool 100
7.1 Navigation bar 100
7.1.1 Application menu 100
7.1.2 Changing Program Name 101
7.2 Home Screen 102
7.3 Connection context actions 102
7.3.1 Connect to device screen 103
7.3.2 Reading a program from the wheelchair 104
7.3.3 Restoring Default Wheelchair Configurations 104
7.3.4 Converting Configuration Files 104
7.3.5 Modifying a Program 105
7.3.6 Writing a program to the wheelchair 105
7.3.7 Saving programs 106
7.3.8 Upgrading Firmware 107
7.3.9 Storing the LAK certificate 108
7.4 File context actions 108
7.4.1 Load from file screen 109
7.4.2 Writing Bundle Files 109
7.4.3 Opening files 111
7.4.4 Deleting files 111
7.4.5 E-mailing files 112

8 Using the LiNX Access PC tool 114
8.1 Installing the software 114
8.1.1 Using Bluetooth on a computer 115
8.2 Layout overview 116
8.3 Concepts 117
8.4 Checking and Getting Latest Version 118
8.5 Connection context actions 119
8.5.1 Connecting/Disconnecting the LiNX Access PC tool 119
8.5.2 Write a program to a wheelchair 120
8.5.3 Read a program from a wheelchair 120
8.5.4 Save a program as a file 120
8.5.5 Storing the LAK certificate 121
8.5.6 Upgrading Firmware 121
8.5.7 Restoring Default Wheelchair Configurations 122
8.5.8 Loading Default Configurations 124
8.5.9 Converting Configuration Files 125
8.6 File context actions 125
8.6.1 Open/Close a file 126
8.6.2 Remove a file from list 126
8.6.3 Writing bundle files to a chair 126

9 Modifying Wheelchair Configurations 128
9.1 Profile and Function Actions 128
9.1.1 Change Profile And Function Actions with iOS Tool 128
9.1.2 Change Profile and Function Actions with PC Tool . . . 132
9.2 Modifying Function and Profile Names 135
9.3 Modifying Drive Parameters 137
9.3.1 Modifying Drive Parameters Numerically 137
9.3.2 Modifying Drive Parameters Graphically (iOS Tool Only) 137
9.4 Adjust Quadrant Operation 138
9.4.1 Adjust Drive Directions 140
9.5 Setting up System for Latched Driving 141
9.6 Modifying Gyro Support in Drive Functions 142
9.7 Modifying Lighting Parameters 143
9.8 Modifying Seating Parameters 143
9.8.1 Trigger Angles (iOS Tool) 146
9.8.2 Trigger Angles (PC Tool) 147
9.9 Modifying Attendant Parameters 147
9.10 Modifying Utility Functions 148
9.11 Joystick Switch Threshold 153

9.12 Joystick Shaping 155
9.13 Configuring Rest 157
9.14 Enable Indirect Navigation 160
9.15 Configuring Control Input/Output (Control IO) 163
9.15.1 Configuring Control IO (iOS Tool) 163
9.15.2 Configuring Control IO (PC Tool) 165
9.15.3 Configuring External Power Button 167
9.15.4 Configuring Mouse Clicks 168
9.15.5 Configuring Toggle Switches 171
9.15.6 Configuring External Switches 175
9.15.7 Programming Multipurpose Buttons 176
9.16 Conditional Control IO 177
9.16.1 Always Rule 183
9.16.2 Conditional Rule 187
9.16.3 Conditional/Else Rule 192
9.17 Installing/Setting up Alternative Switches 197
9.18 Sip and Puff installation 199
9.18.1 Sip and Puff Calibration 200

10 Diagnostics 204

10.1 Viewing System Summary 204
10.2 Viewing Active Errors 204
10.3 Viewing Chair Statistics 205
10.4 Viewing Live Diagnostics 208
10.5 Clearing the event log 208

11 Structure of Program Names 209

11.1 Naming Format 210
11.2 Where-Used Matrices 212

1 General

1.1 Introduction

This document contains important information about assembly, adjustment and advanced maintenance of the product. To ensure safety when handling the product, read this document and the user manual carefully and follow the safety instructions.

Find the user manual on Invacare's website or contact your Invacare representative. See addresses at the end of this document.

Invacare reserves the right to alter product specifications without further notice.

Before reading this document, make sure you have the latest version. You find the latest version as a PDF on the Invacare website.

For pre-sale and user information, see the user manual.

For more information about the product, for example product safety notices and product recalls, contact your Invacare representative. See addresses at the end of this document.

1.2 General Information

Service and maintenance work must be carried out taking this document into account.

Note that there may be sections in this document, which are not relevant to your product, since this document applies to all available models (on the date of printing). If not otherwise stated, each section in this document refers to all models of the product.

The models and configurations available in your country can be found in the country-specific sales documents.

It is imperative that you observe safety information.

Information about operation or about general maintenance and care work on the product should be taken from service manual.

Assembly of accessories might not be described in this document. Refer to the manual delivered with the accessory. Additional manuals can be ordered from Invacare. See addresses at the end of this document.

You can find information about ordering spare parts in the spare parts catalogue.

Spare parts must match original Invacare parts. Only use spare parts which have been approved by Invacare.

The product may only be maintained and overhauled by qualified personnel.

The minimum requirement for service technicians is suitable training, such as in the cycle or orthopedic mechanics fields, or sufficiently long-term job experience. Experience in the use of electrical measuring equipment (multimeters) is also a requirement. Special Invacare training is recommended.

Alterations to the mobility device which occur as a result of incorrectly or improperly executed maintenance or overhaul work lead to the exclusion of all liability on the side of Invacare.

If you have any problems or questions contact your provider.

1.3 Symbols in This Manual

Symbols and signal words are used in this manual and apply to hazards or unsafe practices which could result in personal injury or property damage. See the information below for definitions of the signal words.

WARNING
Indicates a hazardous situation that could result in serious injury or death if it is not avoided.

CAUTION
Indicates a hazardous situation that could result in minor or slight injury if it is not avoided.

NOTICE
Indicates a hazardous situation that could result in damage to property if it is not avoided.

Tips
Gives useful tips, recommendations and information for efficient, trouble-free use.

Tools
Identifies required tools, components and items which are needed to carry out certain work.

Other Symbols

(Not applicable for all manuals)

UK Responsible Person
Indicates if a product is not manufactured in the UK.

Triman
Indicates recycling and sorting rules (only relevant for France).

1.4 Images in This Manual

The detailed images in this manual are given marks to identify various components. Component marks in text and operational instructions always relate to the image directly above.

2 Safety

2.1 Safety information

WARNING!
The procedures in this service manual, must be performed by a specialized dealer or qualified service technician.
– Do not handle this product or any available optional equipment without first completely reading and understanding these instructions and any additional instructional material such as user manuals, installation manuals or instruction sheets supplied with this product or optional equipment.

The information contained in this document is subject to change without notice.

2.2 Safety notes on the electrical system

WARNING!
Fire and burn hazard due to electrical shorts
– The mobility device must be completely switched off before removal of voltage-carrying components. To do this, remove the batteries. For information about removing the batteries, refer to the service manual of the particular wheelchair.
– Avoid short-circuiting the contacts when carrying out measurements on voltage-carrying components.

WARNING!
Risk of injury or damage due to electrical shorts
Connector pins on cables connected to the power module can still be live even when the system is off.
– Cables with live pins should be connected, restrained or covered (with non-conductive materials) so that they are not exposed to human contact or materials that could cause electrical shorts.
– When cables with live pins have to be disconnected, for example, when removing the bus cable from the remote for safety reasons, make sure to restrain or cover the pins (with non-conductive materials).

Risk of damage to the connector pins
If you touch the connector pins, they can become dirty or they can be damaged by electrostatic discharge.
– Do not touch the connector pins.

To maximize performance, minimize EMC emissions, maximize EMC and ESD immunity, and to keep the cabling of the wheelchair safe and tidy, observe the following guidelines:

- All wiring should comply with the requirements of ISO7176-14.
- Keep all cables as short as possible.
- All cables used should be resistant to fire to VW-1 (UL 1581) or similar.
- Avoid wire loops, especially loops of single wires instead of wire pairs.
- Try to run wires in pairs or bunches. For example, run the battery's positive and negative wires together, and the motor's positive and negative wires together. Bind wires together and fix them to the chassis.
- Do not route the cables (including the motor cable) near the motor case, where possible.
- Make sure that all vehicle sub-frames, particularly the motors and controller case, are electrically connected.
- Do not use the vehicle frame as the earth return. Any electrical low-resistance connection to the frame is a safety risk and is not allowed by international safety standards.
- To minimize electromagnetic emissions by the motor brushes, it may be necessary to fit capacitors between the brush holders and the motor case. Make sure that the leads are kept as short as possible. A suitable capacitor is 4n7, 2kV Ceramic.
- For best electrical performance, the wire size must be as large as possible, but no larger than what the crimp in the connector can withstand. Always use the correct tool for crimping.
- Recommended minimum wire sizes are shown in the wiring sections.
- For low-current signals, do not use wire sizes smaller than 0.5 mm^2/20 AWG, because smaller wires are physically not strong enough for this application.
- The type of cable used must be appropriate for the mechanical and environmental abuse it is likely to encounter.
- Do not use damaged or abused cables. A damaged cable can potentially produce localized heat, sparks or arcing, and as such it can cause a fire.
- Protect all cables against possible contact with flammable material.
- If an extension loom is fitted, mount it with the female connector facing horizontal or downwards, and protect it from direct splashing. If the extension loom is to be used for frequent disconnection, mount the female connector so that it faces downwards.

3 Assembly

3.1 Tightening Torques

CAUTION!
Risk of damage to mobility device due to improperly tightened screws, nuts or plastic connections.
– Always tighten screws, nuts etc. to the stated tightening torque.
– Only tighten screws or nuts which are not listed here fingertight.

The tightening torques stated in the following list are based on the thread diameter for the nuts and bolts for which no specific values have been determined. All values assume dry and de-greased threads.

Thread	Tightening Torque in Nm ±10 %
M4	3 Nm
M5	6 Nm
M6	10 Nm
M8	25 Nm
M10	49 Nm
M12	80 Nm
M14	120 Nm
M16	180 Nm

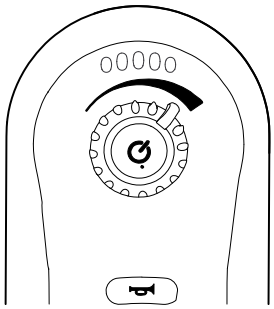
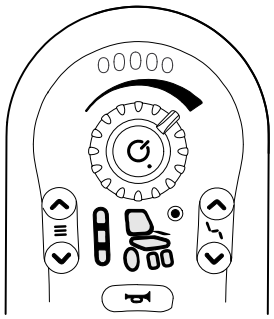
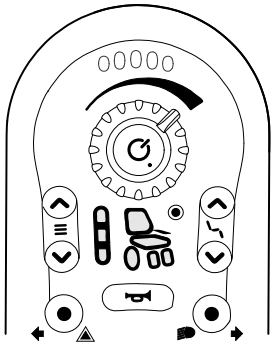
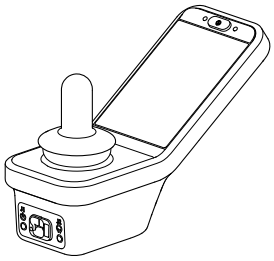
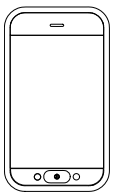
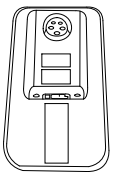
3.2 Imperial to metric conversion chart

You can use this chart as an orientation to find the right tool size.

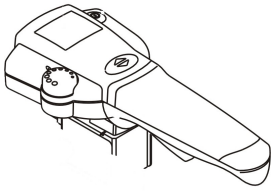
IMPERIAL	METRIC
inch	**mm**
5/64	1.9844
3/32	2.3813
7/64	2.7781
1/8	3.1750
9/64	3.5719
5/32	3.9688
11/64	4.3656
3/16	4.7625
13/64	5.1594
7/32	5.5563
15/64	5.9531
1/4	6.3500
17/64	6.7469
9/32	7.1438
19/64	7.5406
5/16	7.9375
21/64	8.3344
11/32	8.7313
23/64	9.1281
3/8	9.5250
25/64	9.9219

IMPERIAL	METRIC
inch	mm
13/32	10.3188
27/64	10.7156
7/16	11.1125
29/64	11.5094
15/32	11.9063
31/64	12.3031
1/2	12.7000
33/64	13.0969
17/32	13.4938
35/64	13.8906
9/16	14.2875
37/64	14.6844
19/32	15.0813
39/64	15.4781
5/8	15.8750
41/64	16.2719
21/32	16.6688
43/64	17.0656
11/16	17.4625
45/64	17.8594
23/32	18.2563
47/64	18.6531
3/4	19.0500
49/64	19.4469
25/32	19.8438
51/64	20.2406
13/16	20.6375
53/64	21.0344
27/32	21.4313
55/64	21.8281
7/8	22.2250

3.3 Overview Components

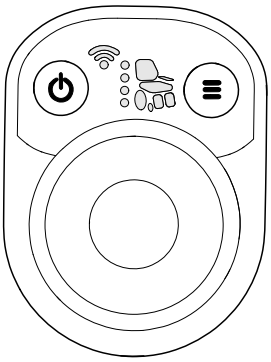
Remote modules	
	DLX-REM110 • Drive function
	DLX-REM211 • Drive function • Powered seating function
	DLX-REM216 • Drive function • Powered seating function • Lighting function
	DLX-REM400 • Touch screen interface to facilitate: – Multiple drive functions – Multiple powered seating functions – Lighting function • Multipurpose buttons • 3.5 mm jack sockets
 	DLX-REM500 • Touch screen interface to facilitate: – Multiple drive functions – Multiple powered seating functions – Lighting function • Multipurpose buttons • 3.5 mm jack sockets

Secondary remote modules



LiNX IDC
Intuitive Dual Control

- On/Off button
- Speed dial
- Display for drive direction indicator

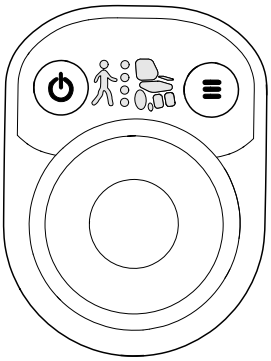


DLX-CR400
Compact Remote

- On/Off button
- Menu button
- Display for drive, seating and connectivity functions

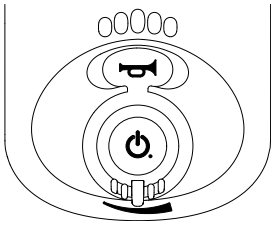
DLX-CR400LF
Compact Remote Low Force

- As compact remote
- With low force joystick



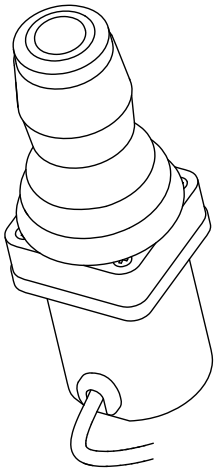
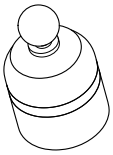
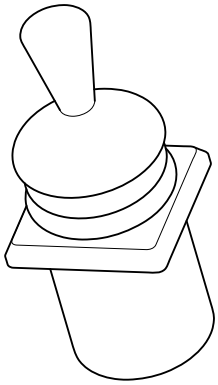
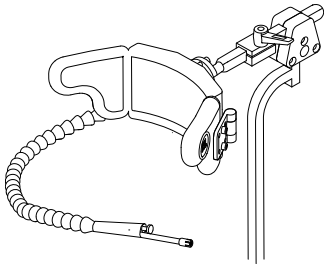
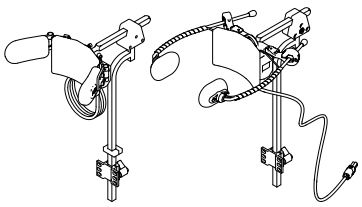
DLX-ACU200
Attendant Control Unit

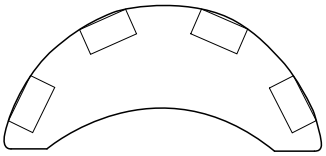
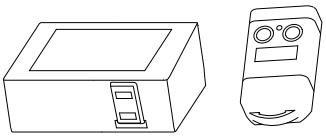
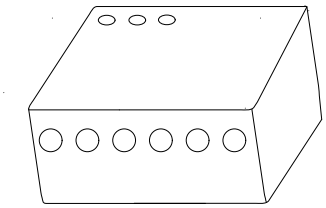
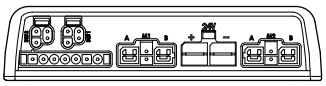
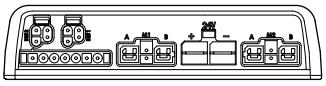
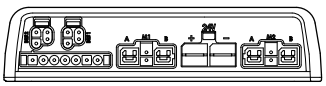
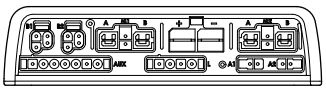
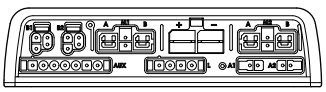
- On/Off respectively Select button
- Menu button
- Display for drive and seating functions and "who's in charge" indication

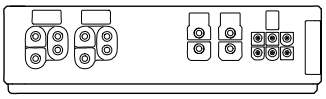
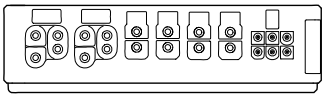
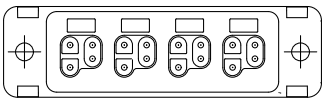
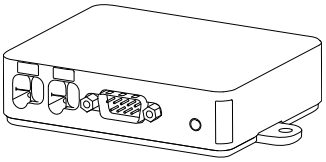
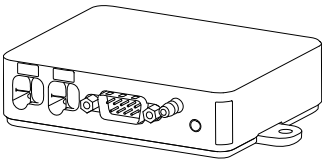
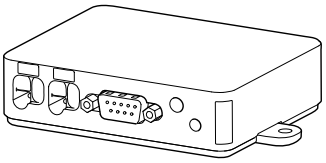
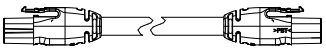
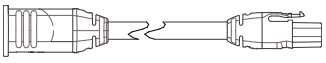
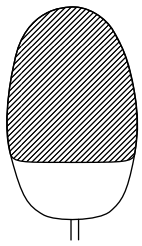
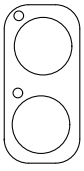


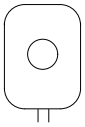
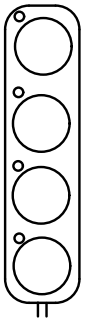
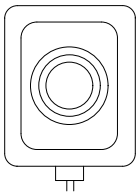
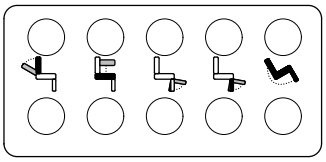
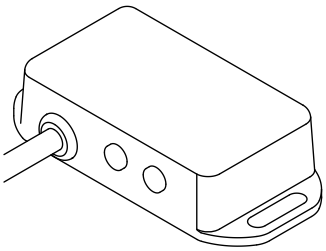
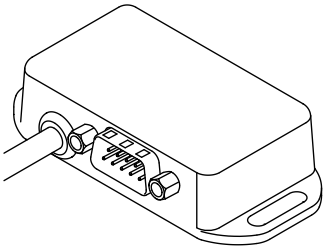
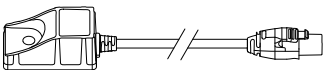
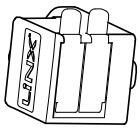
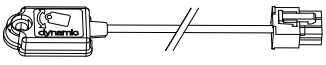
DLX-REM050

- Attendant control unit with drive function

ASL components	
	ASL 138 Extremity Control Joystick
	ASL 133 Compact Single Switch Joystick
	ASL 130 Micro Extremity Control Joystick
	ASL 132 Compact Joystick
	ASL 109 Sip and Puff Head Array
	ASL 104/ASL 104P Head Array

ASL components	
	ASL 106 Four Switch Proximity Array
	ASL 504 Remote Stop Switch
	Wireless Accessories for ATOM: • Wireless Mouse Emulator ASL 558 • Wireless Triple Switch Receiver ASL 557-3
Power modules	
	DLX-PM60 • 63 A maximum current • 2 x bus sockets • Dynamic Load Compensation • Adaptive Load Compensation • Utility port • Real-time clock
	DLX-PM75 • 78 A maximum current • 2 x bus sockets • Dynamic Load Compensation • Adaptive Load Compensation • Utility port • Real-time clock
	DLX-PM120 • 120 A maximum current • 2 x bus sockets • Dynamic Load Compensation • Adaptive Load Compensation • Utility port • Real-time clock
	DLX-PM75AL • 78 A maximum current • 2 x bus sockets • Dynamic Load Compensation • Adaptive Load Compensation • Utility port • 2 x actuators • 3 x lights • Real-time clock
	DLX-PM120AL • 120 A maximum current • 2 x bus sockets • Dynamic Load Compensation • Adaptive Load Compensation • Utility port • 2 x actuators • 3 x lights • Real-time clock

LiNX seating modules and interfaces	
	DLX-ACT200 • 2 x actuator channels • 2 x bus ports • 1 x 6-pin general purpose input (GPI) port • Module status LED • Actuator power provided through the bus
	DLX-ACT400 • 4 x actuator channels • 2 x bus ports • 1 x 6-pin general purpose input (GPI) port • Module status LED • Actuator power provided through the bus
	GLM-CONX4 4-way connector • Expansion block to connect to additional, multiple modules in a LiNX system
	DLX-IN200 Input module • DB9 connector for proportional and switched inputs • 12 V (200 mA) power supply • Jack input (stereo) • 2 x LiNX bus connector • Activity indicator displaying input demands
	DLX-IN500 Input module • DB9 connector for proportional and switched inputs • 12 V (200 mA) power supply • Sip and puff nozzle • Jack input (stereo) • 2 x LiNX bus connector • Activity indicator displaying input demands
	DLX-OUT500 Output module • DB9 connector for switched outputs • Jack output (stereo) • 2 x LiNX bus connector • Status indicator
	Bus cable; length from 300 up to 2500 mm
	Extension loom; length 640 and 900 mm
Powered seating accessories	
	ASL300 Egg switch • Momentary switch • Normally open • Mono jack
	Stereo button switch • 2 switches • Stereo jack

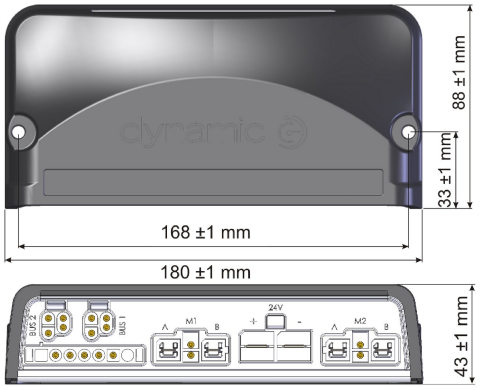
Powered seating accessories	
	Stereo toggle switch • Toggle switch • Normally open • Stereo jack
	4–way button switch • 4 switches • DB9 connector
	4–way toggle switch • 4 toggle directions • DB9 connector
	10–way switch • Hardware-only module that provides simple, direct access to powered seating functions
	DLX-FKEY01 • For systems with one physical actuator • Powered seating control through egg switch, stereo button switch or stereo toggle switch
	DLX-FKEY02 • For systems with two or more physical actuators • Powered seating control through 4-way button switch or 4-way toggle switch
	DLX-GYR100 LiNX G-Trac module • stabilizes wheelchair's driving behaviour
	DLX-USB02 LiNX USB charger • 2 USB charger ports • 1 A charging current per port • Protective rubber bungs
	DLX-TILT201–A Angle sensor • measures backrest angle

3.4 Power module mounting

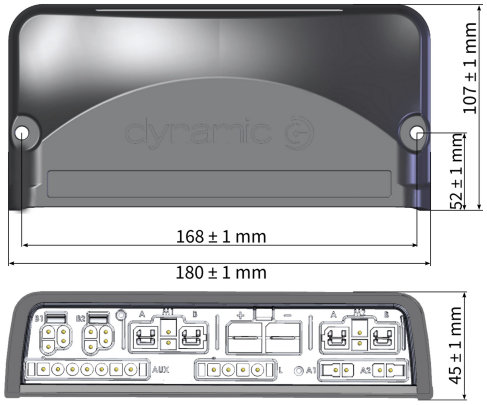
The mounting orientation of the power module that is specified by Invacare per wheelchair model must be kept.

Dimensions of the power modules

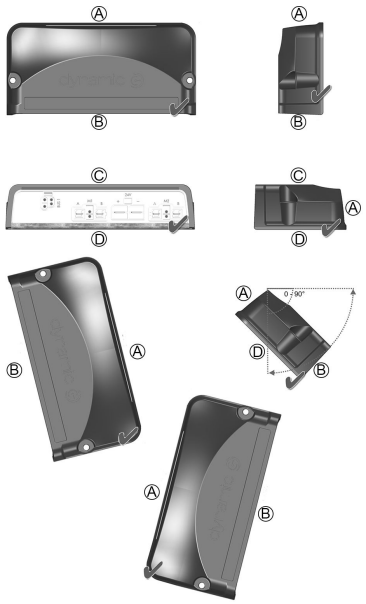
DLX-PM60, DLX-PM75, DLX-PM120



DLX-PM75AL, DLX-PM120AL



Correct mounting



Ⓐ Rear

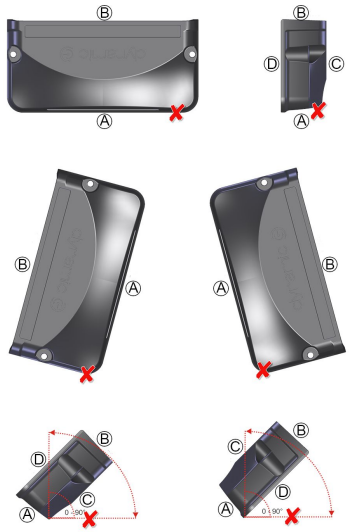
Ⓑ Connectors

Ⓒ Top

Ⓓ Base

The power modules can be placed on its side or at an angle. When placing the power modules at an angle, ensure that the connectors Ⓑ facing downwards, so that the connector recesses will not collect or retain foreign matter or liquids.

Incorrect mounting



Ⓐ Rear

Ⓑ Connectors

Ⓒ Top

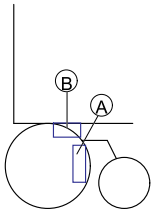
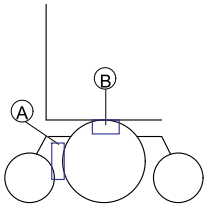
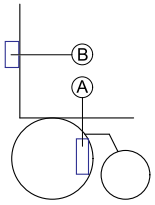
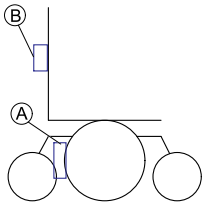
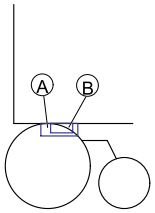
Ⓓ Base

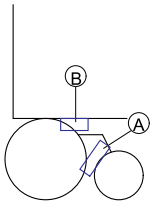
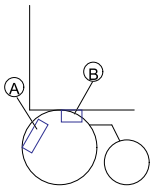
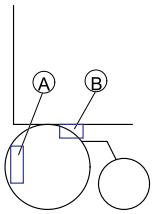
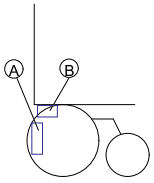
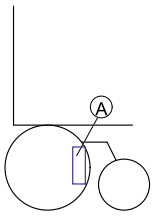
Testing

The LiNX system must be fully tested after all modules and cables have been installed.

3.5 Mounting positions on wheelchairs

The positions of the power modules Ⓐ and DLX-ACT200/400 Ⓑ depending on wheelchair model and —configuration are shown in the table below. For further information about access to the components, refer to the Service manual of the particular wheelchair model.

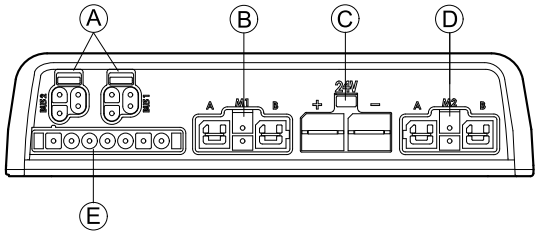
Rear Wheel Drive		Center Wheel Drive	
AVIVA RX with Modulite seat		Pronto M41, TDX SP2, TDX SP2 narrow base, TDX SP2 wide base with Modulite seat	
AVIVA RX with Ultra Low Maxx seat		TDX SP2 narrow base and TDX SP2 wide base with Ultra Low Maxx seat	
Bora/Spectra XTR, Spectra XTR HD w/o lifter/tilt module			

Rear Wheel Drive		Center Wheel Drive	
Bora/Spectra XTR, Spectra XTR HD w lifter/tilt module			
Fox			
Kite, Kite HD			
Storm4, Storm4 X-plore, Storm4 Max[1]			
Stream[1]			

1 no DLX-ACT200/400 on Storm4 Max and Stream

3.6 Port pin-outs

DLX-PM60, DLX-PM75, DLX-PM120



Ⓐ LiNX communication bus

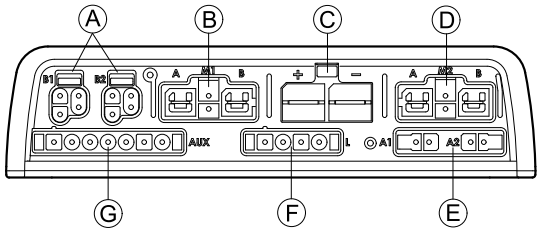
Ⓑ Motor / park brake port M1

Ⓒ Battery port

Ⓓ Motor / park brake port M2

Ⓔ Utility port

DLX-PM60AL, DLX-PM75AL, DLX-PM120AL



Ⓐ LiNX communication bus

Ⓑ Motor / park brake port M1

Ⓒ Battery port

Ⓓ Motor / park brake port M2

Ⓔ Actuator ports

Ⓕ Lighting port

Ⓖ Utility port

3.7 Actuator Port Configurations (Factory Setup)

Actuator ports, properties and behavior per actuator are defined by Invacare. You can change speed, direction and operation mode. This is done in different menus, refer to *9.8 Modifying Seating Parameters, page 143*

Seating Motion

The seating movement is called seating motion. The seating motion defines the icon displayed on the user interface, overall speed, the individual actuators and their speeds. A seating motion can control one or more actuators. There are six seating motions defined in the factory set-up.

Seating Function

The seating function is the user input and defines how the motion is operated.

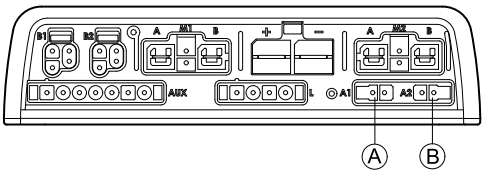
The “AL” power modules that feature actuators and lights, have two actuator ports. If required, the system is completed with the DLX-ACT200 or DLX-ACT400, based on the configuration. The following chapters detail the port set-up per module/configuration.

3.7.1 Port configurations for systems with DLX-REM2xx (EU-Version with Modulite seat)

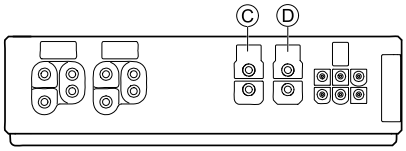
Channel	Seating motion (Icon)		Seating function (Operation)
Ⓐ	Tilt		Proportional FWD/REV
Ⓑ	Recline		Proportional FWD/REV
Ⓒ	Right leg	Both legs	Proportional FWD/REV
Ⓓ	Left leg/ Center-mounted legrest		Proportional FWD/REV
Ⓔ	Lifter		Proportional FWD/REV

Port configuration without lifter

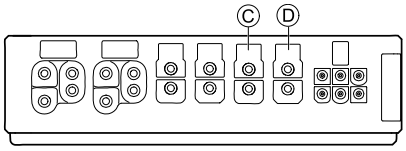
Power module



DLX-ACT200

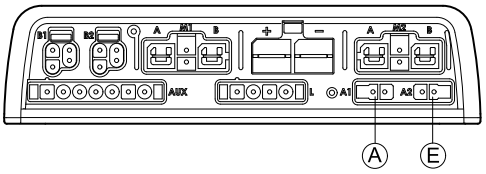


DLX-ACT400

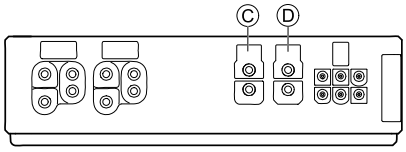


Port configuration with lifer

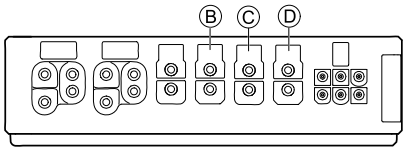
Power module



DLX-ACT200



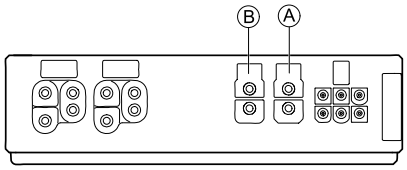
DLX-ACT400



3.7.2 Port configuration for non-expandable systems (US version)

Non-expandable systems are fitted with external switches and a functionkey, to control the powered seating functions. For more information about functionkeys, refer to chapter *3.7.4 Port Configurations for Functionkeys, page 23*.

Single actuator systems

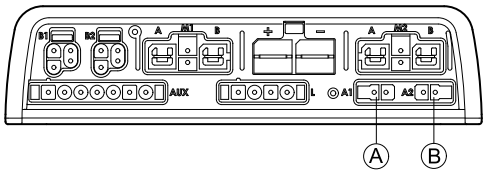


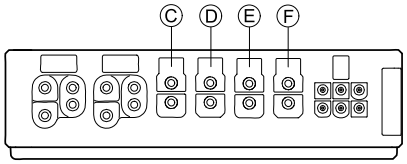
Channel	Seating motion (Icon)	Seating function (Operation)
Ⓐ	Recline only	Proportional FWD/REV
Ⓑ	Tilt only	Proportional FWD/REV
Ⓑ	LNX only	Proportional FWD/REV

Two actuator systems

Channel	Seating motion (Icon)	Seating motion (Icon)	Seating motion (Icon)	Seating motion (Icon)	Seating motion (Icon)	Seating function (Operation)
Ⓐ	Tilt	Tilt	Recline	Left leg	Recline	Proportional FWD/REV
Ⓑ	Lifter	LNX	LNX	Right leg	Tilt	Proportional FWD/REV

3.7.3 Port configuration for systems with DLX-REM400 and DLX-REM500 (with Ultra Low Maxx seat)





Channel	Seating motion (Icon)	Seating function (Operation)
Ⓐ	Tilt	Proportional FWD/REV
Ⓑ	Lifter	Proportional FWD/REV
Ⓒ	Legrest right	Proportional FWD/REV
Ⓓ	Legrest left	Proportional FWD/REV

Channel	Seating motion (Icon)	Seating function (Operation)
Ⓔ	LNX	Proportional FWD/REV
Ⓕ	Recline	Proportional FWD/REV

3.7.4 Port Configurations for Functionkeys

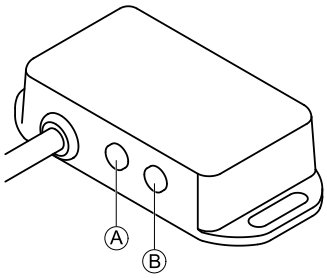
If the system is installed with an external switch to control the powered seating functions (except a 10–way switch), a functionkey is an option to interface switches. There are two different configurations of functionkeys. The type of functionkey determines the behaviour of the system in regards to the control of actuators. Properties and behaviour per switch are defined by Invacare and can be reassigned via the port to which the control input is connected. Reassigning is done in the **CONTROL INPUTS/OUTPUTS** section of the respective module. See *9.15.6 Configuring External Switches, page 175*

Type 1: Single Actuator System (SAS)

This functionkey is for systems with one physical actuator. It is available in one configuration:

- FKEY01TDC: actuator control through switches and joystick

External switches to control the powered seating functions, must be plugged into the Jack sockets, see table below.



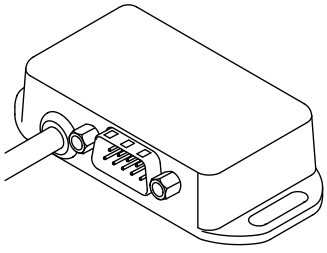
Ⓐ Mono jack to connect egg switch

Ⓑ Stereo jack to connect stereo button switch or stereo toggle switch

Type 2: Multi-Actuator System (MAC)

This functionkey is for systems with two or more physical actuators. It is available in one configuration:

- FKEY02TDC: actuator control through switches and joystick



The 4–way button switch or the 4–way toggle switch must be plugged into the DB9 socket.

3.8 Wiring Diagrams

The following diagrams show the wiring for a wheelchair in a complex configuration including multiple actuators, lights and attendant control unit.

To identify the required cable length, see tables below or measure the cable after removing it.

3.8.1 Wiring for Modulite Seating System

Wiring for Modulite: Lifter, Tilt, Recline, Powered Elevating Legrests, Lights, Dual Control, Secondary Input, DLX-ACT400, GLM-CONX4 (2x), DLX-IN200 and USB Charger

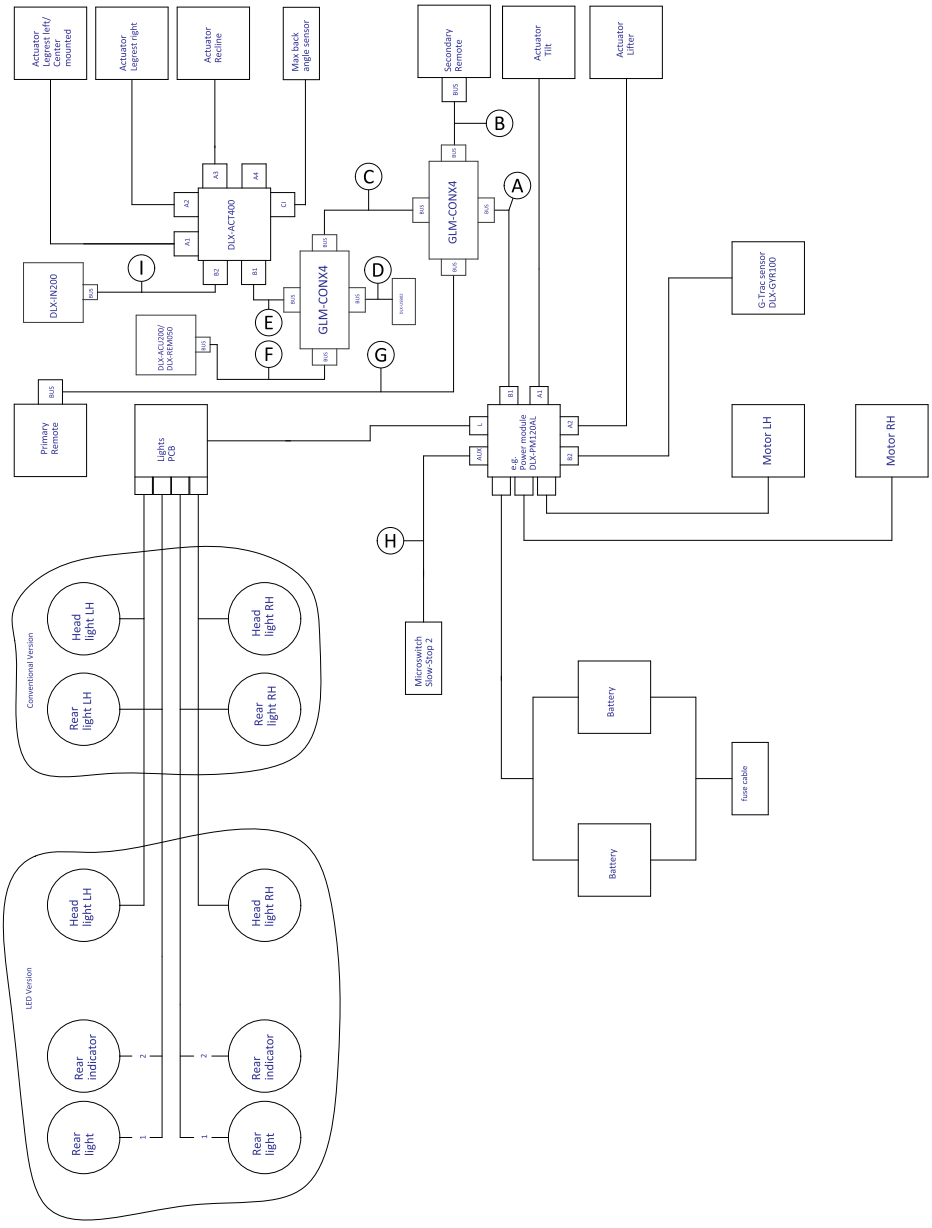


Fig. 3-1

Cable length may vary depending on mounting positions of primary and secondary remotes and of 4–way connector GLM-CONX4.

Model	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ
AVIVA FX	1500 mm + 640 mm extension loom	1500 mm	300 mm	300 mm	700 mm
AVIVA RX	1500 mm	1500 mm	300 mm	300 mm	700 mm
Kite	2500 mm	1500 mm	300 mm	700 mm	700 mm
Spectra XTR² HD, Bora/Spectra XTR Standard	1700 mm	1700 mm	300 mm	700 mm	700 mm

Model	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ
Storm[4], Storm[4] X-plore	1500 mm	1200 mm	300 mm	500 mm	300 mm
TDX SP2	1500 mm	1200 mm	300 mm	300 mm	700 mm

Model	Ⓕ	Ⓖ	Ⓗ	Ⓘ
AVIVA FX	1200 mm	2000 mm	1000 mm	N/A
AVIVA RX	1200 mm	2000 mm	640 mm	500 mm
Kite	1500 mm	2500 mm	700 mm	N/A
Spectra XTR[2] HD, Bora/Spectra XTR Standard	1200 mm	2000 mm	700 mm	N/A
Storm[4], Storm[4] X-plore	1200 mm	2000 mm	300 mm	N/A
TDX SP2	1000 mm	1700 mm	300 mm	N/A

Wiring for Modulite: Lifter, Tilt, Recline, Powered Elevating Legrests, Lights, Dual Control, DLX-ACT400, GLM-CONX4 and USB Charger

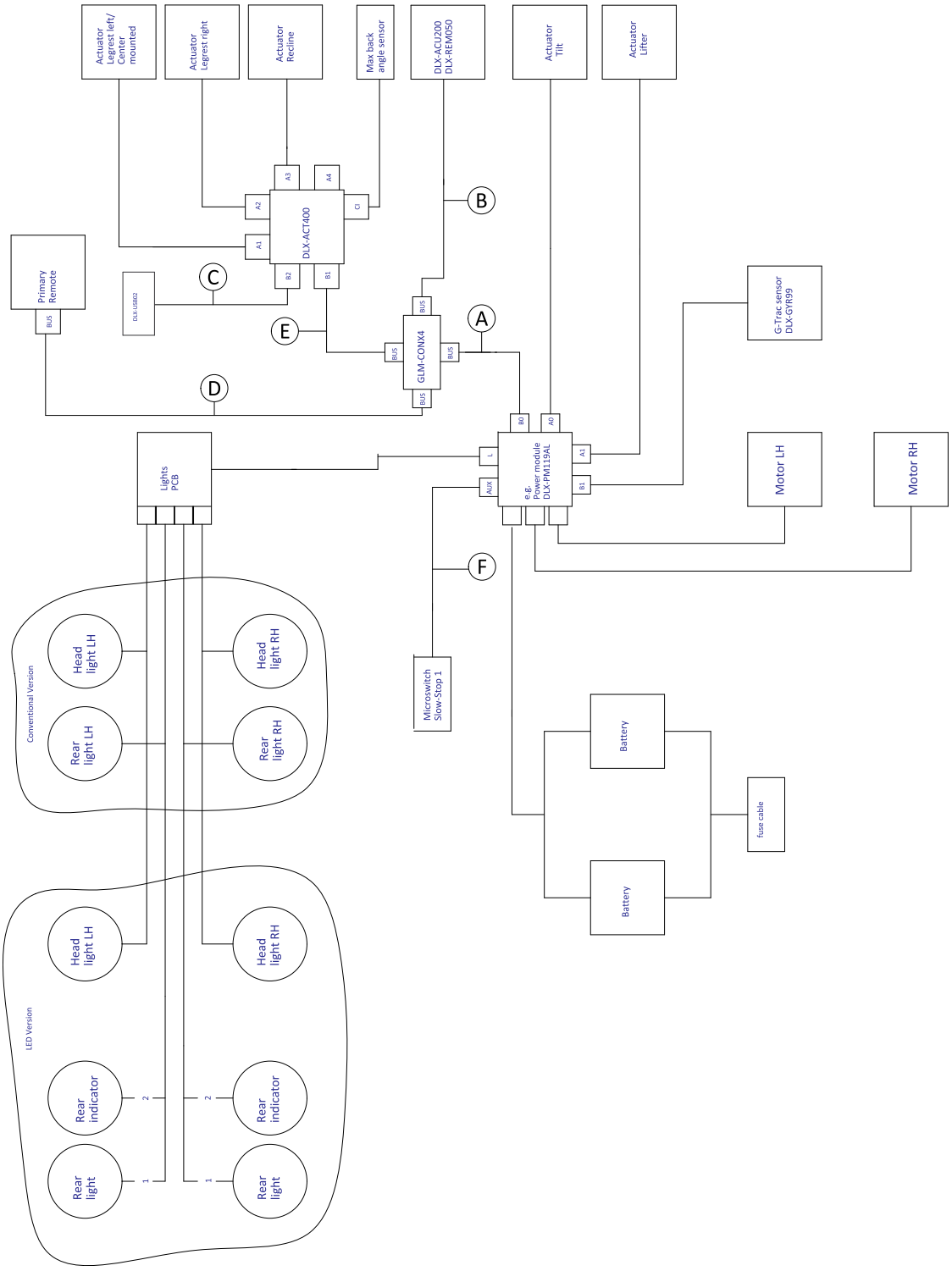


Fig. 3-2

Cable length may vary depending on mounting positions of primary remote, dual control and of 4–way connector GLM-CONX4.

Model	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓕ
AVIVA FX	1500 mm + 640 mm extension loom	2000 mm	700 mm	2000 mm	700 mm	1000 mm
AVIVA RX	1500 mm	2000 mm	700 mm	2000 mm	700 mm	640 mm
Kite	2500 mm	1500 mm	700 mm	1700 mm	700 mm	700 mm

Model	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓕ
Pronto M41[1]	1700 mm	1500 mm	700 mm	1500 mm	700 mm	-
Spectra XTR[2] HD, Bora/Spectra XTR Standard	1700 mm	1200 mm	700 mm	1500 mm	700 mm	700 mm
Storm[4], Storm[4] X-plore	1500 mm	1200 mm	500 mm	1500 mm	300 mm	300 mm
TDX SP2	1500 mm	1000 mm	300 mm	1500 mm	700 mm	300 mm

1 Pronto M41 without G-Trac Sensor, Microswitch and Back Angle Sensor

Wiring for Modulite: Tilt, Recline, Powered Elevating Legrests, Lights and DLX-ACT200

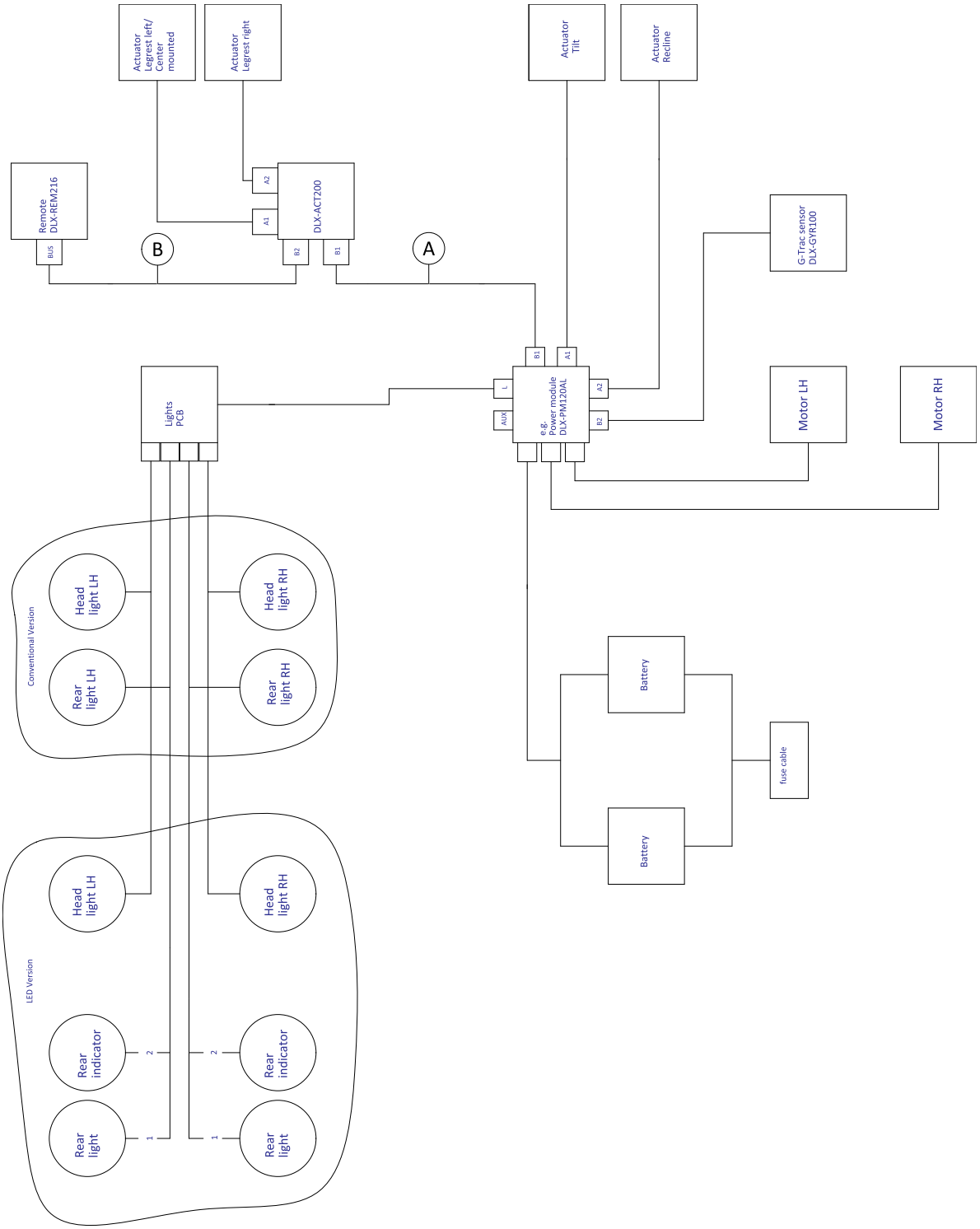


Fig. 3-3

Cable length may vary depending on mounting positions of primary remote.

Model	Ⓐ	Ⓑ
AVIVA FX	1500 mm + 640 mm extension loom	1700 mm 2500 mm (when mounted as attendant remote)
AVIVA RX	1500 mm	1700 mm 2500 mm (when mounted as attendant remote)

Model	Ⓐ	Ⓑ
Kite	1500 mm	1500 mm
Spectra XTR² HD, Bora/Spectra XTR Standard	1500 mm	1500 mm
Storm⁴, Storm⁴ X-plore	1200 mm	1500 mm
TDX SP2	1700 mm	1000 mm

Wiring for Modulite: Simple Tilt/Drive only

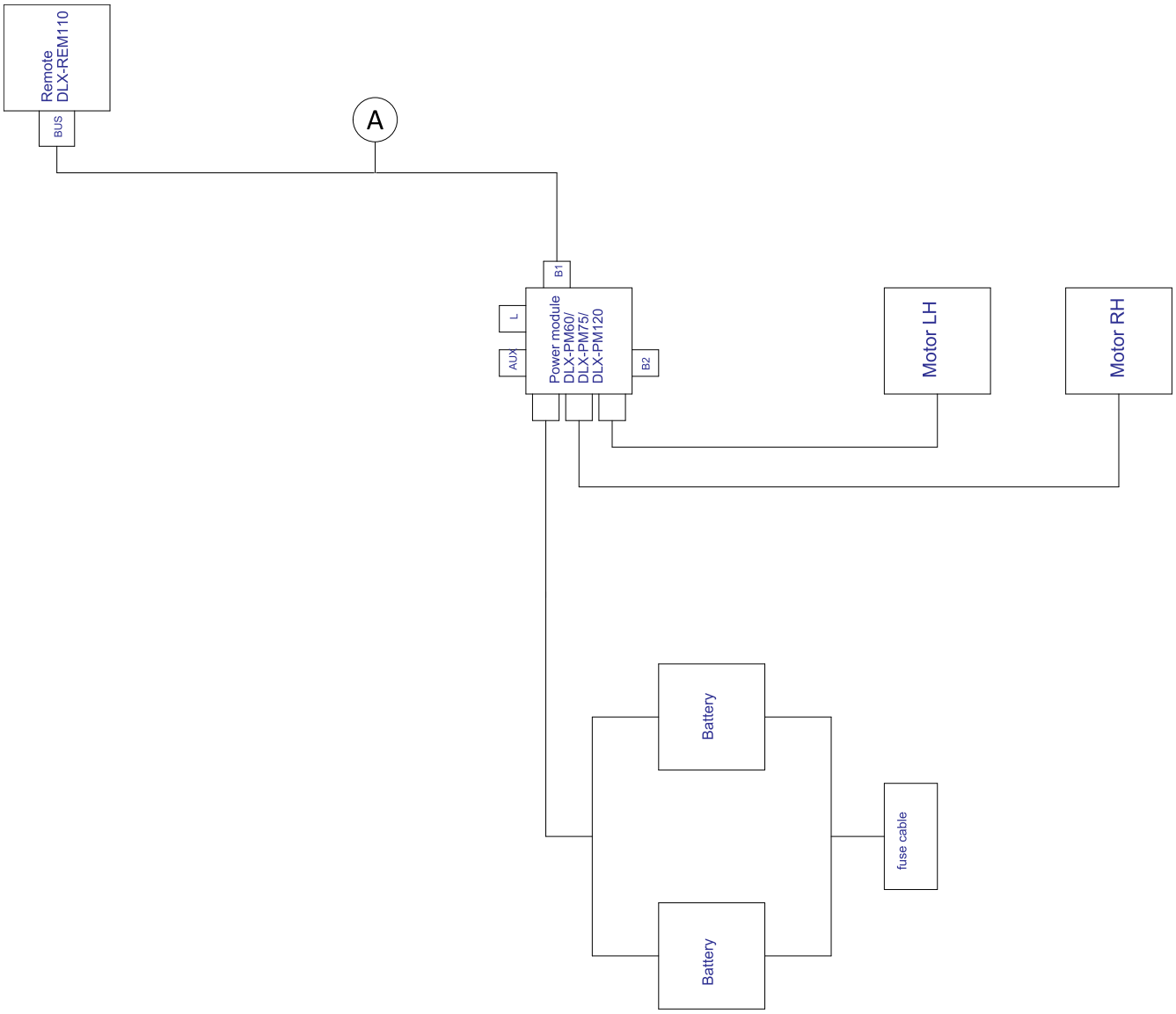


Fig. 3-4

Cable length may vary depending on mounting positions of primary remote.

Model	Ⓐ
AVIVA FX	1700 mm + 640 mm extension loom
AVIVA RX	1700 mm
Fox	1000 mm + 640 mm extension loom
Kite	2000 mm
Pronto M41	2000 mm
Spectra XTR² HD, Bora/Spectra XTR Standard	2000 mm
Storm⁴, Storm⁴ X-plore	2000 mm
Stream	1500 mm
TDX SP2	1500 mm

3.8.2 Wiring for Modulite Seating System (Pronto M41 Only)

Wiring for Pronto M41 with Modulite: Tilt, Recline, Powered Elevating Legrests and DLX-ACT400

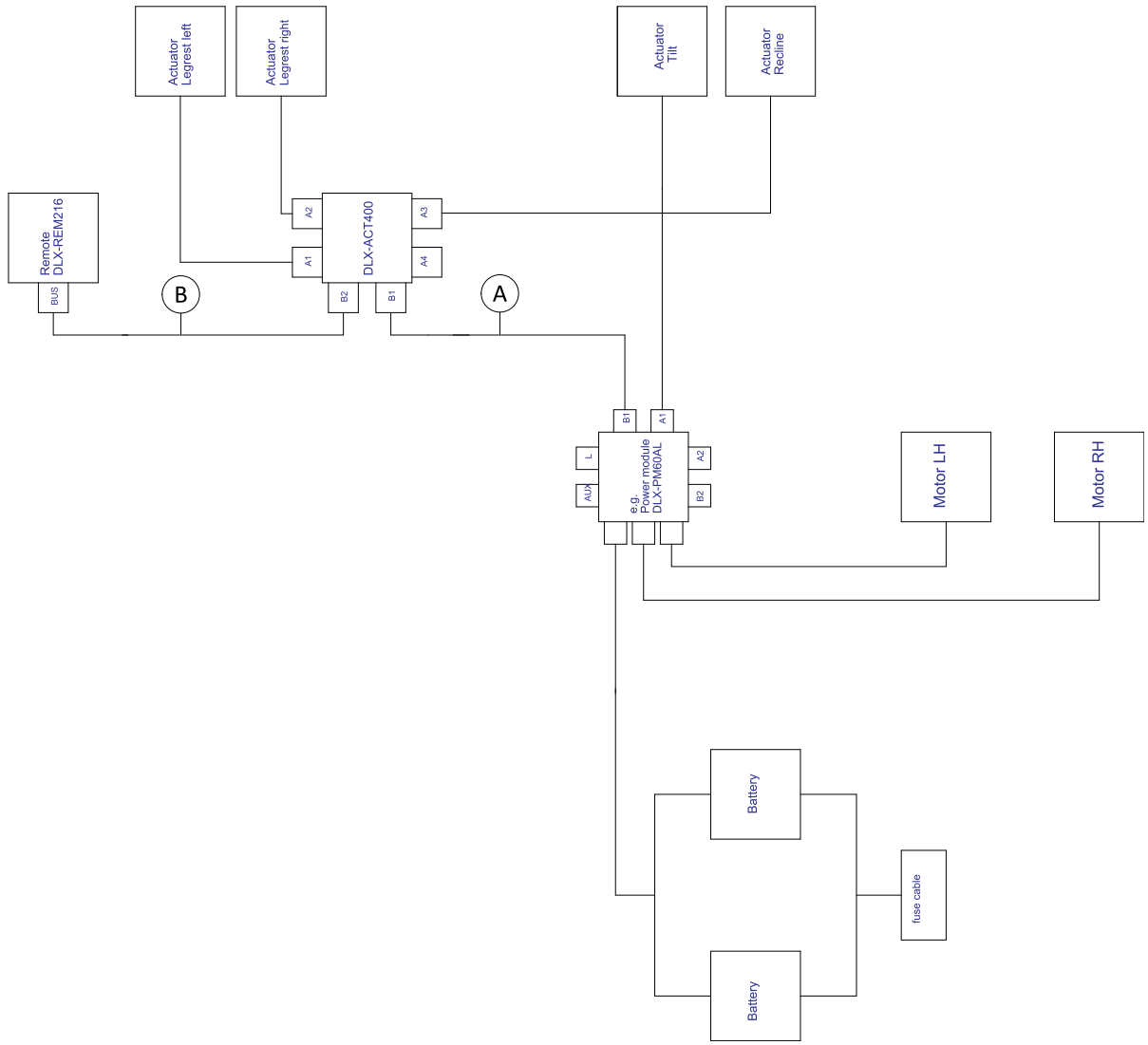


Fig. 3-5

Cable length may vary depending on mounting positions of primary remote.

Ⓐ	1000 mm
Ⓑ	1200 mm

3.8.3 Wiring for Modulite Seating System (Fox Only)

Wiring for Fox with Modulite: Drive Only with ACU

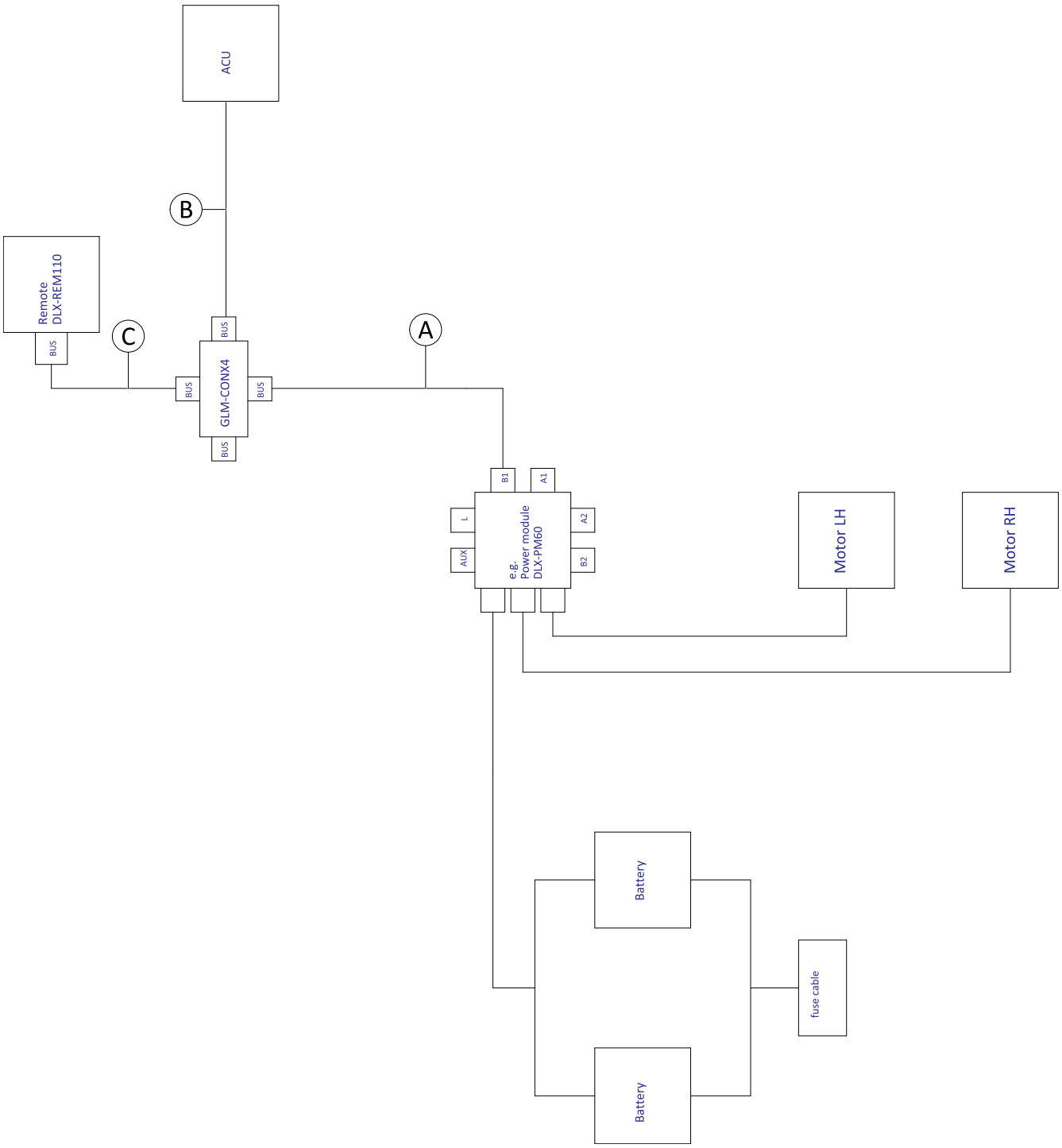


Fig. 3-6

Cable length may vary depending on mounting positions of primary and secondary remotes and of 4–way connector GLM-CONX4.

Ⓐ	300 mm + 640 mm extension loom
Ⓑ	1000 mm
Ⓒ	1000 mm

Wiring for Fox with Modulite: Recline Only

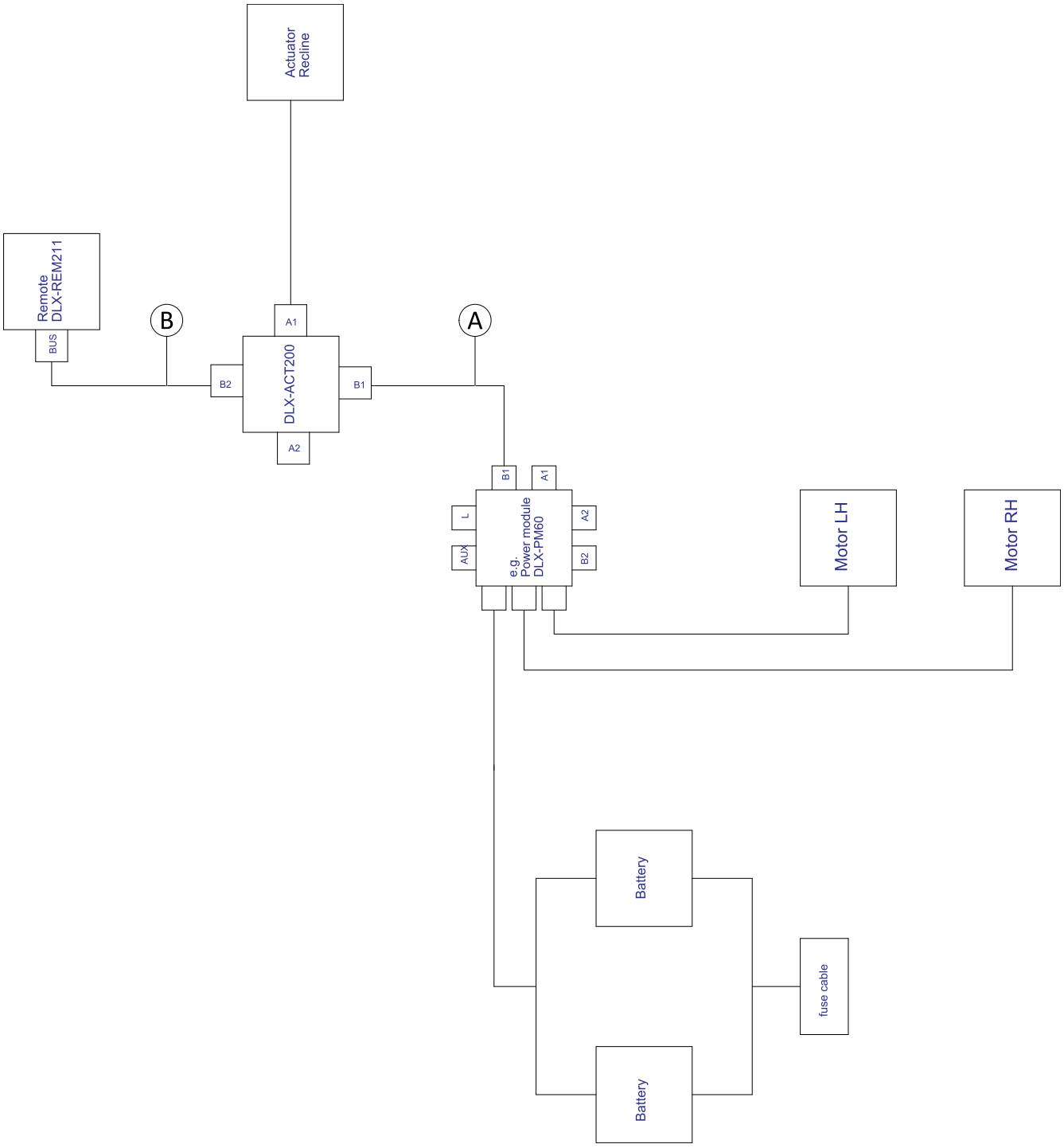


Fig. 3-7

Cable length may vary depending on mounting positions of primary remote.

Ⓐ	300 mm + 640 mm extension loom
Ⓑ	1000 mm

Wiring for Fox with Modulite: Recline Only and ACU

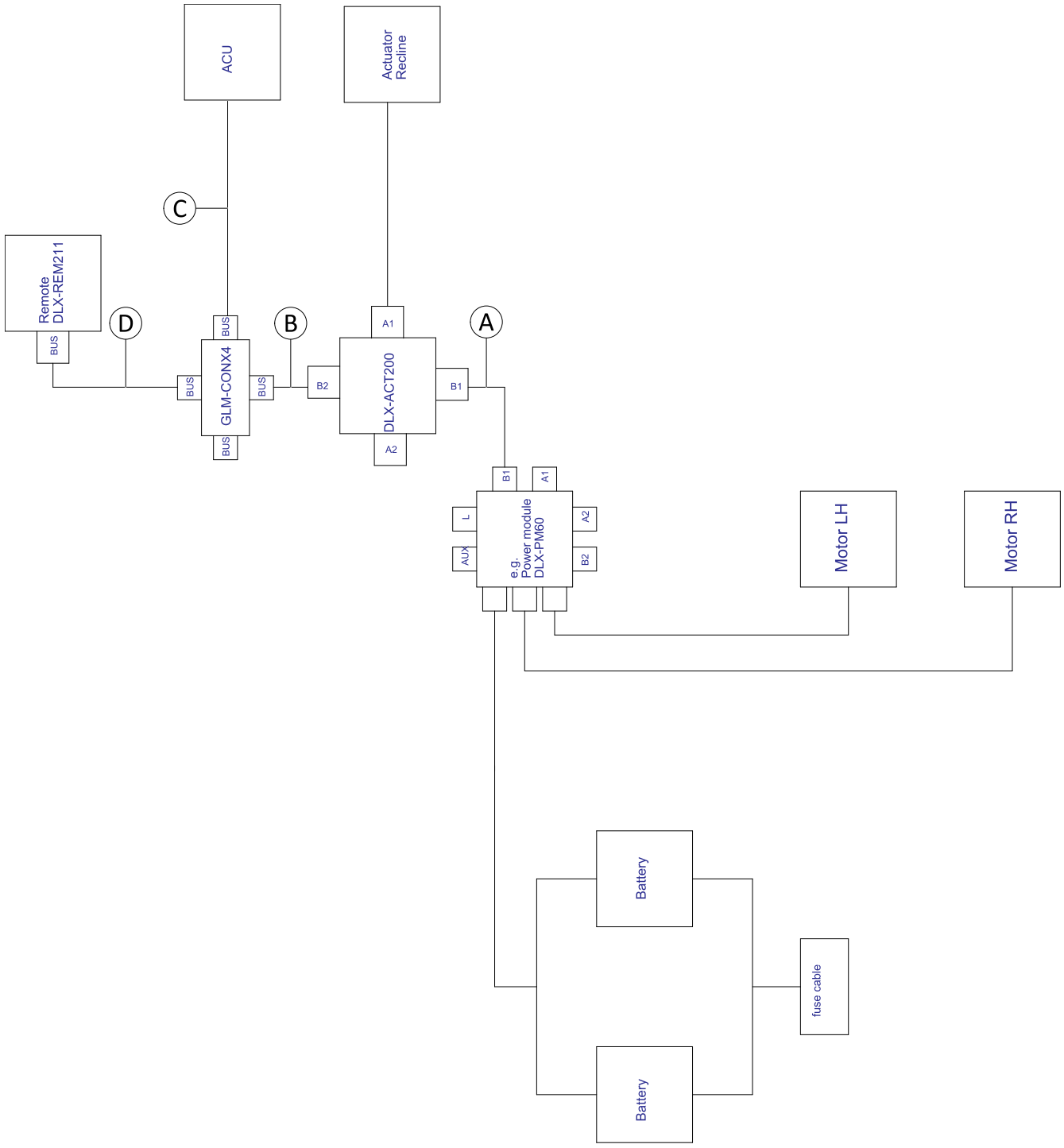


Fig. 3-8

Cable length may vary depending on mounting positions of primary and secondary remotes and of 4–way connector GLM-CONX4.

Ⓐ	300 mm + 640 mm extension loom
Ⓑ	500 mm
Ⓒ	1000 mm
Ⓓ	1000 mm

3.8.4 Wiring for Ultra Low Maxx Seating System

Wiring for Non expandable systems with Ultra Low Maxx seat (US only)

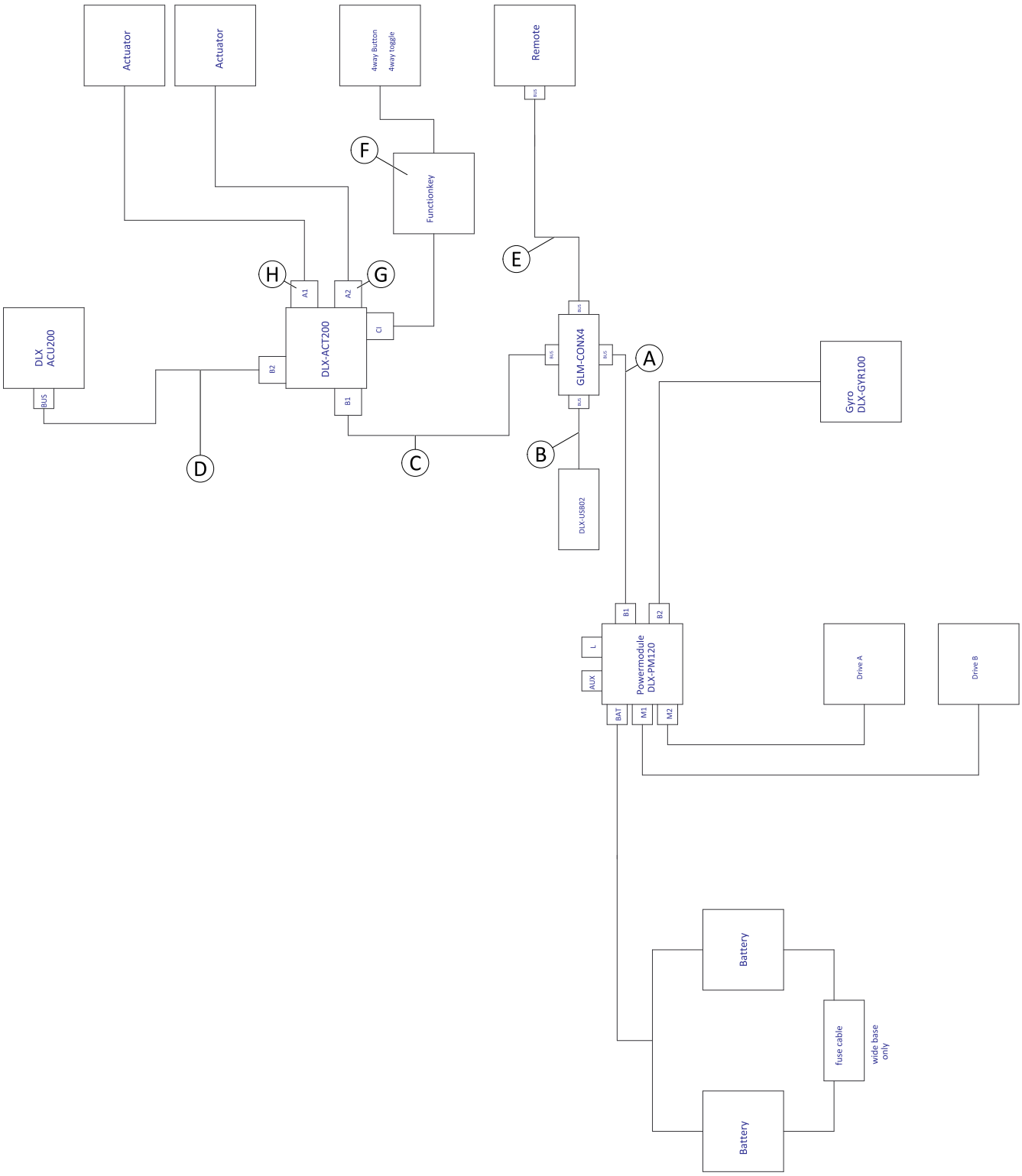


Fig. 3-9

Cable length may vary depending on mounting positions of primary and secondary remotes and of 4–way connector GLM-CONX4.

Configuration	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓕ	Ⓖ	Ⓗ
Recline only	1200 mm	300 mm	700 mm	300 mm	1500 mm	Functionkey FKEY01/ FKEY01TDC	not used	Recline connected
Tilt /Recline	1200 mm	300 mm	700 mm	300 mm	1500 mm	Functionkey FKEY02/ FKEY02TDC	Tilt connected	Recline connected
LNX only	1200 mm	300 mm	1200 mm	300 mm	1500 mm	Functionkey FKEY01/ FKEY01TDC	LNX connected	not used
Tilt only	1200 mm	300 mm	1200 mm	300 mm	1500 mm	Functionkey FKEY01/ FKEY01TDC	Tilt connected	not used
Dual legs	1200 mm	300 mm	1200 mm	300 mm	1500 mm	Functionkey FKEY02/ FKEY02TDC	Legrest right connected	Legrest left connected
Recline/LNX	1200 mm	300 mm	1200 mm	300 mm	1500 mm	Functionkey FKEY02/ FKEY02TDC	LNX connected	Recline connected
Tilt/LNX	1200 mm	300 mm	1200 mm	300 mm	1500 mm	Functionkey FKEY02/ FKEY02TDC	LNX connected	Tilt connected
Tilt/Lifter	1200 mm	300 mm	1200 mm	300 mm	1500 mm	Functionkey FKEY02/ FKEY02TDC	Lifter connected	Tilt connected

Wiring for configurations with Ultra Low Maxx seat

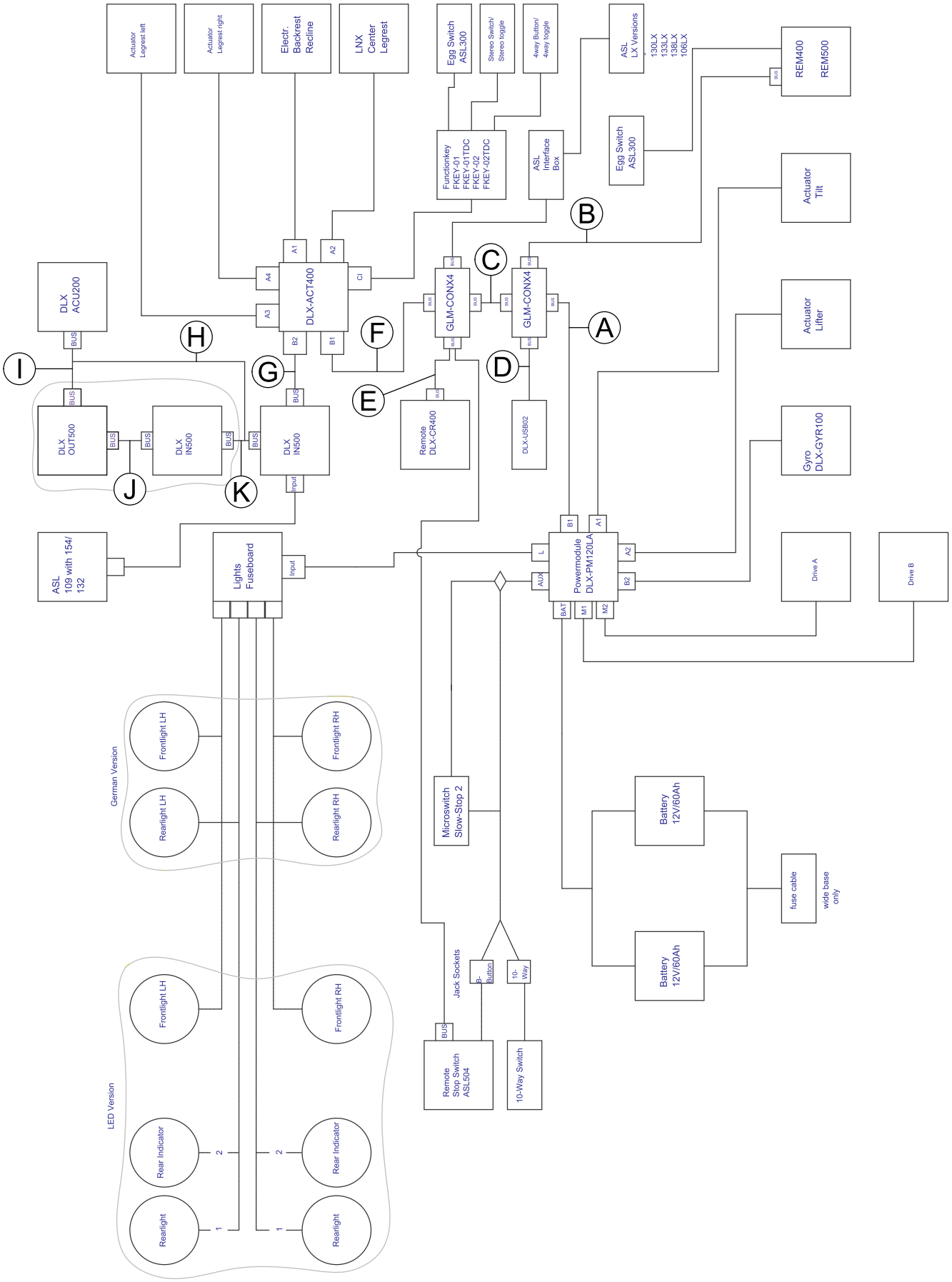


Fig. 3-10

Cable length may vary depending on mounting positions of primary and secondary remotes and of 4–way connector GLM-CONX4.

Depending on configuration, the Egg switch ASL300 can be connected to the primary remote.

Configuration	w tilt, w recline, w/o lifter	w tilt, w/o recline, w/o lifter	w tilt, w recline, w lifter	w tilt, w/o recline, w lifter
Ⓐ	1200 mm	1200 mm	1500 mm	1500 mm
Ⓑ[1]	REM400: 1500 mm REM500: 1700 mm	REM400: 1500 mm REM500: 1700 mm	REM400: 1500 mm REM500: 1700 mm	REM400: 1500 mm REM500: 1700 mm
Ⓒ	700 mm	1200 mm	700 mm	1200 mm
Ⓓ	300 mm	300 mm	300 mm	300 mm
Ⓔ[2]	1700 mm	1200 mm	1200 mm	1200 mm
Ⓕ	300 mm	300 mm	300 mm	300 mm
Ⓖ	300 mm	300 mm	300 mm	300 mm
Ⓗ	300 mm	300 mm	300 mm	300 mm
Ⓘ	300 mm	300 mm	300 mm	300 mm
Ⓙ	300 mm	300 mm	300 mm	300 mm
Ⓚ	300 mm	300 mm	300 mm	300 mm

[1] Depending on primary remote

[2] Bus port either for DLX-CR400 or for Remote Stop Switch. Cannot be combined.

3.9 Mounting the primary remotes

For more information about how remote holders are mounted to the wheelchair, refer to the service manual of the seating system.

3.9.1 Mounting Remotes to Standard Remote Holder

The following remotes can be mounted to the remote holder:

- DLX-REM1XX
- DLX-REM2XX
- DLX-REM400

Mounting DLX-REM1XX or DLX-REM2XX for Modulite

- 3 mm Allen key
- 8 mm wrench

1.

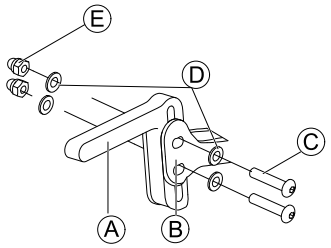


Fig. 3-11

Mount joystick holder Ⓐ to remote adapter Ⓑ with screws Ⓒ, washers Ⓓ and nuts Ⓔ.

2.

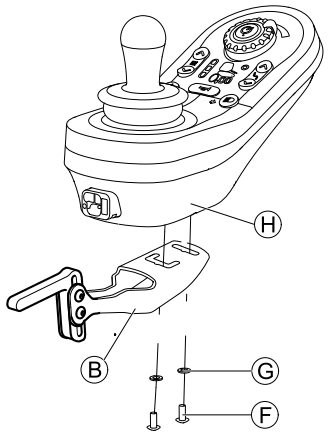


Fig. 3-12 The remote in the graphic serves as an example. Every possible remote is mounted in the same way as shown.

Mount remote Ⓗ to remote adapter Ⓑ with screws Ⓕ and washers Ⓖ.

Mounting DLX-REM400 or DLX-REM2XX for Ultra Low Maxx

- 3 mm Allen key
- 8 mm wrench

1.

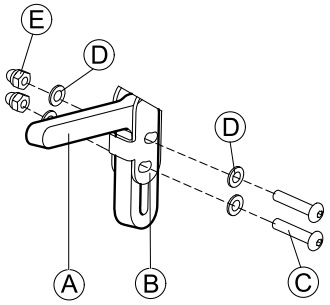


Fig. 3-13

Mount joystick holder Ⓐ to remote adapter Ⓑ with screws Ⓒ, washers Ⓓ and nuts Ⓔ.

2.

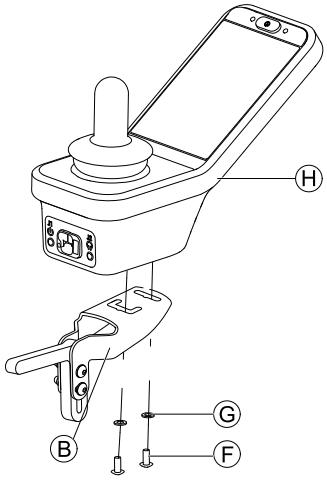


Fig. 3-14 The remote in the graphic serves as an example. Every possible remote is mounted in the same way as shown.

Mount remote Ⓗ to remote adapter Ⓑ with screws Ⓕ and washers Ⓖ.

3.9.2 Mounting Remotes to Swing-Away Remote Holder

The following remotes can be mounted to the remote holder:

- DLX-REM1XX
- DLX-REM2XX
- DLX-REM400
- DLX-REM500

Mounting DLX-REM1XX, DLX-REM2XX or DLX-REM400

- 3 mm Allen key
- 4 mm Allen key
- 8 mm wrench
- 10 mm wrench

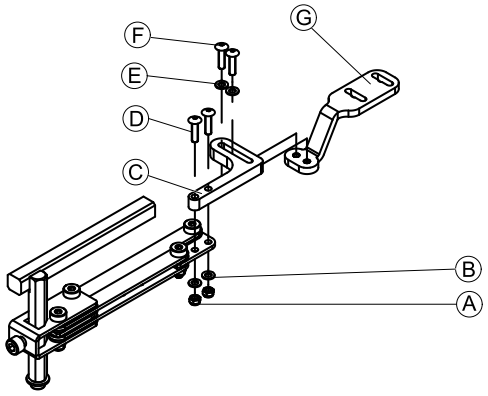


Fig. 3-15

1. Pull screws Ⓓ through bracket Ⓒ, remote holder and washers Ⓑ.
2. Tighten screws with nuts Ⓐ.

3. Pull screws Ⓕ through washers Ⓔ, bracket Ⓒ and bracket Ⓖ and tighten screws.
4.

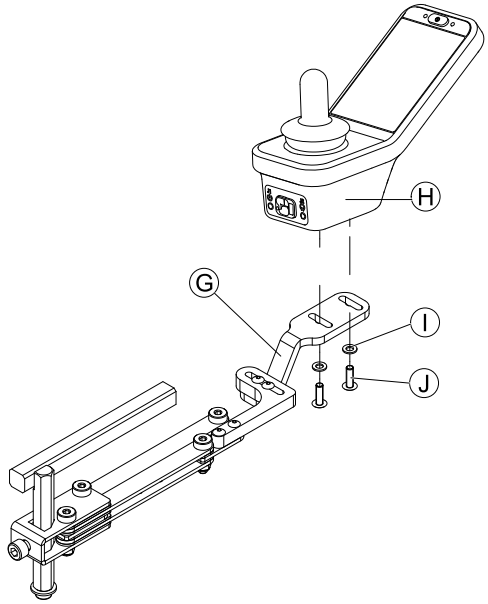


Fig. 3-16 The remote in the graphic serves as an example. Every possible remote is mounted in the same way as shown.

Tighten remote with screws Ⓐ to bracket Ⓖ.

Mounting DLX-REM500

- 3 mm Allen key
- 4 mm Allen key
- Medium-strength thread locking adhesive (Loctite 243 or similar)

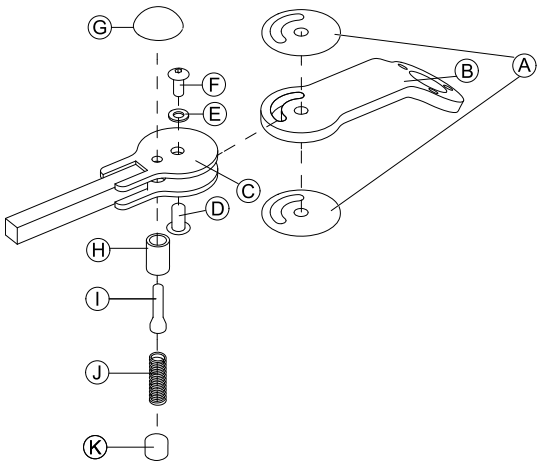


Fig. 3-17

1. Connect slip sticker Ⓐ with joint arm Ⓑ and insert into support Ⓒ.
2. Fix with sleeve nut Ⓓ, washer Ⓔ and screw Ⓕ.

   Apply thread locking adhesive to screw Ⓕ.

3. Insert locking bolt Ⓗ and compression spring Ⓘ through support Ⓒ and joint arm Ⓑ.
4. Fix with locking knob Ⓖ and grub screw Ⓙ .

   Apply thread locking adhesive to grub screw Ⓙ.

5.

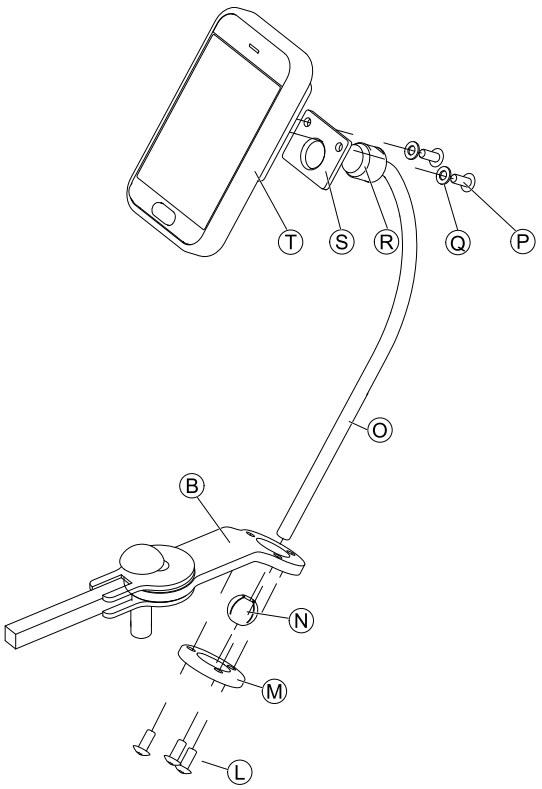


Fig. 3-18

Insert bracket Ⓞ into joint arm Ⓑ, clamp ball Ⓝ and clamp ring Ⓜ.
Fix with screws Ⓛ.

6. Mount remote Ⓣ to support plate Ⓢ and clamping bush Ⓡ with washers Ⓠ and screws Ⓟ.

3.9.3 Mounting Remotes to Quad Link Remote Holder

Only available for Ultra Low Maxx

The following remotes can be mounted to the remote holder:

- DLX-REM1XX
- DLX-REM2XX
- DLX-REM400

- 3 mm Allen key
- 5 mm Allen key

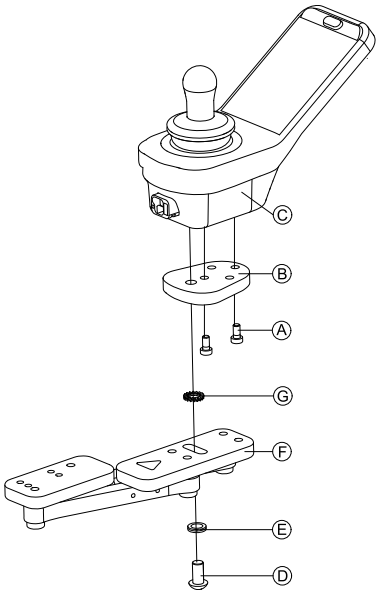


Fig. 3-19 The remote in the graphic serves as an example. Every possible remote is mounted in the same way as shown.

1. Mount LiNX remote adapter Ⓑ with screws Ⓐ to remote Ⓒ.

   The LiNX remote adapter can be turned 90° right or left for more adjustment options.

2. Mount remote to Quad Link Ⓕ with screw Ⓓ, Nord-Lock washer Ⓔ and serrated lock washer Ⓖ.

   Tighten screw Ⓓ with a maximum torque of 25 Nm.

3.9.4 Mounting Remotes to Attendant Remote Holders

The following remotes can be mounted to the remote holder:

- DLX-REM1XX
- DLX-REM2XX
- DLX-REM400

Mounting DLX-REM1XX or DLX-REM2XX on Modulite

The remote is fitted to the wheelchair using a bracket on the push handle or the push bar.

- 4 mm Allen key
- 3 mm Allen key

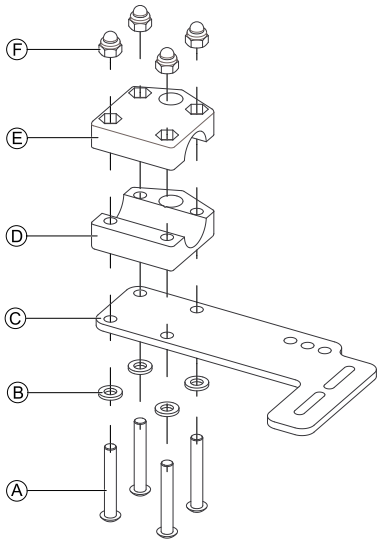


Fig. 3-20

1. Pull screws Ⓐ through washers Ⓑ, mounting plate Ⓒ and bottom side of bracket Ⓓ.
2. Tighten bottom side of the bracket to push bar with the top side of the bracket Ⓔ and nuts Ⓕ.
3.

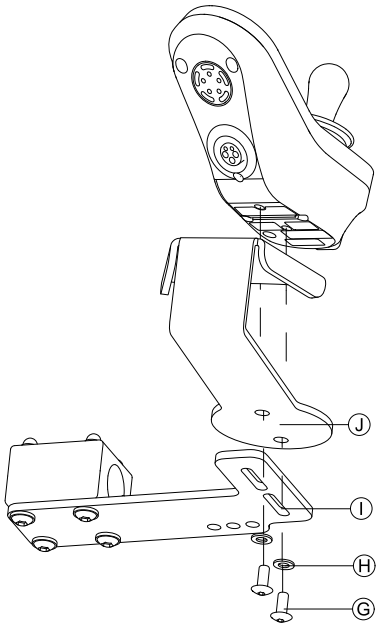


Fig. 3-21

   Fix remote and support Ⓙ to bracket Ⓘ with screws Ⓖ and washers Ⓗ .

For mounting positions, refer to *3.11.4 Mounting the DLX-REM050, page 53*.

Mounting DLX-REM1XX, DLX-REM2XX or DLX-REM400 on Ultra Low Maxx Powered Backrest

The remote is fitted to the wheelchair using a bracket on the push handle or the push bar.

- 4 mm Allen key
- 8 mm wrench

1.

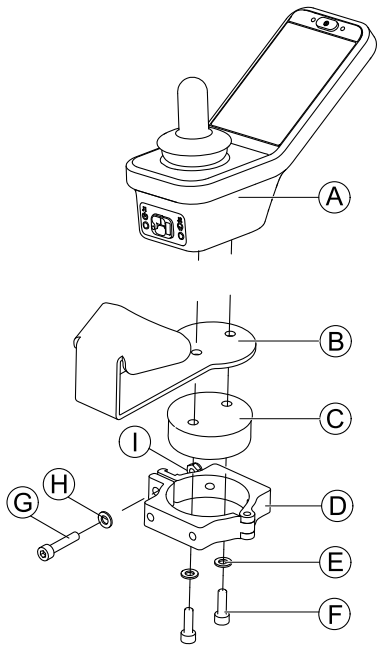


Fig. 3-22 The remote in the graphic serves as an example. Every possible remote is mounted in the same way as shown.

Mount remote Ⓐ with support Ⓑ and support drum Ⓒ to clamp Ⓓ with screws Ⓕ and washers Ⓔ.

2.

Risk of damage to the remote
The maximum torque to tighten the screw is 1 Nm.
– Do not exceed this rating as it may damage the remote.

Fix support drum Ⓒ in clamp Ⓓ with screw Ⓖ, washer Ⓗ and nut Ⓘ.

3.

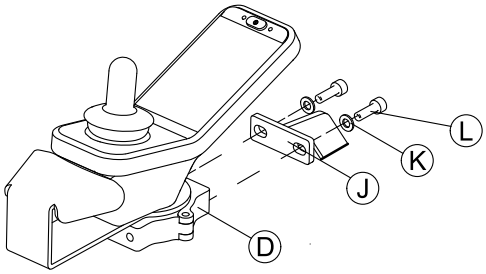


Fig. 3-23

Attach clamp Ⓓ to bracket Ⓙ with screws Ⓛ and washers Ⓚ.

4.

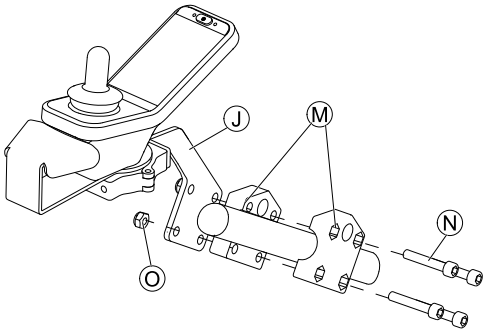


Fig. 3-24

Attach bracket Ⓙ to gripper clamp Ⓜ with screws Ⓝ and nuts Ⓞ.

Manual Backrest

The remote is fitted to the wheelchair using a bracket on the push handle or the push bar.

- 4 mm Allen key
- 5 mm Allen key
- 8 mm wrench
- Thread locking adhesive (Loctite 225 or similar)

1.

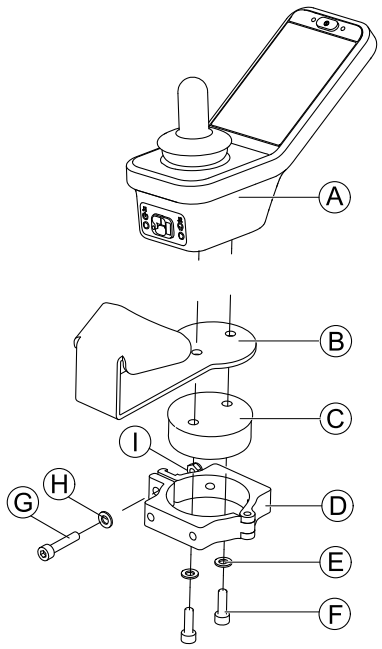


Fig. 3-25 The remote in the graphic serves as an example. Every possible remote is mounted in the same way as shown.

Mount remote Ⓐ with support Ⓑ and support drum Ⓒ to clamp Ⓓ with screws Ⓕ and washers Ⓔ.

2.

Risk of damage to the remote
The maximum torque to tighten the screw is 1 Nm.
– Do not exceed this rating as it may damage the remote.

Fix support drum Ⓒ in clamp Ⓓ with screw Ⓖ, washer Ⓗ and nut Ⓘ.

3.

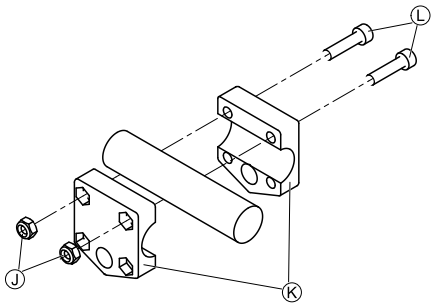


Fig. 3-26

Install gripper clamp Ⓚ to push bar using screws Ⓛ and nuts Ⓙ.
Tighten screws with 10 Nm.

4.

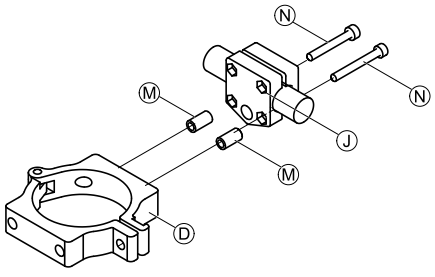


Fig. 3-27

Insert screws Ⓝ through gripper clamp Ⓙ and spacers Ⓜ in clamp Ⓓ.
Use thread locking adhesive and tighten screws with 10 Nm.

3.9.5 Mounting Toggle Switches on the DLX-REM400

The toggle switches are suitable for the DLX-REM400–B remote module only — they must not be installed to the DLX-REM400–A version.

- TX8 Torx key
- Opening pick (or similar)
- Two additional screws (included in mounting kit)
- Label kit (included in mounting kit)

1.

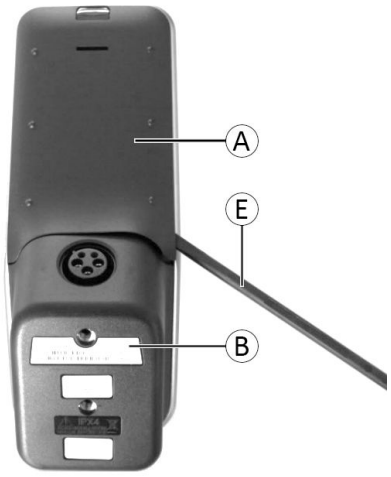


Fig. 3-28

Remove rear shroud Ⓐ using opening pick Ⓔ.

2.

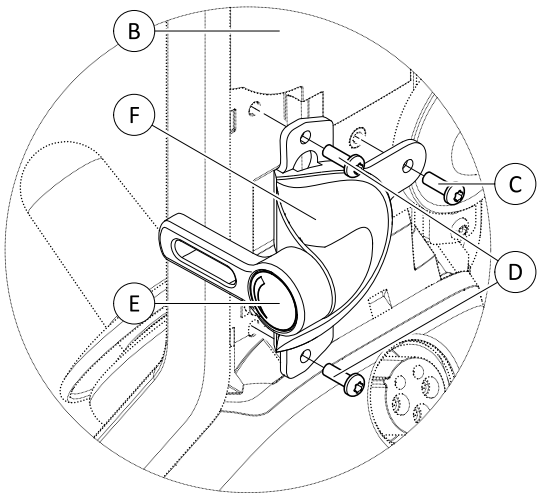


Fig. 3-29

Loosen and remove four silver screws Ⓓ.

3. Mount toggle switch Ⓕ to remote Ⓑ with screws Ⓒ and Ⓓ.
4. Repeat step 2 and 3 to install second switch / blanking plate.
5. Install new rear shroud included in mounting kit.
6. Install labels Ⓔ on both toggles.

3.10 Mounting Primary Remotes to Nucleus Midline Holder

CAUTION!
Risk of Injury and Damage
Remaining burrs and missing end caps after modifications on rods, such as shortened rod, can lead to injury or damage.
– Deburr cut after cutting excessive length.
– Re-install end cap after deburring.
– Check end cap for tight fitting.

Mounting DLX-REM1XX, DLX-REM2XX or DLX-REM400

- 4 mm Allen key
- 8 mm wrench

1.

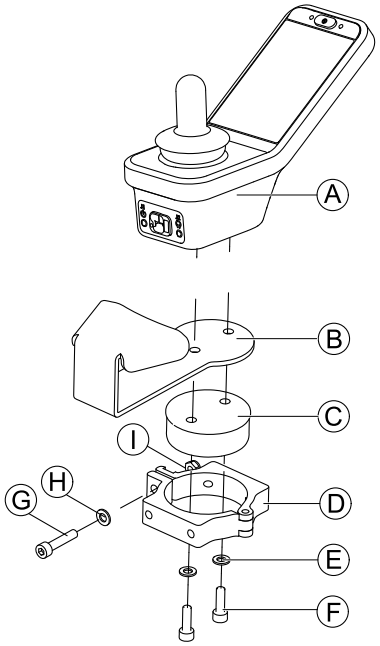


Fig. 3-30 The remote in the graphic serves as an example. Every possible remote is mounted in the same way as shown.

Mount remote Ⓐ with support Ⓑ and support drum Ⓒ to clamp Ⓓ with screws Ⓕ and washers Ⓔ.

2.

Risk of damage to the remote
The maximum torque to tighten the screw is 1 Nm.
– Do not exceed this rating as it may damage the remote.

Fix support drum Ⓒ in clamp Ⓓ with screw Ⓖ, washer Ⓗ and nut Ⓘ.

3.

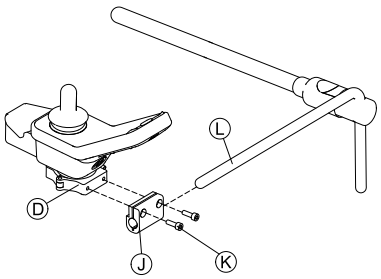


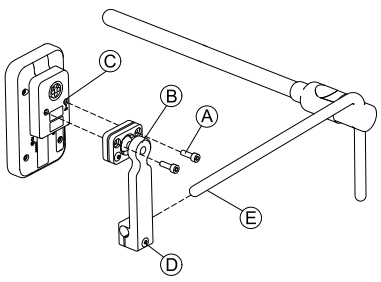
Fig. 3-31

Pull clamp bracket Ⓙ over nucleus Ⓛ.

4. Attach clamp Ⓓ to clamp bracket Ⓙ and fix everything with screws Ⓚ.

Mounting DLX-REM500

- 4 mm Allen key
- 3/16 inch Allen key



1. Mount remote Ⓒ to bracket Ⓑ with screws Ⓐ.
2. Pull bracket Ⓑ over nucleus Ⓔ.
3. Tighten bracket to nucleus with screw Ⓓ.

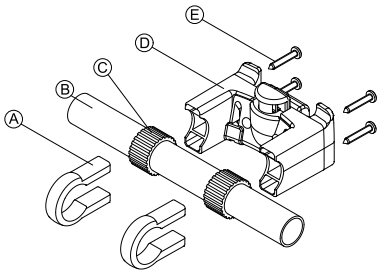
3.11 Mounting the secondary remotes

For more information about how remote holders are mounted to the wheelchair, refer to the service manual of the seating system.

3.11.1 Mounting KLICKfix Adapter for IDC

Standard mounting

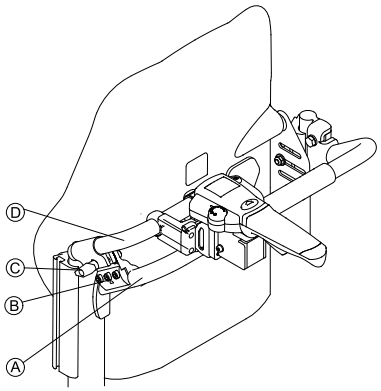
- Phillips screwdriver



1. Position the tightening clamps Ⓐ on the wheelchair push handle Ⓑ.
2. Make sure, the rubber band Ⓒ is between the tightening clamps and the push handle.
3. Fit the KLICKfix adapter Ⓓ onto the tightening clamps.
4. Tighten the screws Ⓔ.

Mounting on the Ultra Low Maxx seating system

- 4 mm (3/16”) Allen key
- Phillips screwdriver



1. Fix the retaining clamp Ⓑ on the wheelchair push handle Ⓐ.
2. Slide the adapter tube Ⓓ through the retaining clamp.
3. Tighten the wing bolt Ⓒ.
4. Mount the KLICKfix adapter on the adapter tube, refer to chapter Standard mounting.

3.11.2 Mounting the DLX-ACU200

Mounting for Modulite Seating System

- 3 mm Allen key
- 5 mm Allen key
- 8 mm wrench
- 10 mm wrench

1.

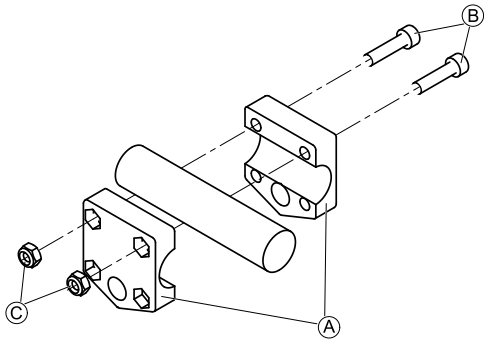


Fig. 3-32

Attach gripper clamp Ⓐ to tube with screws Ⓑ and nuts Ⓒ.

2.

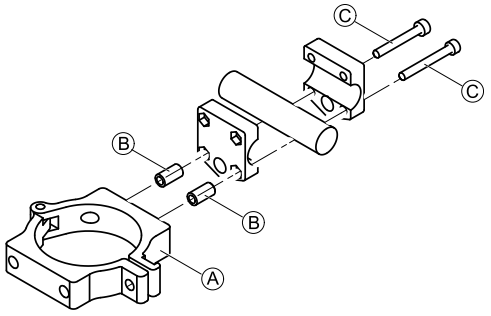


Fig. 3-33

Attach clamp Ⓐ and spacers Ⓑ to gripper clamp with screws Ⓒ.

3.

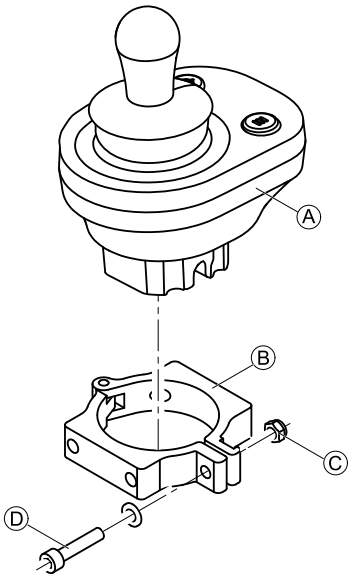


Fig. 3-34

Risk of damage to the remote
The maximum torque to tighten the screw is 1 Nm.
– Do not exceed this rating as it may damage the remote.

Set remote Ⓐ in clamp Ⓑ and tighten screw Ⓓ and nut Ⓒ.

Mounting for Ultra Low Maxx Seating System (Powered Backrest)

- 4 mm Allen key
- 8 mm wrench

1.

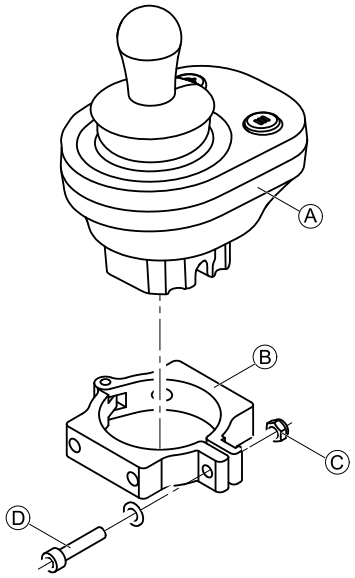


Fig. 3-35

Risk of damage to the remote
The maximum torque to tighten the screw is 1 Nm.
– Do not exceed this rating as it may damage the remote.

Set remote Ⓐ in clamp Ⓑ and tighten screw Ⓓ and nut Ⓒ.

2.

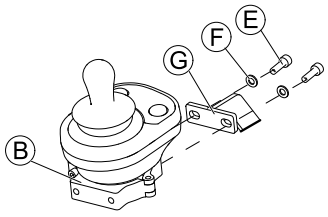


Fig. 3-36

Attach clamp Ⓑ to bracket Ⓖ with screws Ⓔ and washers Ⓕ.

3.

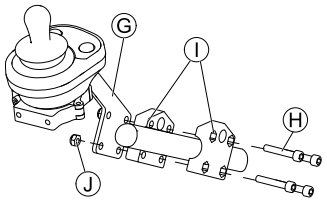


Fig. 3-37

Attach bracket Ⓖ to gripper clamp Ⓘ with screws Ⓗ and nuts Ⓙ.

Mounting for Ultra Low Maxx Seating System (Manual Backrest)

- 4 mm Allen key
- 5 mm Allen key
- 8 mm wrench
- Thread locking adhesive (Loctite 225 or similar)

1.

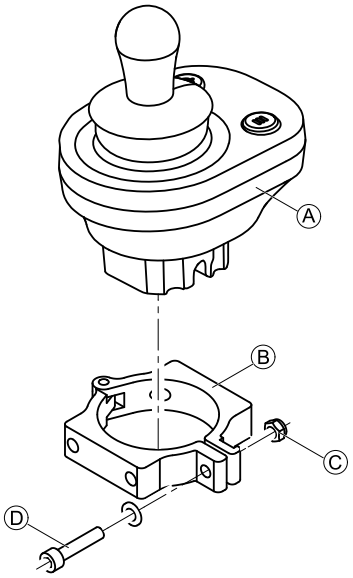


Fig. 3-38

Risk of damage to the remote
The maximum torque to tighten the screw is 1 Nm.
– Do not exceed this rating as it may damage the remote.

Set remote Ⓐ in clamp Ⓑ and tighten screw Ⓓ and nut Ⓒ.

2.

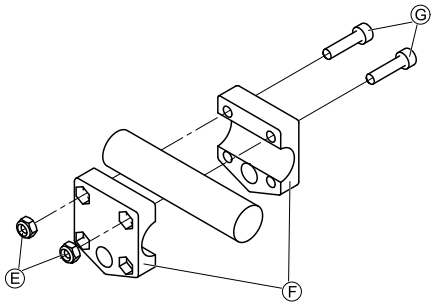


Fig. 3-39

Install gripper clamp Ⓕ to pushbar using screws Ⓖ and nuts Ⓔ.
Tighten screws with 10 Nm.

3.

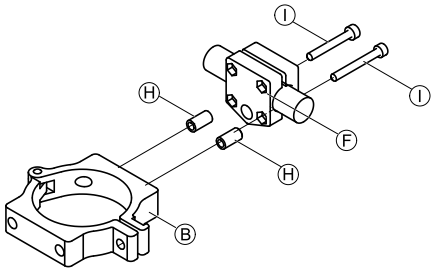


Fig. 3-40

Insert screws Ⓘ through gripper clamp Ⓕ and spacers Ⓗ in clamp Ⓑ.
Use thread locking adhesive and tighten screws with 10 Nm.

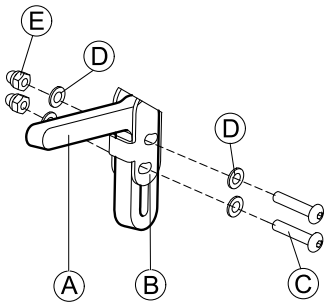
3.11.3 Mounting the DLX-CR400

also valid for DLX-CR400LF

Standard Remote Holder

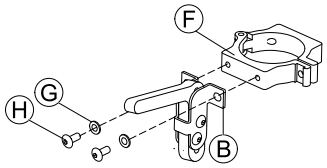
- 3 mm Allen key
- 4 mm Allen key
- 8 mm wrench

1.



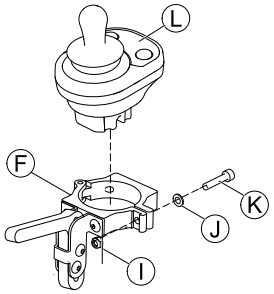
Mount joystick holder Ⓐ to DLX-CR400 adapter Ⓑ with screws Ⓒ, washers Ⓓ and nuts Ⓔ.

2.



Attach clamp Ⓕ to DLX-CR400 adapter Ⓑ with washers Ⓖ and screws Ⓗ.

3.



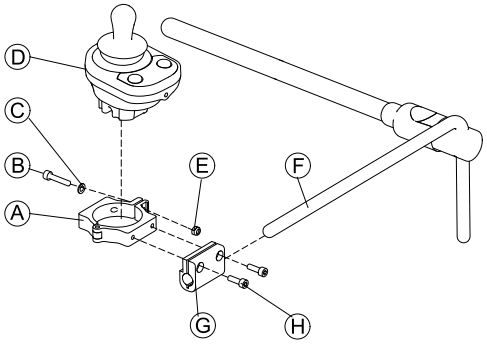
Risk of damage to the remote
The maximum torque to tighten the screw is 1 Nm.
– Do not exceed this rating as it may damage the remote.

Set remote Ⓛ in clamp Ⓕ and tighten screw Ⓚ and washer Ⓙ with nut Ⓘ.

Nucleus Midline Holder

CAUTION!
Risk of Injury and Damage
Remaining burrs and missing end caps after modifications on rods, such as shortened rod, can lead to injury or damage.
– Deburr cut after cutting excessive length.
– Re-install end cap after deburring.
– Check end cap for tight fitting.

- 4 mm Allen key
- 8 mm wrench



1.

Risk of damage to the remote
The maximum torque to tighten the screw is 1 Nm.
– Do not exceed this rating as it may damage the remote.

Set remote Ⓓ in clamp Ⓐ and tighten screw Ⓑ and washer Ⓒ with nut Ⓔ.

2. Pull clamp bracket Ⓖ over nucleus Ⓕ.
3. Attach clamp Ⓐ to clamp bracket Ⓖ and fix everything with screws Ⓗ.

3.11.4 Mounting the DLX-REM050

- 4 mm Allen key
- 3 mm Allen key

The attendant control unit is fitted to the wheelchair using a bracket on the push handle or the push bar.

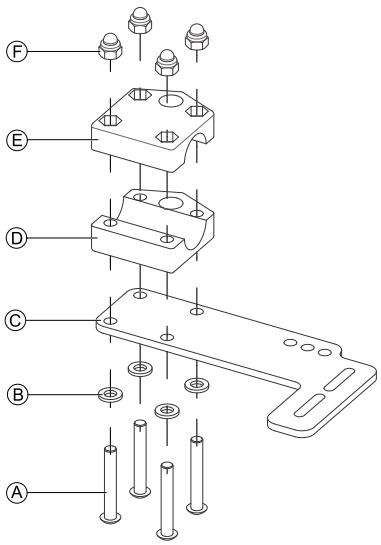


Fig. 3-41

1. Pull screws Ⓐ through washers Ⓑ, mounting plate Ⓒ and bottom side of bracket Ⓓ.
2. Tighten bottom side of the bracket to push bar with the top side of the bracket Ⓔ and nuts Ⓕ.
3.

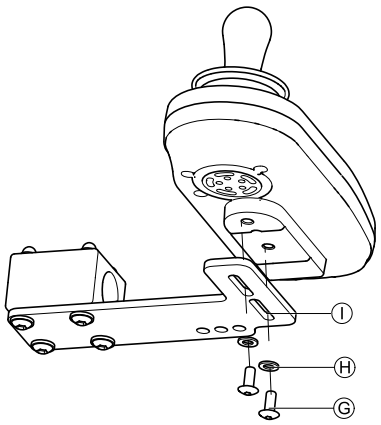
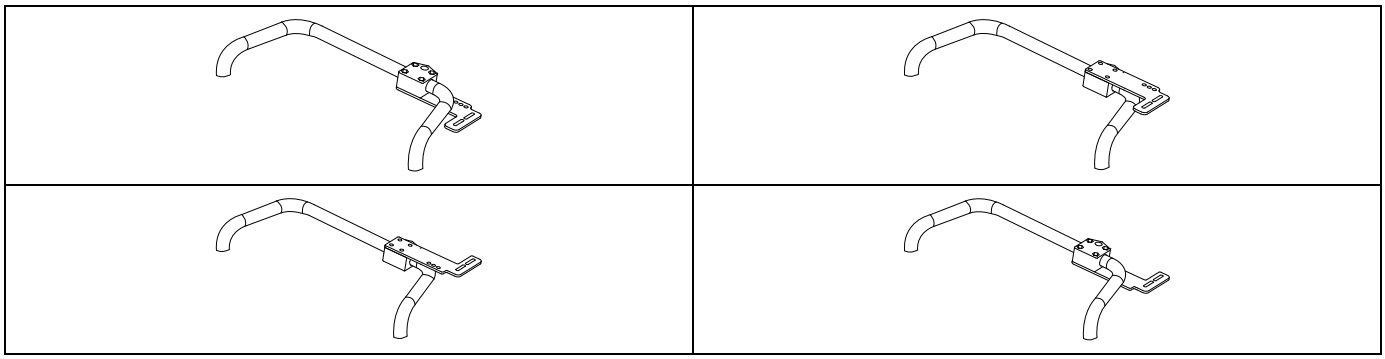
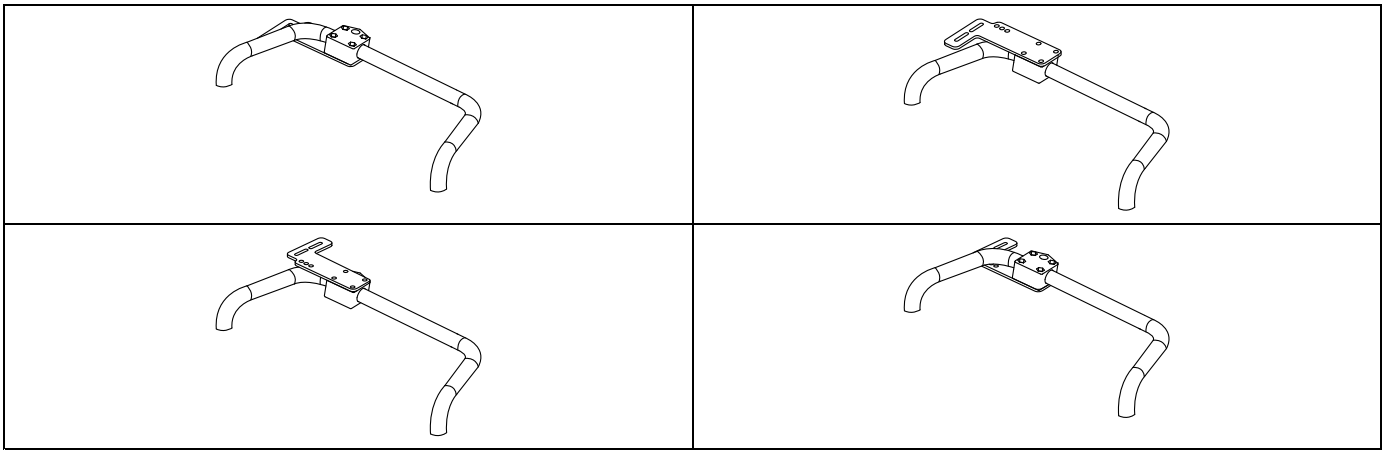


Fig. 3-42

   Pull screws Ⓖ through washers Ⓗ bracket Ⓘ and attendant control unit.
4. Tighten screws.
5. Connect attendant control unit.

Mounting positions





3.12 Mounting the ASL components

For more information about how remote holders are mounted to the wheelchair, refer to the service manual of the seating system.

3.12.1 Mounting Interface Boxes

Mounting ASL Joystick Interface Box for Ultra Low Maxx

- 5 mm Allen key

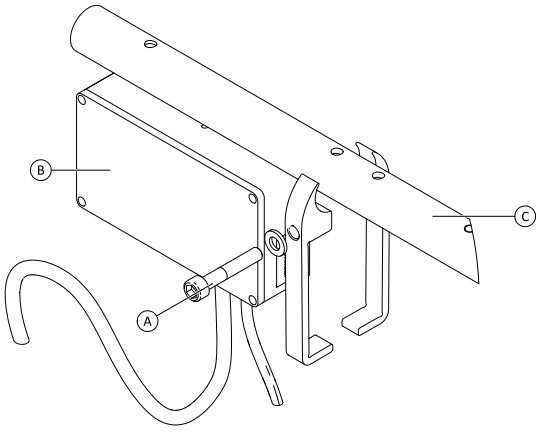


Fig. 3-43

1. Loosen screw Ⓐ.
2. Install Interface Box Ⓑ.
3. Place both parts onto armrest tube Ⓒ and re-tighten screw Ⓐ.

Mounting ASL Joystick Interface Box for Modulite

- 3 mm Allen key
- 6 mm Allen key

Illustration below shows left-hand mounted holder on seat with mounted flip-up armrest. Armrest holder Ⓐ can be replaced by saddle washer and also mounting position can varify. Installation order is the same.

1.

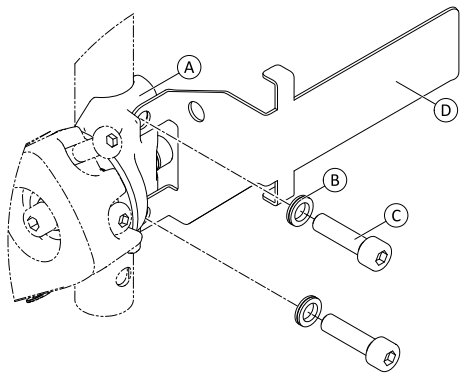


Fig. 3-44

Loosen and remove upper screw Ⓒ and washer Ⓑ.

2. Install base holder Ⓓ. Ensure that armrest holder (saddle washer) Ⓐ is installed in correct way and both holes are in line.
3. Re-insert screw and washer.
4. Repeat steps one to three for second screw.
5. Tighten both screws Ⓒ to 6 Nm.
6.

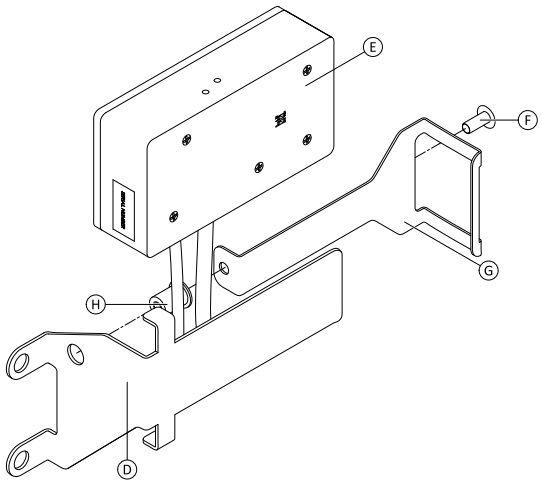


Fig. 3-45

Install well nut Ⓗ, interface box Ⓔ and holder Ⓖ.

7. Tighten bolt Ⓕ to 0.3 Nm.

Mounting ASL106 Interface Box for Ultra Low Maxx (Manual Recline)

- 1/8 inch Allen key
- 3 mm Allen key
- 8 mm wrench

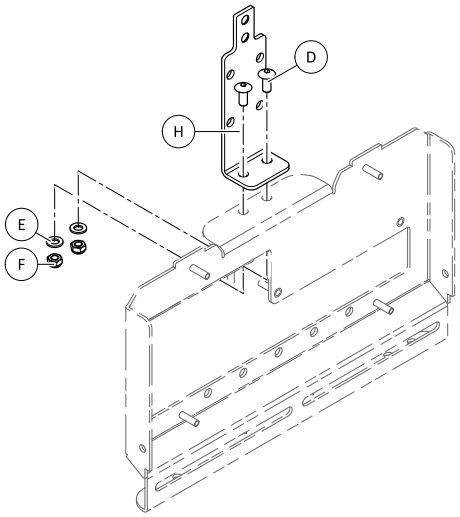


Fig. 3-46

1. Insert bolts Ⓓ.
2. Install holder Ⓗ, washers Ⓔ and nuts Ⓕ.

3. Tighten nuts Ⓕ.
4.

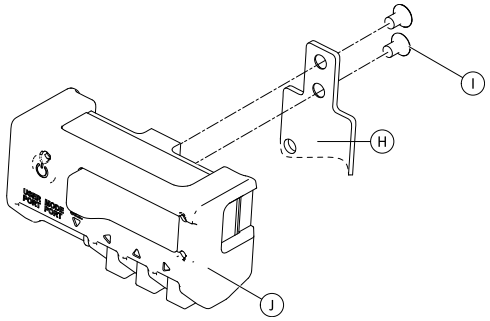


Fig. 3-47

Tighten interface box Ⓙ to holder Ⓗ with screws Ⓘ.

Mounting ASL106 Interface Box for Ultra Low Maxx (Powered Recline)

- 1/8 inch Allen key
- 5 mm Allen key
- 6 mm Allen key
- 13 mm wrench

1.

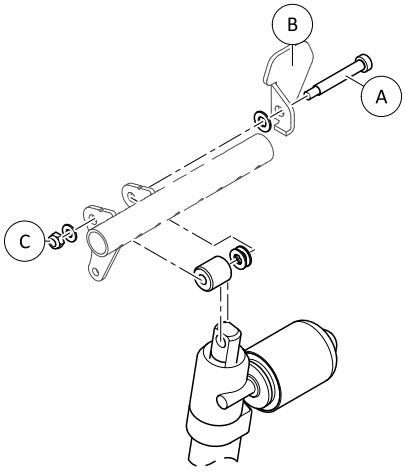


Fig. 3-48

Loosen and remove nut Ⓒ, washers, spacers and bolt Ⓐ.
2. Re-insert bolt Ⓐ and flange Ⓑ, washers, spacers and nut Ⓒ.
3. Tighten nut.
4.

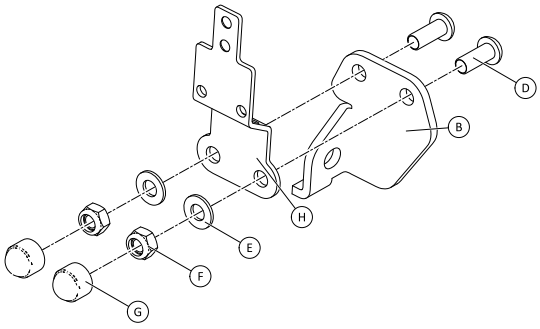


Fig. 3-49

Insert bolts Ⓓ.
5. Install holder Ⓗ, washers Ⓔ and nuts Ⓕ.
6. Tighten nuts Ⓕ.

7. Install end caps Ⓖ.
8.

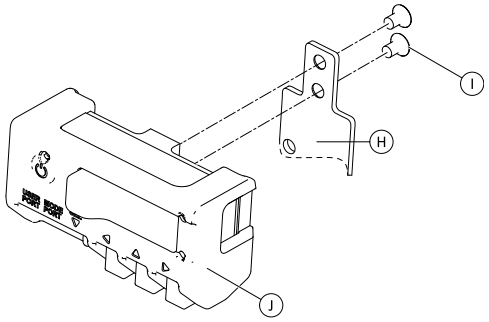


Fig. 3-50

Tighten interface box Ⓙ to holder Ⓗ with screws Ⓘ.

Mounting ASL106 Interface Box for Modulite

- 1/8 inch Allen key
- 5 mm Allen key
- 13 mm wrench

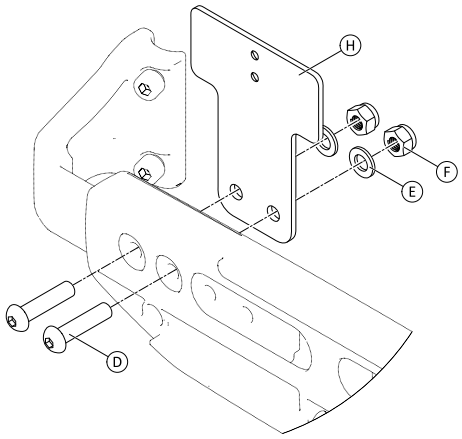


Fig. 3-51

1. Insert bolts Ⓓ.
2. Install holder Ⓗ, washers Ⓔ and nuts Ⓕ.
3. Tighten nuts Ⓕ.
4.

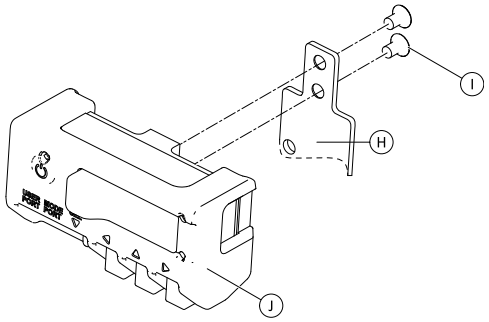


Fig. 3-52

Tighten interface box Ⓙ to holder Ⓗ with screws Ⓘ.

Mounting ASL154 Sip And Puff Interface Box for Ultra Low Maxx

- 5 mm Allen key
- Flat screwdriver

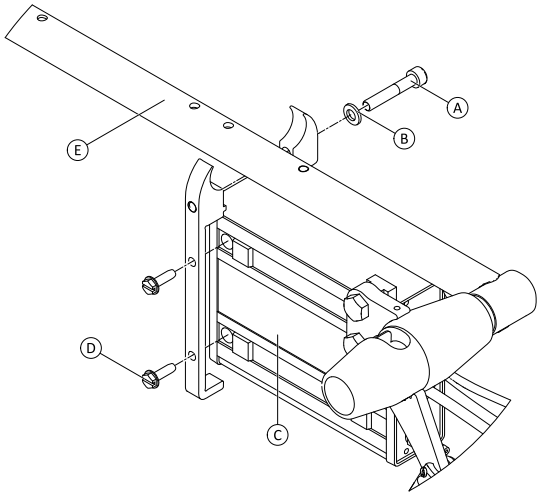


Fig. 3-53

1. Loosen screw Ⓐ.
2. Place holder on armrest tube Ⓔ and re-tighten screw Ⓐ.
3. Install Interface Box Ⓒ and tighten screws Ⓓ.

3.12.2 Mounting the Compact Single Switch Joystick

Lateral Tray Mount

- 1/8 inch Allen key
- 5/32 inch Allen key
- 3/16 inch Allen key

1.

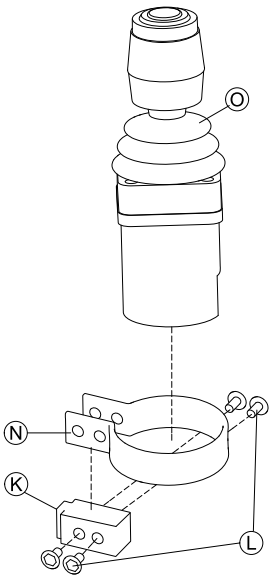


Fig. 3-54

Insert joystick Ⓞ in clamp Ⓝ, pull clamp over adapter block Ⓚ and fix with screws Ⓛ.

2.

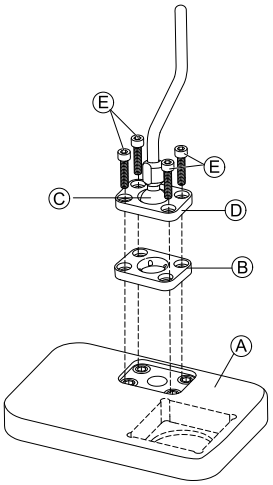


Fig. 3-55

Insert clamp plate Ⓑ into cutout on tray Ⓐ.

3. Fix clamp plate Ⓑ, clamp ball Ⓒ and upper clamp plate Ⓓ with screws Ⓔ.

4.

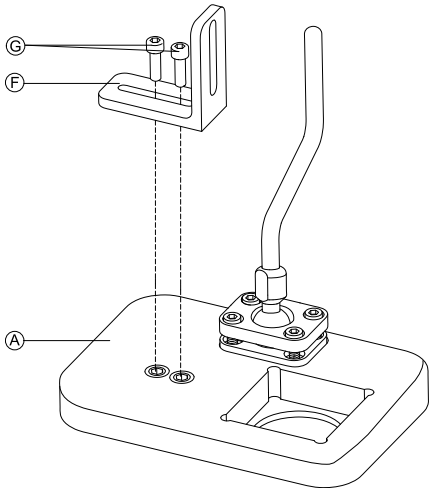


Fig. 3-56

Mount angle bracket Ⓕ with screws Ⓖ to tray Ⓐ.

5.

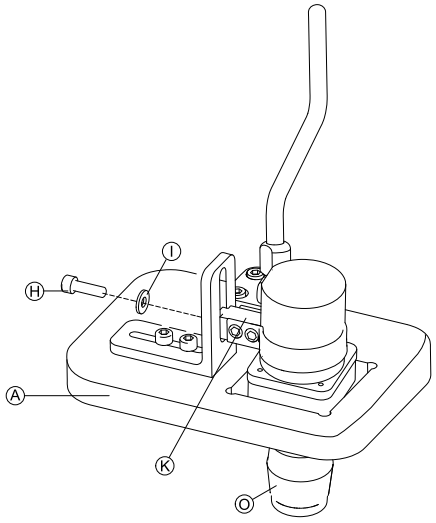


Fig. 3-57

Insert remote Ⓞ into tray Ⓐ.

6. Fix adapter block Ⓚ to angle bracket Ⓕ with screw Ⓗ and washer Ⓘ.

Nucleus Tray Mount

CAUTION!
Risk of Injury and Damage
Remaining burrs and missing end caps after modifications on rods, such as shortened rod, can lead to injury or damage.
– Deburr cut after cutting excessive length.
– Re-install end cap after deburring.
– Check end cap for tight fitting.

- 1/8 inch Allen key
- 5/32 inch Allen key
- 3/16 inch Allen key

1.

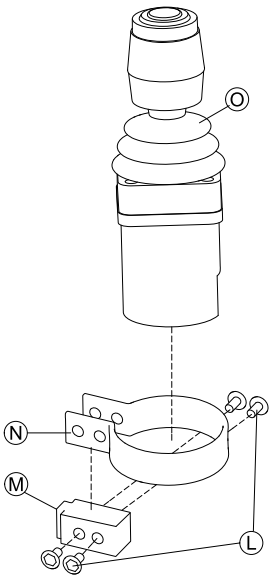


Fig. 3-58

Insert joystick Ⓞ in clamp Ⓝ, pull clamp over adapter block Ⓜ and fix with screws Ⓛ.

2.

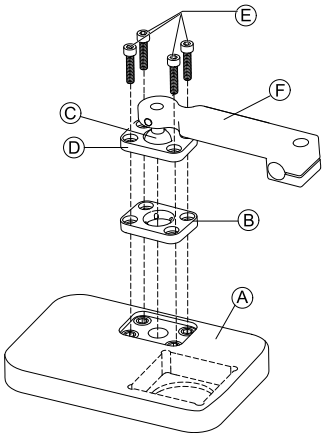


Fig. 3-59

Insert clamp plate Ⓑ into cutout on tray Ⓐ.

3. Fix clamp plate Ⓑ, clamp ball Ⓒ and upper clamp plate Ⓓ with screws Ⓔ.

4.

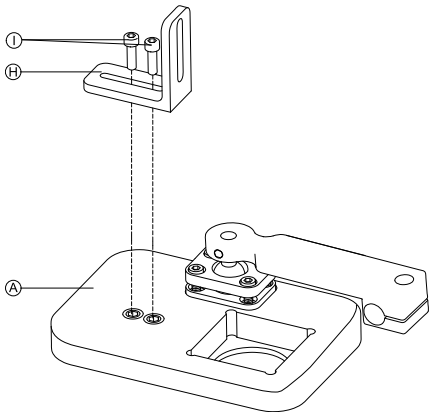


Fig. 3-60

Mount angle bracket Ⓗ with screws Ⓘ to tray Ⓐ.

5.

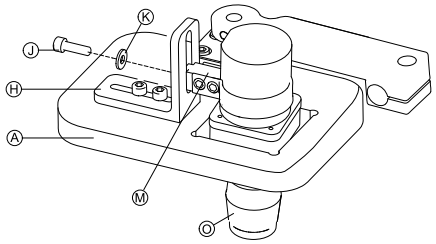


Fig. 3-61

Insert remote Ⓞ into tray Ⓐ.

6. Fix adapter block Ⓜ to angle bracket Ⓗ with screw Ⓙ and washer Ⓚ.
7.

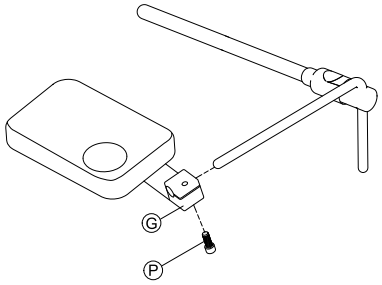


Fig. 3-62

Pull hitch mount Ⓖ over nucleus and tighten with screw Ⓟ.

Nucleus Only Mount

CAUTION!
Risk of Injury and Damage
Remaining burrs and missing end caps after modifications on rods, such as shortened rod, can lead to injury or damage.
– Deburr cut after cutting excessive length.
– Re-install end cap after deburring.
– Check end cap for tight fitting.

- 1/8 inch Allen key
- 5/32 inch Allen key

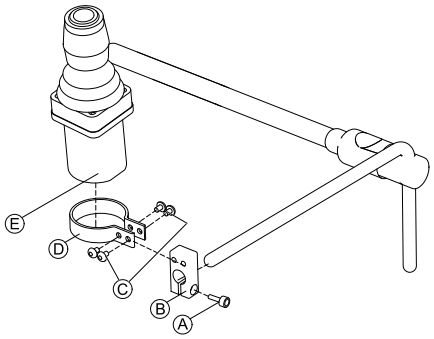


Fig. 3-63

1. Pull adapter block Ⓑ over nucleus and tighten with screw Ⓐ.
2. Insert remote Ⓔ into clamp Ⓓ.
3. Mount clamp Ⓓ to adapter block Ⓑ with screws Ⓒ.

3.12.3 Mounting the Micro Extremity Control Joystick

Lateral Tray Mount

- 1/8 inch Allen key
- 5/32 inch Allen key
- 3/16 inch Allen key

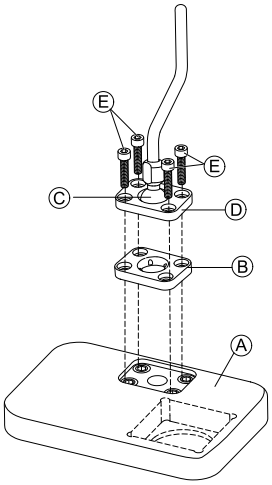


Fig. 3-64

1. Insert clamp plate Ⓑ into cutout on tray Ⓐ.
2. Fix clamp plate Ⓑ, clamp ball Ⓒ and upper clamp plate Ⓓ with screws Ⓔ.
3.

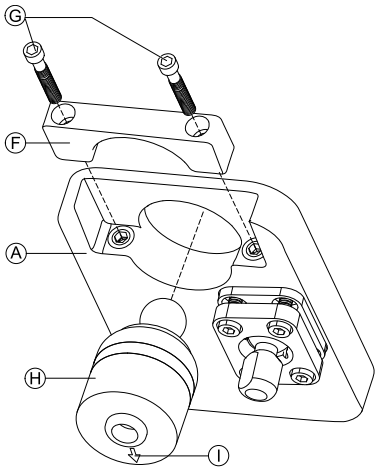


Fig. 3-65

Insert remote Ⓗ from below into tray Ⓐ. Make sure, arrow Ⓘ shows into reverse driving direction.

Nucleus Tray Mount

CAUTION!
Risk of Injury and Damage
Remaining burrs and missing end caps after modifications on rods, such as shortened rod, can lead to injury or damage.
– Deburr cut after cutting excessive length.
– Re-install end cap after deburring.
– Check end cap for tight fitting.

- 1/8 inch Allen key
- 5/32 inch Allen key
- 3/16 inch Allen key

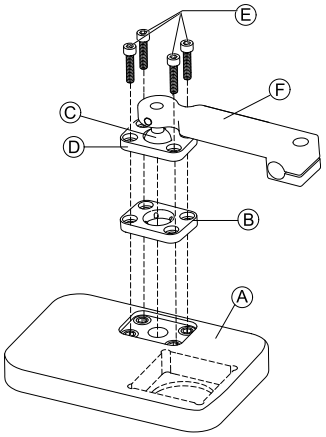


Fig. 3-66

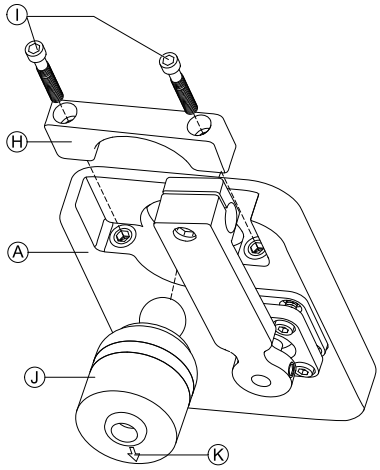
1. Insert clamp plate Ⓑ into cutout on tray Ⓐ.
2. Fix clamp plate Ⓑ, clamp ball Ⓒ and upper clamp plate Ⓓ with screws Ⓔ.
3. 

Fig. 3-67

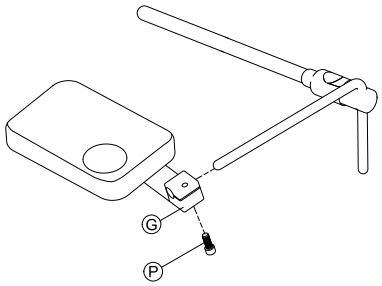
   Insert remote Ⓙ from below into tray Ⓐ. Make sure, arrow Ⓚ shows into reverse driving direction.
4. 

Fig. 3-68

   Pull hitch mount Ⓖ over nucleus and tighten with screw Ⓟ.

Nucleus Only Mount

CAUTION!
Risk of Injury and Damage
Remaining burrs and missing end caps after modifications on rods, such as shortened rod, can lead to injury or damage.
– Deburr cut after cutting excessive length.
– Re-install end cap after deburring.
– Check end cap for tight fitting.

- 1/8 inch Allen key
- 5/32 inch Allen key

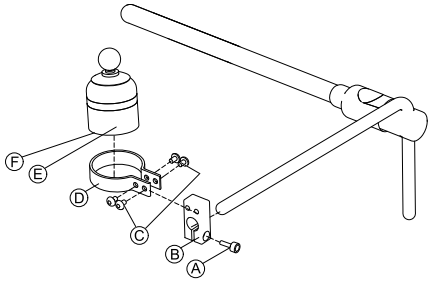


Fig. 3-69

1. Pull adapter block Ⓑ over nucleus and tighten with screw Ⓐ.
2. Insert remote Ⓔ into clamp Ⓓ. Make sure, arrow Ⓕ (not visible in picture) shows into reverse driving direction.
3. Mount clamp Ⓓ to adapter block Ⓑ with screws Ⓒ.

3.12.4 Mounting the Pediatric Compact Joystick

Lateral Tray Mount

- 1/8 inch Allen key
- 5/32 inch Allen key
- 3/16 inch Allen key

1.

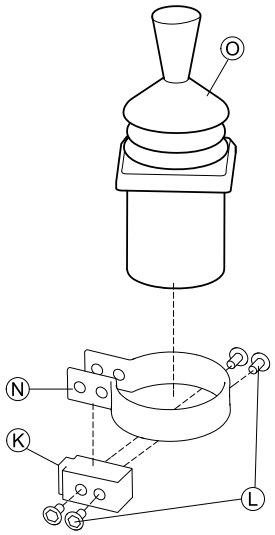


Fig. 3-70

Insert remote Ⓞ into clamp Ⓝ. Pull clamp over adapter block Ⓚ and tighten with screws Ⓛ.

2.

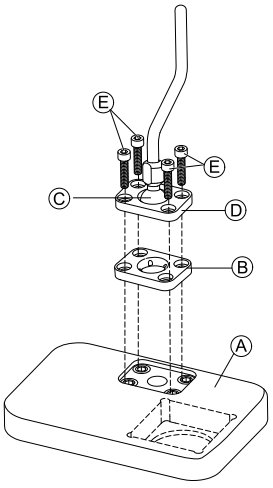


Fig. 3-71

Insert clamp plate Ⓑ into cutout on tray Ⓐ.

3. Fix clamp plate Ⓑ, clamp ball Ⓒ and upper clamp plate Ⓓ with screws Ⓔ.

4.

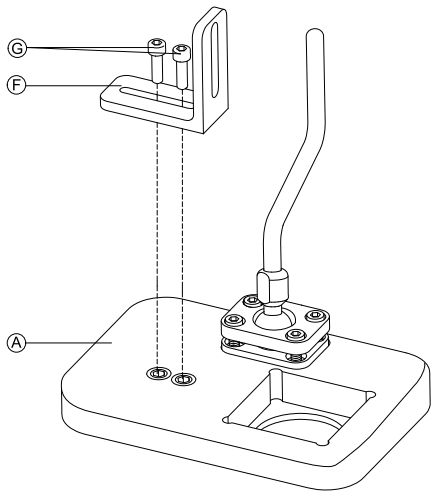


Fig. 3-72

Mount angle bracket Ⓕ with screws Ⓖ to tray Ⓐ.

5.

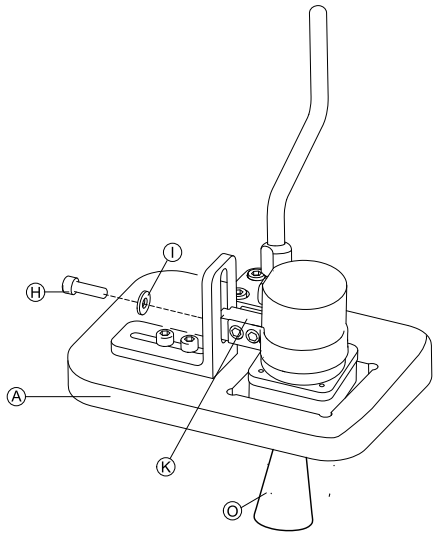


Fig. 3-73

Fix adapter block Ⓚ to angle bracket Ⓕ with screw Ⓗ and washer Ⓘ.

Nucleus Tray Mount

CAUTION!
Risk of Injury and Damage
Remaining burrs and missing end caps after modifications on rods, such as shortened rod, can lead to injury or damage.
– Deburr cut after cutting excessive length.
– Re-install end cap after deburring.
– Check end cap for tight fitting.

- 1/8 inch Allen key
- 5/32 inch Allen key
- 3/16 inch Allen key

1.

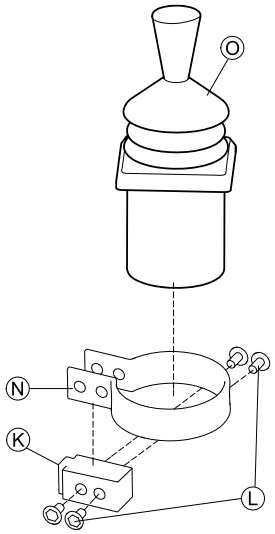


Fig. 3-74

Insert remote Ⓞ into clamp Ⓝ. Pull clamp over adapter block Ⓚ and fix with screws Ⓛ.

2.

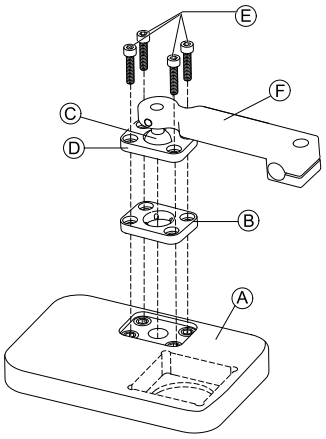


Fig. 3-75

Insert clamp plate Ⓑ into cutout on tray Ⓐ.

3. Fix clamp plate Ⓑ, clamp ball Ⓒ and upper clamp plate Ⓓ with screws Ⓔ.

4.

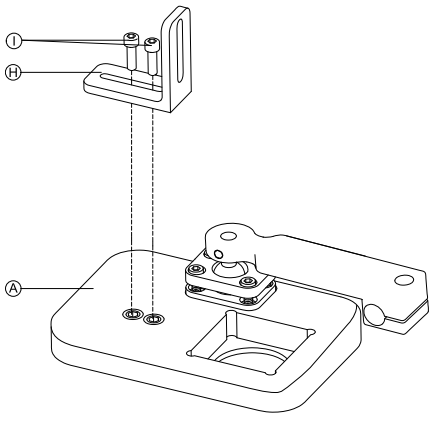


Fig. 3-76

Mount angle bracket Ⓗ with screws Ⓘ to tray Ⓐ.

5.

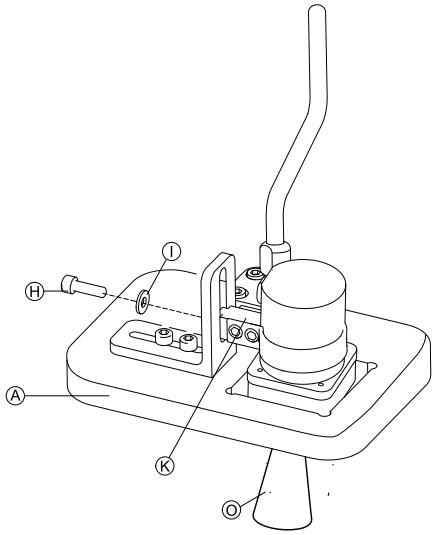


Fig. 3-77

Fix adapter block Ⓜ to angle bracket Ⓗ with screw Ⓙ and washer Ⓚ.

6.

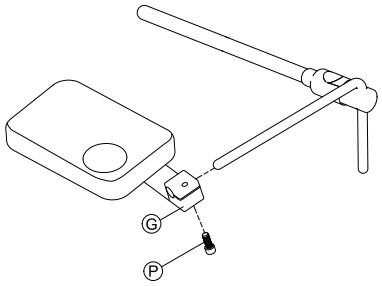


Fig. 3-78

Pull hitch mount Ⓖ over nucleus and tighten with screw Ⓟ.

Nucleus Only Mount

CAUTION!
Risk of Injury and Damage
Remaining burrs and missing end caps after modifications on rods, such as shortened rod, can lead to injury or damage.
– Deburr cut after cutting excessive length.
– Re-install end cap after deburring.
– Check end cap for tight fitting.

- 1/8 inch Allen key
- 5/32 inch Allen key

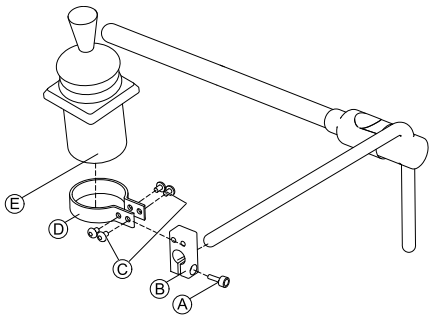


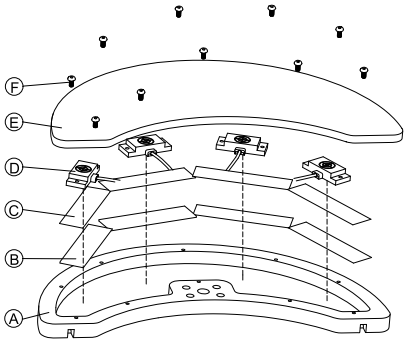
Fig. 3-79

1. Pull adapter block Ⓑ over nucleus and tighten with screw Ⓐ.
2. Insert remote Ⓔ into clamp Ⓓ.
3. Mount clamp Ⓓ to adapter block Ⓑ with screws Ⓒ.

3.12.5 Mounting the eclipse tray with proximity sensors

- 3/32 inch Allen key
- 5/32 inch Allen key
- 3/16 inch Allen key
- 4x loop straps 25x100 mm
- 4x hook straps 25x100 mm

1.



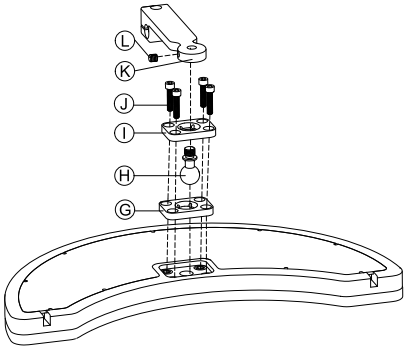
Fix hook straps Ⓑ inside eclipse tray Ⓐ.

2. Cut loop straps Ⓒ accordingly shape of proximity sensors Ⓓ.
3. Fix loop straps to proximity sensors.
4. Fix loop straps to hook straps.
5.

Pay attention that wiring of proximity sensors fit into intended gaps.

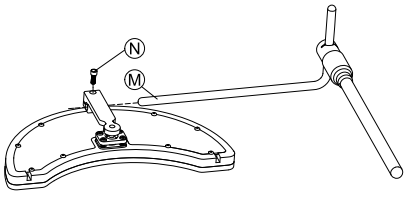
Fix coverage Ⓔ to eclipse tray with screws Ⓕ.

6.



Insert clamp plate Ⓖ into cutout on eclipse tray.

7. Fix clamp plate, clamp ball Ⓗ and upper clamp plate Ⓘ with screws Ⓙ.
8. Screw hitch mount Ⓚ to clamp ball with grub screw Ⓛ.
9.

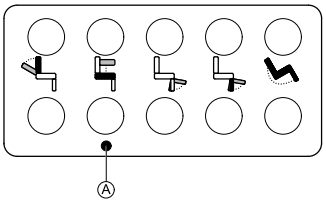
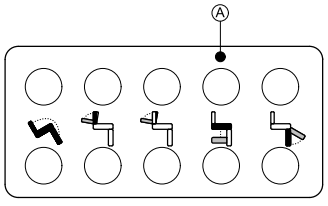


Pull hitch mount over nucleus Ⓜ and tighten with screw Ⓝ.

3.13 Mounting the 10 way switch

For more information about how 10 way switch holders are mounted to the wheelchair, refer to the service manual of the seating system.

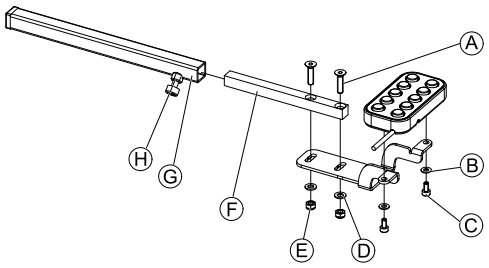
While mounting the 10 way switch or changing the labeling, the orientation spot Ⓐ must face downwards, see table below.

Orientation right	Orientation wrong
	

3.13.1 Mounting the 10 way switch for Modulite

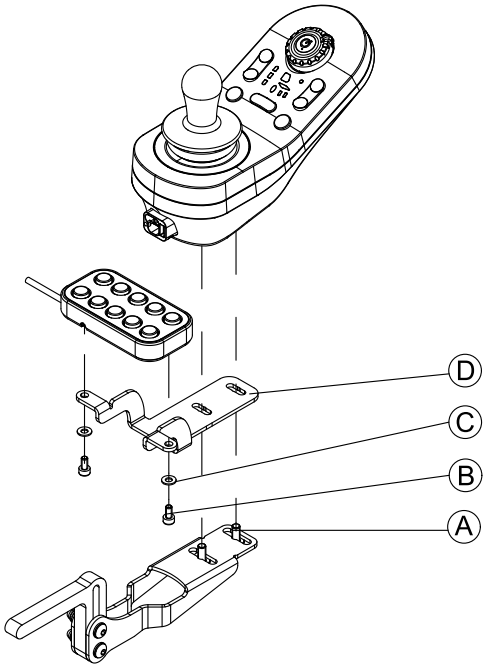
Mounting at the front

- 3 mm Allen key
- 4 mm Allen key
- 8 mm wrench



1. Tighten 10 way switch to bracket with screws Ⓒ and washers Ⓑ.
2. Tighten bracket to remote mounting tube Ⓕ with screws Ⓐ, washers Ⓓ and nuts Ⓔ.
3. Insert remote mounting tube inside mounting bracket Ⓖ.
4. Adjust 10 way switch to desired position.
5. Tighten wing screw Ⓗ.

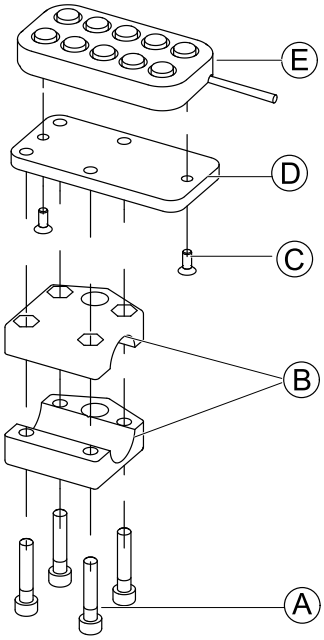
In combination with DLX-REM211/DLX-REM216



1. Tighten 10 way switch to bracket Ⓓ with screws Ⓑ and washers Ⓒ.
2. Tighten bracket to remote mounting bracket with screws Ⓐ.

Mounting at the rear (for attendants)

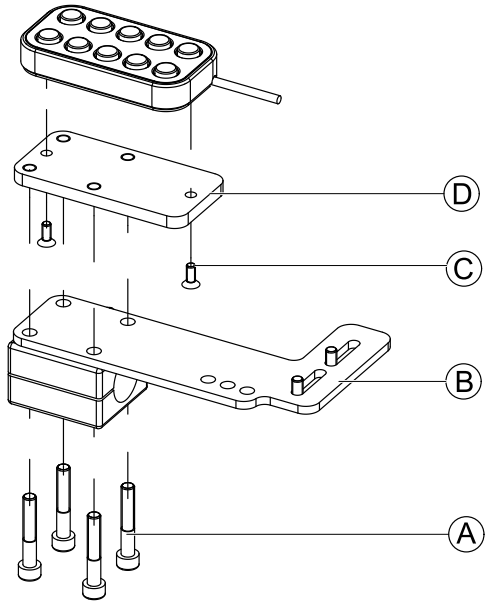
- 3 mm Allen key
- 4 mm Allen key



The 10 way switch is fitted to the rear of the wheelchair using a bracket Ⓑ on the push handle or push bar.

1. Tighten mounting plate Ⓓ with screws Ⓒ to 10 way switch Ⓔ.
2. Pull screws Ⓐ through bracket Ⓑ and mounting plate Ⓓ.

In combination with DLX-REM050 (attendant control unit)



1. Tighten 10 way switch to mounting plate Ⓓ with screws Ⓒ.
2. Tighten mounting plate Ⓓ to mounting plate Ⓑ with screws A.

For the possible positions of the attendant control unit, refer to *Mounting the DLX-REM400*.

3.13.2 Mounting the 10 way switch for Ultra Low Maxx

Mounting at the front

- 3 mm Allen key
- 8 mm wrench

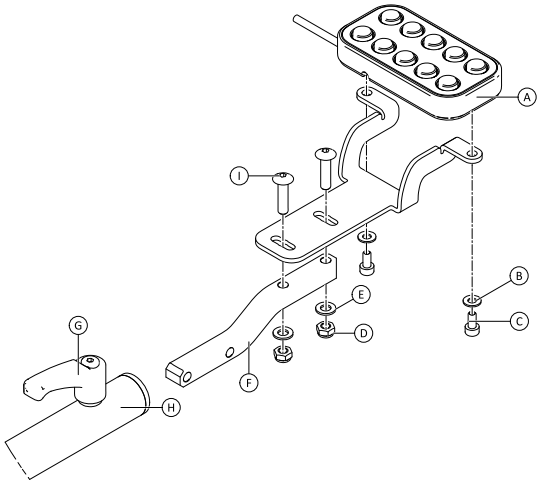


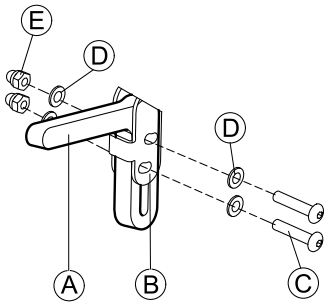
Fig. 3-80

1. Tighten 10 way switch Ⓐ to bracket with screws Ⓒ and washers Ⓑ.
2. Tighten bracket to remote mounting tube Ⓕ with bolts Ⓘ, washers Ⓔ and nuts Ⓓ.
3. Insert remote mounting tube inside mounting bracket Ⓗ.
4. Adjust 10 way switch to desired position.
5. Tighten lever Ⓖ.

In combination with DLX-REM2XX or DLX-REM400

- 3 mm Allen key
- 8 mm wrench

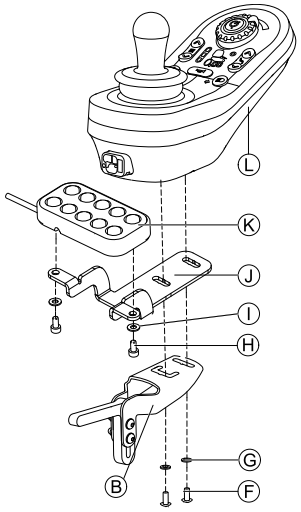
1.



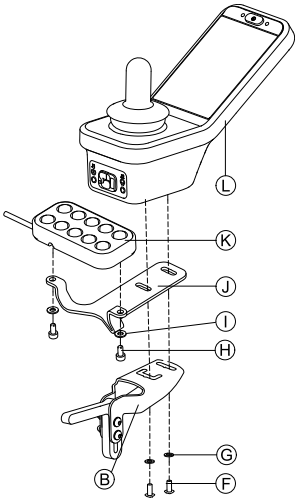
Mount joystick holder Ⓐ to remote adapter Ⓑ with screws Ⓒ, washers Ⓓ and nuts Ⓔ.

2.

DLX-REM2XX



DLX-REM400



Mount remote Ⓛ to remote adapter Ⓑ and support sheet Ⓙ with screws Ⓕ and washers Ⓖ.

3. Mount 10 way switch Ⓚ to support sheet Ⓙ with screws Ⓗ and washers Ⓘ.

For more information about mounting the 10 way switch for attendants, refer to the service manual of the Ultra Low Maxx.

3.13.3 Changing Labeling

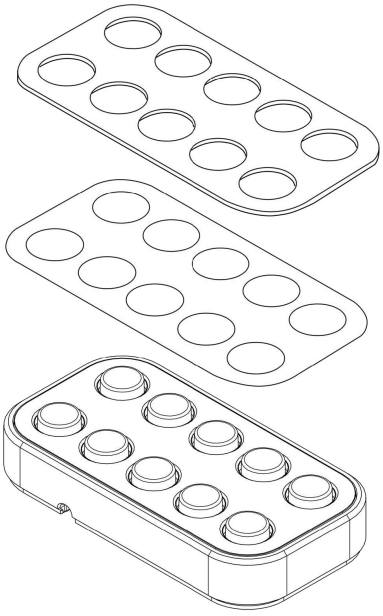


Fig. 3-81

- Small pointed tool (Nylon screw or similar)
- Label

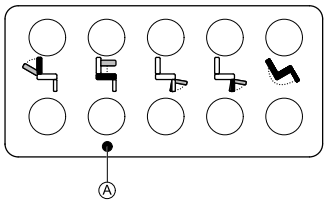


Fig. 3-82 Correct orientation of labeling

1. Remove switch from bracket.
2.

Fig. 3-83

   Insert tool in upper two holes Ⓑ on rear side and push out covering plate and labeling on other side.
3.

   While installing new labeling, ensure that orientation spot Ⓐ faces downwards and correct function icons are shown.

   Replace labeling.
4. Install covering plate.
5. Install switch to bracket.

4 Replacing Wheelchair Components

4.1 General information on setup

The tasks described in this chapter are intended to be performed by trained and authorized service technicians for initial setup. They are not intended to be performed by the user.

4.2 Battery Synchronisation on New Batteries

The LiNX enhanced battery gauge integrates new technology that determines the State of Charge (SOC) of lead-acid batteries more accurately than conventional battery gauges which are based on battery-terminal voltage.

- The new enhanced gauge estimates the real SOC by looking at a number of factors, not just instantaneous terminal voltage, which on its own, is a poor indicator of SOC.
- The gauge does not measure current, which is difficult to do in a power wheelchair system.
- The gauge determines if the battery is charging or discharging, and depending on this state, applies logic and calculations to find the real SOC. Part of this is knowing the recent history of the battery use.
- The gauge models the discharge based on the terminal voltage, the rate of change of terminal voltage and how long the battery has been in this state, to get an actual SOC.
- The new gauge differentiates between real charging and regenerated voltage or recovery, which causes a distortion of the charge estimate in conventional gauges.
- If the battery is actually charging, the change in SOC is calculated based on where it is in the charge cycle, the rate of change in the terminal and how long it has been charging.

New Batteries

The enhanced battery gauge uses the recent charge / discharge history of the battery to calculate the SOC. When new batteries are connected, this history is no longer applicable , but the gauge will continue to calculate the SOC based on the information from previous battery. To rectify this, the enhanced battery gauge needs to be synchronised to the new batteries.

Battery manufacturers recommend that batteries are formatted when new. This involves cycling the battery a number of times without deep discharging them. This procedure does note impact on the gauge synchronisation for new batteries.

Synchronizing new Batteries

1. Connect new batteries to power wheelchair.
2. Reset battery statistics using LiNX Access tools, see *Resetting Battery Usage, page 206*
3. Connect power wheelchair to battery charger. This must be done with system switched ON or within 24 hours of system being switched on.
4. Leave power wheelchair connected to battery charger for longer than ten minutes.
5. Wait until battery gauge displays more than 80 % (5 LEDs).
6. Leave power wheelchair connected to battery charger for at least two hours. For a new battery, the time should be an extended period as per battery manufacturer’s recommendations.

4.3 Replacing Power Module as Spare Part

With replacing the power module the currently used chair configuration is lost. Up to eight pre-configured configurations for different wheelchairs were stored on power module until June 2018. For rules for file naming, see *11 Structure of Program Names, page 209*

We recommend to take backups of current configuration, if possible. For more information on creating backups see *7.3.7 Saving programs, page 106* for iOS or *8.5.4 Save a program as a file, page 120* for PC.

1. If possible, take backup of current configuration.
2. Replace power module. For more information see corresponding service manual of wheelchair.
3. Connect wheelchair and LiNX Access tool.
4. Perform setup procedure. See *4.4 Setup Procedure After Power Module Replacement, page 74*.

4.4 Setup Procedure After Power Module Replacement

After replacing a power module we recommend that you perform following procedures to ensure that customized settings of your user wont be lost and the user gets access to the latest features of LiNX.

Upgrading Firmware / Write Bundle File

Upgrading the firmware of the LiNX components to the latest versions allow your user to use the newest features and other improvements Invacare introduced for the wheelchair. Currently there are two different ways to ensure that your system is up-to-date:

- Using Firmware Upgrade Mode (needs internet connection)

- Write Bundle File

Bundle files contain at least one wheelchair configuration and/or the latest firmware upgrades for the installed LiNX components.

1. Upgrade firmware to latest release.
   a. Firmware Upgrade Mode: For iOS tool, see *7.3.8 Upgrading Firmware, page 107*. For PC tool, see *8.5.6 Upgrading Firmware, page 121*
   b. Bundle File: For iOS tool, see *7.4.2 Writing Bundle Files, page 109*. For PC tool, see *8.6.3 Writing bundle files to a chair, page 126*

Restoring Backup File

We recommend to write a previously saved backup file to wheelchair after installing a new power module.

1. Restore backup file to wheelchair.
   For iOS tool, see *7.3.6 Writing a program to the wheelchair, page 105*. For PC tool, see *8.5.2 Write a program to a wheelchair, page 120*
2. If needed, modify parameters to match user needs.

Calibrating Adaptive Load Compensation (ALC)

During the ALC calibration process an utility calculates motor resistance values to help providing a more consistent motor speed. In case of installing a new power module the module must re-learn this values.

1. Perform suggested programming procedure. See *6.3 Step 3 – Set Load Compensation, page 92*.

Converting Old Configurations (Optional)

1. Convert configuration to enable latest feature, such as Switch Control.
   For iOS tool, see *7.3.4 Converting Configuration Files, page 104*. For PC tool, see *8.5.9 Converting Configuration Files, page 125*.

Setting up Alternative Inputs (Optional)

For more information, see *9.17 Installing/Setting up Alternative Switches, page 197*.

1. Set parameter **Profile User Input** or **User Function Input** on desired function or profile to **Input Module** or to **Third Party**, depending on component input.
2. Set parameter **User Input Configuration** (**Modules** → IN 500 / TPI) to desired input type.

   Check if default value of parameter meets installed input type.

3. Modify other parameters, depending on used component.

Setting up Alternative Outputs (Optional)

1. Set parameters for short and long press in utitlity card to desired values.
   For more information, see *9.10 Modifying Utility Functions, page 148*

Modifying Lighting Parameters (Optional)

1. Edit lighting parameters to desired values.
   For more information, see *9.7 Modifying Lighting Parameters, page 143*

Modifying Gyro Support in Drive Functions (Optional)

1. Set parameter **Gyro Enabled Drive Function** to desired value.
   For more information, see *9.6 Modifying Gyro Support in Drive Functions, page 142*

5 LiNX Access Tools

The LiNX system is programmed during manufacturing with default settings. These settings can be modified with a programming tool to suit the user.

The LiNX system can be programmed with one of two programming and diagnostic tools:

- LiNX Access iOS tool used with Apple's iPhone, iPad and iPod touch with iOS 9.0 or later and
- LiNX Access PC tool used with Windows-based PCs or laptops.

The programming and diagnostic tools communicate with a LiNX system via Bluetooth. The Bluetooth capability of a LiNX system is provided by a LiNX Access Key inserted into the remote module's XLR socket.

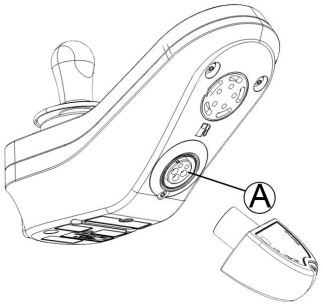
If your PC does not have built-in Bluetooth, then a Bluetooth adaptor plugged into a spare USB port can be used instead.

Both, the iOS and the PC programming tools, offer a Live edit mode that allows certain parameters to be programmed, and take effect, while the system is live (e.g. while driving). For more information, refer to *7.3.5 Modifying a Program, page 105*

5.1 The LiNX Access Key

! – The LiNX Access Key is recommended for indoor use only, or outdoors in dry conditions.
– The LiNX Access Key must not be plugged in when in radio frequency (RF) sensitive environments.
– Always inspect the LiNX Access Key for damage before using it.
– Ensure that the LiNX Access Key is fully inserted into the XLR socket before use.
– Confirm that the connection is made to the wheelchair that is to be programmed by checking the LED on the LiNX Access Key.
– Take care while driving around during tuning of the wheelchair not to damage the LiNX Access Key by hitting a solid object. Always keep a clear distance from any objects that could damage the LiNX Access Key.
– The surface of the LiNX Access Key can get hot if left in direct sunlight for long periods.
– Do not leave the LiNX Access Key connected to the system when the wheelchair is powered down or when the wheelchair is to be stored for a long time, as the Access Key will continue to draw from the batteries when the system is off. If left in place, the expected storage life of the system will not be met and the batteries may be damaged.

The LiNX Access Key provides the Bluetooth connection for a programming tool to communicate with a LiNX system.



The LiNX Access Key plugs directly into the remote module's XLR port Ⓐ. REM2xx displayed in picture, works for REM400 and REM500 the same way.

The LiNX Access Key has a blue status indicator to show when it is:

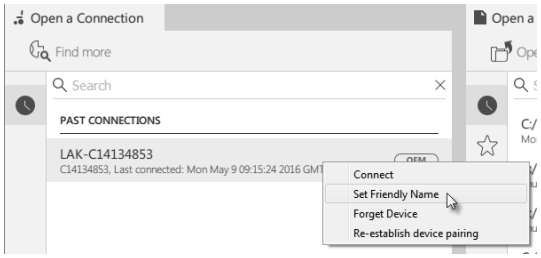
- powered up, but not connected (indicator flashes slowly),
- connecting (indicator flashes quickly) or
- connected (indicator permanently on).

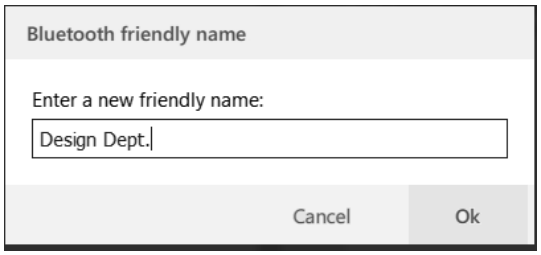
If the blue status indicator turns completely off while trying to connect, or while connected, remove the LiNX Access Key from the remote module, wait for 5 seconds and the reinsert it into the remote module before trying to connect again.

Before the programming tools can be used for programming and diagnostics, you need to pair the devices, which is the process of connecting the devices via Bluetooth. The pairing process differs depending on the programming tool that is used.

5.1.1 Rename LiNX Access Key (only possible with LiNX Access PC tool)

The LiNX Access Key is normally identified with the letters **LAK** followed by a series of characters, for example: **LAK-L12147605**. Although each name is unique, identifying one key from another may become difficult when you have more than one LiNX Access Key. As an option, you can change the names of the keys to more familiar names.

1. Right-click on LiNX Access Key in **Open a Connection** tab. You may have to close your connection if you are already in a connection context.
2. 

   Select **Set Friendly Name** option from context menu.
3. 

   Enter new name into text box and click **OK** button.

After clicking **OK** button the wheelchair is power-cycled and the friendly name is updated. A confirmation screen is displayed, informing you that the name was changed successfully.

5.2 Overview LiNX Access Tools

Top Level Parameter Categories	Parameter Subcategories
Chair Configs	
Restore to Default Config	
Diagnostics/Chair Log	For details see following table
Live Diagnostics[1]	Speed Demand
	Turn Demand
	Motor Voltage
	Motor Current
	Motor Resistance
	Battery Voltage
	Speed Dial
System Summary	System modules with hardware number, firmware number and serial number
Functions	Different kind of profiles and functions
User Preferences (for details see *5.2.2 Overview User Preferences, page 80*)	Drive Settings
	Switched Driving
	Sleep Settings
	Lock Settings
	User Function Navigation
	Control Input/Output Settings
	Display Settings
	Energy Use Settings
	Speedometer and Odometer
Modules	For details see following table

1. Live Diagnostics only available in Connection context mode

Top Level Parameter Categories	Parameter Subcategories
Actuator Motions	For details see following table
Trigger Angles	For details see following table
Lighting	Turn indicators
	Position

Top Level Parameter	Parameter Subcategories	
Diagnostics/Chair Log	Active Errors	Active error list
	Chair Log/Event Log	Log
	Chair Statistics	Battery usage
		Drive statistics

Parameter Subcategories		
Modules	Power Module	Power Module • Motors • Load Compensation
		Control Inputs/Outputs 1–4 (for details see *5.2.5 Control Input Types and Options, page 88*)
	Primary Remotes	Display Settings (for details see *5.2.3 Overview Display Settings, page 84*, only for remotes with display)
		User Input - Configuration
		User Input - Joystick Shaping
		Speaker - Audible Cues
		Control Inputs/Outputs (for details see *5.2.5 Control Input Types and Options, page 88*, only for remotes with inputs/outputs)
	Secondary Remotes	User Input - Configuration
		User Input - Joystick Shaping
	TPI	User Input
		Control Inputs/Outputs 4–32 (for details see *5.2.5 Control Input Types and Options, page 88*)
	Input Module	User Input
		Control Inputs/Outputs Jack Socket (for details see *5.2.5 Control Input Types and Options, page 88*)
	ACT200[2]	Control Inputs/Outputs 1–4 (for details see *5.2.5 Control Input Types and Options, page 88*)
	ACT400[2]	Control Inputs/Outputs 1–4 (for details see *5.2.5 Control Input Types and Options, page 88*)
Actuator Motions[2]	Configured Seating Motion[2]	Identification
		Behaviour
		Actuator Channels

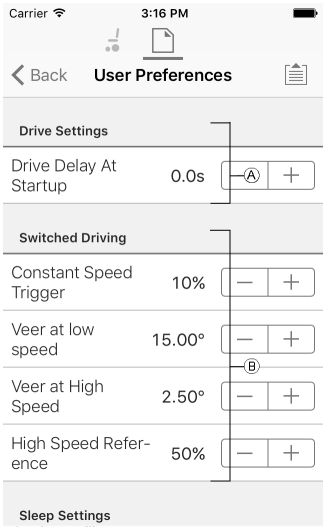
2. Optional

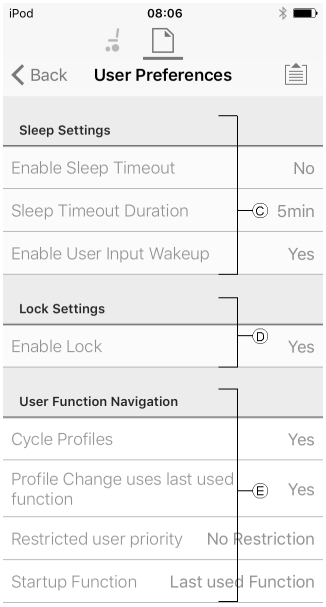
Parameter Subcategories		
Trigger Angles[2]	Configured Trigger Angles[2]	Angle Sensor Source
		Debounce Timer
		Trigger Angle

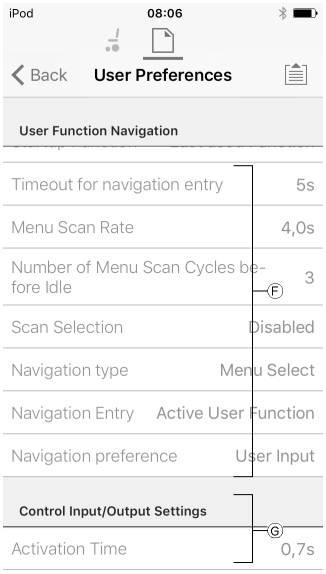
5.2.1 Overview Profiles

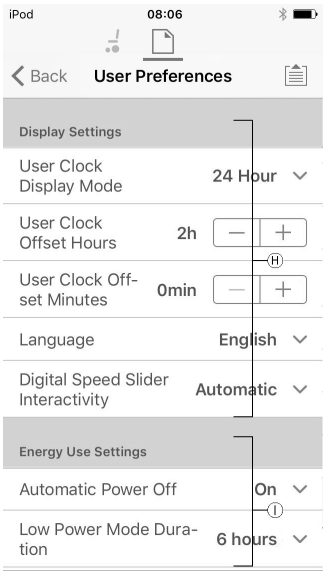
Profile Name	Name for the current profile.
Enable Profile	When enabled, this profile becomes visible to the user.
Profile User Input	Selects the user input for this profile.
Enable Function Wrap	When enabled, this allows the user to continually scroll and loop through available functions without changing the scrolling direction.
Enable Menu Scan	Enables scanning the menu for this profile.
Enter Navigation Instead of Function Wrap	When enabled, the navigation menu is displayed instead of wrapping around to the next function when at either end of the current profile. This occurs regardless to the **Enable Function Wrap** setting.
Rest Timeout Enabled	If set, the system enters rest state after a specified time of user inactivity. The rest state is entered from this profil's drive or seating functions only.

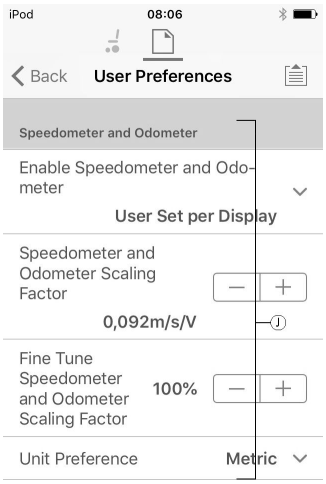
5.2.2 Overview User Preferences

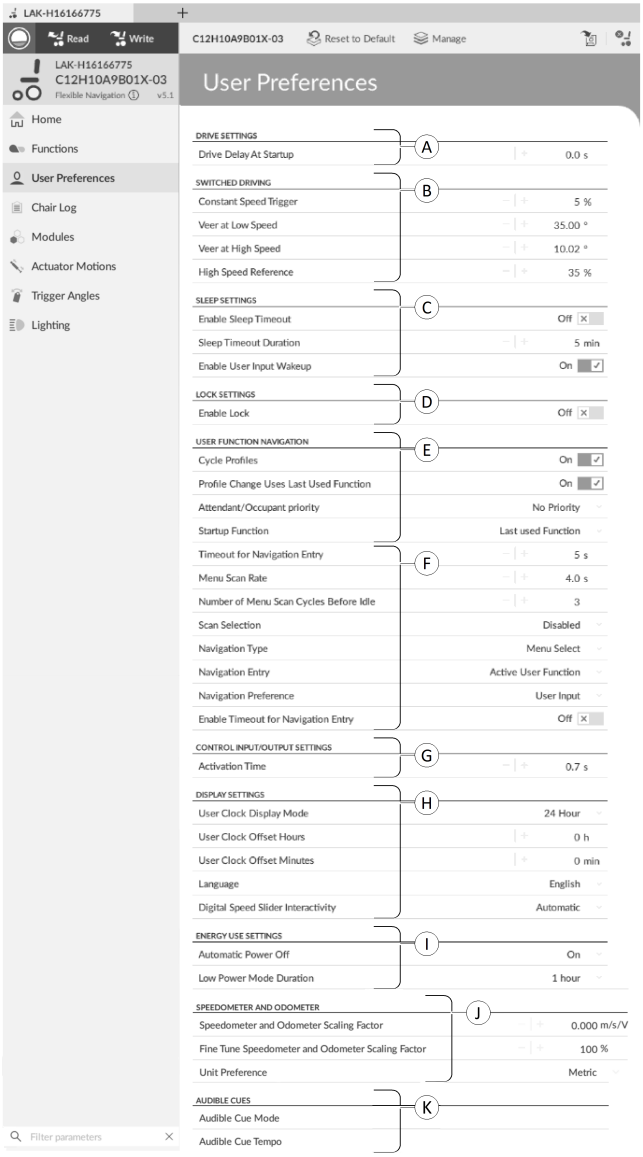












Ⓐ	**Drive Settings**	**Drive Delay At Startup**: Allows time delay to be set up between power-up and driving.
Ⓑ	**Switched Driving**	These parameters set veer behaviour of drive functions which use switched inputs, for example a Sip and Puff array. They are unique to switched driving and independent of forward, reverse and turn parameters that are used in driving and turning with proportional inputs, such as joysticks.
		Constant Speed Trigger: Sets minimum forward / reverse speed during veer. If wheelchair is stationary or travelling at a low speed (lower than **Constant Speed Trigger**), speed ramps up to **Constant Speed Trigger**. Once at **Constant Speed Trigger**, speed remains constant.
		Veer at Low Speed: Provides possibility of maximum veering at lowest speed. Value must be set greater than **Veer at High Speed**. Speed at which **Veer at Low Speed** is applied is set by **Constant Speed Trigger**.
		Veer at High Speed: Is set to produce less veering at higher speeds. Value must be less than **Veer at Low Speed**. Speed at which **Veer at High Speed** is applied is set by **High Speed Reference**.
		High Speed Reference: Sets point at which **Veer at High Speed** is applied. When wheelchair travels at speeds lower than this, veer is defined by graph between **Veer at Low Speed** and **Veer at High Speed**. For all speeds higher than **High Speed Reference**, amount of veer applied is the same as that set by **Veer at High Speed**.

Ⓒ	**Sleep Settings**	**Enable Sleep Timeout**: Determines whether system goes to sleep after a period without user activity.
		Sleep Timeout Duration: Sets amount of time without user activity before system goes to sleep, if sleep is enabled.
		Enable User Input Wakeup: Determines whether deflecting joystick can wake system from sleep.
		Rest Timeout Duration: Sets the amount of time without user activity before the system enters the rest state, if rest timeout is enabled for the active profile.
Ⓓ	**Lock Settings**	**Enable Lock**: Determines whether system can be locked by pressing power button for four seconds.
Ⓔ	**User Function Navigation**	**Cycle Profiles**: User profile menu either cycles or stops at each end. Parameter determines, if profile menu can cycle around when stepping through it.
		Profile Change uses last used function: Sets behaviour of system to enter last used function of profile when particular profile is changed into.
		Attendant/Occupant priority: Selection for setting system user change restrictions.[1]
		Startup Function: Sets default user function on startup as either first user function of first profile or last used user function.
Ⓕ	**User Function Navigation**	See *9.14 Enable Indirect Navigation, page 160* for more information.
Ⓖ	**Control Input/Output Settings**	**Activation Time**: Sets maximum time between two button presses to be recognized as double press and minimum time to detect long button press.[2]
Ⓗ	**Display Settings**	**User Clock Display Mode**: Sets the display mode to the user clock to either 12 hour or 24 hour format.
		User Clock Offset Hours: Adjusts the display clock hour value to the time zone.
		User Clock Offset Minutes: Adjusts the display clock minutes value to the time zone.
		Language: Sets the language for text information on the display.
		Digital Speed Slider Interactivity: Sets whether the touch screen speed slider is able to be used in a system where it has the priority.
Ⓘ	**Energy Use Settings**	**Automatic Power Off**: Enables the LiNX system to power down itself after 12 hours of user inactivity. Parameter is equivalent to pressing a power button.
		Low Power Mode Duration: Sets the time which the LiNX system will remain in low power mode after power off. Low power mode is used to monitor battery charging, allow for joystick wakeup from sleep, and to apply electronic braking to actuators.
Ⓙ	**Speedometer and Odometer**	**Speedometer and Odometer Scaling Factor**: Scaling factor for speedometer and odometer.
		Fine Tune Speedometer and Odometer Scaling Factor: Fine tune the speedometer and odometer value.
		Unit Preference: Sets the measurement units for the display.
Ⓚ	**Audible Cues**	**Audible Cue Mode**: Determines the mode of audible cues.
		Audible Cue Tempo: Sets the speed at which audible cues are played, where 1 is slowest and 10 is fastest.

1 **Risk of injury or damage**
– When setting either occupant or attendant as restricted user in user-in-charge-system, consideration needs to be given to whether benefit outweighs risk, since restricted user is unable to take control from user by activating power button in emergency.

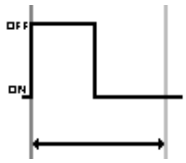
> **CAUTION!**
> **Risk of injury or damage**
> – When setting either occupant or attendant as restricted user in user-in-charge-system, consideration needs to be given to whether benefit outweighs risk, since restricted user is unable to take control from user by activating power button in emergency.

A restricted user is an occupant or attendant that is prevented from being user-in-charge once a system is powered up. By default, there are no restricted users in a LiNX system and both the attendant and the occupant can request to be user-in-charge at any time by pressing power button. However, for safety and other reasons, it may be appropriate to restrict the attendant or occupant from becoming user-in-charge after power-up. If restricted, any request to be user-in-charge is denied.

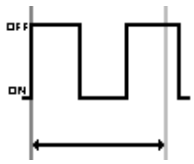
To restrict a user, set this parameter to:

- **No Priority**: Default
- **Occupant Priority**: to restrict attendant.
- **Attendant Priority**: to restrict occupant.
- **No Change Allowed**: to restrict attendant and occupant.

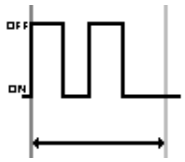
2 Parameter is used to distinguish between a single button press, a double-press and a long button press.



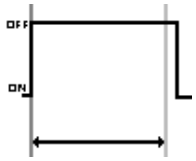
If duration time is less than **Activation Time**, input is detected as single press.



If duration of two button presses is greater than **Activation Time**, input is detected as two single presses.



If duration of two button presses is less than **Activation Time**, input is detected as double-press.



If duration of single button press is greater than **Activation Time**, input is detected as long press.

5.2.3 Overview Display Settings

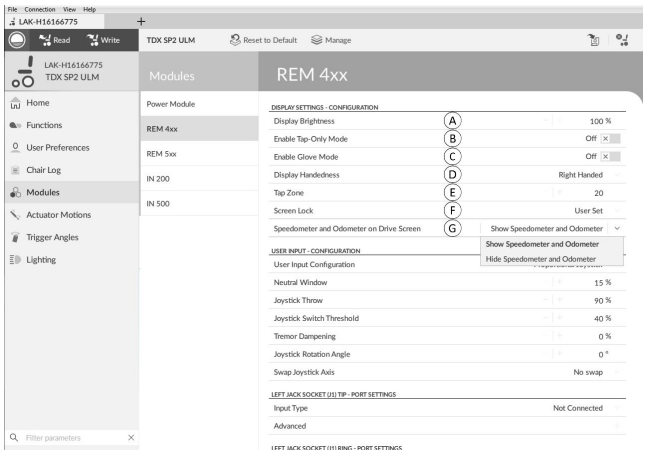


Fig. 5-1 PC tool

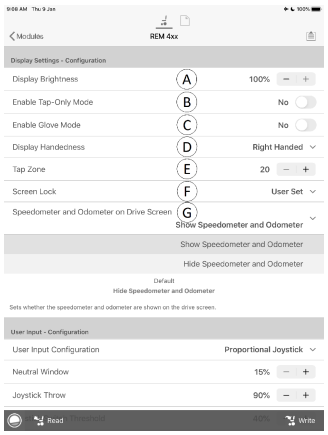


Fig. 5-2 iOS tool

Ⓐ	**Display Brightness**	Sets the brightness of the display.
Ⓑ	**Enable Tap-Only Mode**	Enables **Tap-Only Mode** where swipe interactions are replaced by taps.
Ⓒ	**Enable Glove Mode**	Enables **Glove Mode** on a remote with touch screen.
Ⓓ	**Display Handedness**	Sets whether the display is used by a left or right handed user.
Ⓔ	**Tap Zone**	Defines the area used for detecting a tap action on the touch interface.
Ⓕ	**Screen Lock**	Sets the touch screen lock. This persists over power cycles.
Ⓖ	**Speedometer and Odometer on Drive Screen**	Sets whether the speedometer and odometer are shown on the drive screen.

5.2.4 Overview Control Input / Output (Control IO)

Control IO provides a number of options for the wheelchair user, therapist and manufacturer to extend the input and output capabilities on their LiNX system. These include, for example:

- configuring an input with an external power switch for users who cannot reach the power button on the remote module;
- configuring inputs to increment or decrement the speed slider for users who have difficulties using the speed slider on a REM400 or REM500;
- configuring an input to open a specific function card for users who need quick access to this function card;
- configuring a number of external buttons to perform mouse actions (clicks and movement) and common keyboard actions for users who cannot use the joystick.

In this manual there are mentioned different types of input and output.

- System control input:
  Given via remote or external inputs like buddy buttons or head array.
- Control input (CI):
  Configurable module inputs like CI pins or jack sockets.
- Output:
  Includes driving, seating, lighting, horns, function selection, navigation, connectivity and control output. The outputs are configurable via the LiNX Access tools.
- Control output (CO):
  Configurable module outputs like DB9 connector and jack sockets.

On selected LiNX modules, you can configure a control input (CI) to select and use outputs or to configure further control output (CO) on the Output module. The following graphic shows a simplified view of the LiNX Control IO.

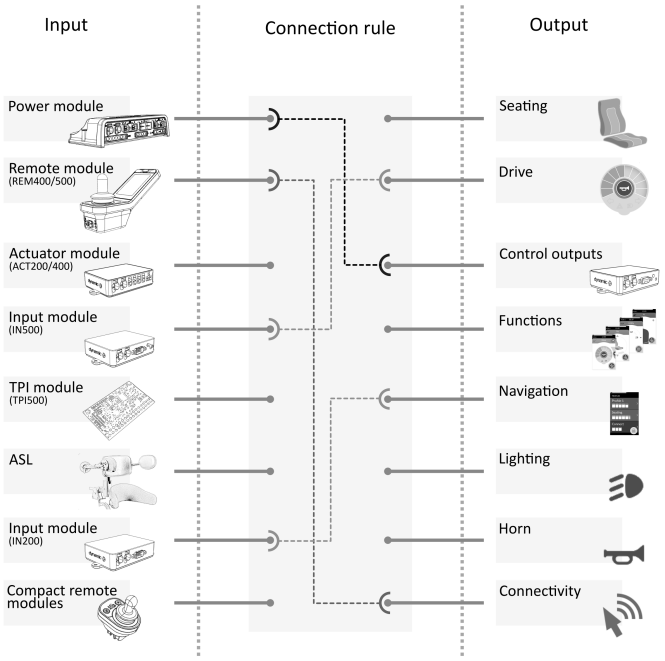


Fig. 5-3

Connection rules link the inputs to the outputs. These describe which inputs activate which outputs, including how and when. Connection rules are created using the LiNX Access tools.

Creating connection rules for control IO:

1. Select and configure a control input, for example power module, Control Input 1, 10–way switch or Switch 5.
2. Assign an output and actions, for example seating, tilt or toggle.
3. Configure advanced settings (optional), for example Input Port Debounce or monitored.

For more detailed information about using the LiNX Access iOS tool, refer to *9.15.1 Configuring Control IO (iOS Tool), page 163* and for the LiNX Access PC tool, refer to *9.15.2 Configuring Control IO (PC Tool), page 165*.

Control Inputs

Supported modules and their control inputs are:

- Power module: CI pins on Aux port via Accessory loom
- Remote module: multipurpose buttons, toggles, jack sockets
- Actuator modules: CI pins
- Input module: CI pins on DB9, jack socket
- TPI/ASL module: CI pins
- Compact remote module: mode button

Power modules offer control inputs through the utility port CI pins. The LiNX 100 series power modules provide three inputs, the LiNX 200 series power modules provide four inputs.

The REM400 and REM500 remote modules provide control inputs through the multipurpose buttons, toggles (REM400 only) and jack sockets. The left jack socket in both modules can be used for a power switch.

Actuator modules, ACT200 and ACT400, provide four control inputs each through the CI port.

The IN500 input module provides two control inputs through the DB9 connector and two through the jack socket. The IN200 input module provides six control inputs through the DB9 connector and two through the jack socket.

To see the control inputs for each module in more detail refer to *5.2.5 Control Input Types and Options, page 88*.

Complex configurations, which have been pre-configured for the manufacturer, are not accessible and are marked with the following icons:

Configurable: If configured, the slot can display the configuration summary.	*Fig. 5-4*
Not configurable: The slot can display the configuration summary.	*Fig. 5-5*
Restricted: The slot cannot show the configuration summary because of its complexity.	*Fig. 5-6*

Outputs

Supported outputs are:

- **Seating**
- **Drive**
- **Control Outputs** (Output module)
- **Functions**
- **Navigation**
- **Lighting**
- **Horn**
- **Connectivity**

Seating: Select **Seating** to set the output to control the position of the seat, backrest and legs. This output can be toggled, switched and latched.

Output	Choice 1	Choice 2
Seating	**Tilt**	**Toggle**
	Recline	**Toggle Latch**
	Elevate	**Switched Extend**
	Left Leg	**Switched Retract**
	Right Leg	**Latched Extend**
	Both Legs	**Latched Retract**
	Recline and Legs	
	LNX	

Drive: Select **Drive** to set the output to control the wheelchair speed and toggle between forward and reverse direction.

Output	Choice 1
Drive	**Increment Speed**
	Decrement Speed
	Toggle Reverse

Control Outputs: Select **Control Outputs** to activate one of eight control output pins on the Output module's DB9 connector or one of two outputs on the Output module's jack socket. Outputs can be set to momentary or their state can be latched with Set, Clear or Toggle actions.

Output	Choice 1	Choice 2
Control Outputs	**Output 1**	**Momentary**
	Output 2	**Set**
	Output 3	**Clear**
	Output 4	**Toggle**
	Output 5	
	Output 6	
	Output 7	
	Output 8	

Functions: Select **Functions** to give the user instant access to specific functions (drive, seating, utility etc.) and profiles. Options include:

- Next Function: selects the next function in the profile.
- Previous Function: selects the previous function in the profile.
- Next Profile: selects the next profile.
- Previous Profile: selects the previous profile.
- Next Function of Purpose: selects the next function of the same specified type in the active profile.
- Previous Function of Purpose: selects the previous function of the same specified type in the active profile.
- Force to Function: selects a specific function. This is configured by specifying the function.

Output	Choice 1	Choice 2
Functions	**Next Function**	
	Previous Function	
	Next Profile	
	Previous Profile	
	Next Function of Purpose	**Choose purpose**
	Previous Function of Purpose	**Choose purpose**
	Forte to Function	**Choose function**

Navigation: **Navigation** outputs can be set to perform a select action when in menu scan mode, toggle between indirect and direct navigation, display settings and toggle the lock screen.

Output	Choice 1
Navigation	**Menu Scan Select**
	Toggle Indirect Navigation
	Toggle REM 4xx Settings Menu
	Toggle REM 4xx Screen Lock
	Toggle REM 5xx Setting Menu
	Toggle REM 5xx Screen Lock

Lighting: Lighting outputs can be set to change the state of position, indicator and hazard lights. The output can be toggled, switched on and switched off.

Output	Choice 1	Choice 2
Lighting	**Position**	**Toggle**
	Left	**On**
	Right	**Off**
	Hazard	

Horn: Use this output to sound the horn on the remote module.

Output	Choice 1
Horn	**All**
	REM LE
	REM 1xx
	REM 2xx
	REM 4xx
	REM 5xx

Connectivity: Select **Connectivity** to access connectivity functions:

- Mouse Direction: move mouse.
- Mouse Left Click: perform a left-click.
- Mouse Middle Click: perform a middle-click.
- Mouse Right Click: perform a right-click.
- Mouse Scroll: perform an up/down scroll or toggle scroll mode.
- Switch Control: perform a keyboard action.

Output	Choice 1	Choice 2
Connectivity	**Mouse Direction**	**Up/Down/Left/Right**
	Mouse Left Click	**Single/Double/Toggle**
	Mouse Middle Click	**Single/Double/Toggle**
	Mouse Right Click	**Single/Double/Toggle**

Output	Choice 1	Choice 2
	Mouse Scroll	**Up/Down/Scroll Mode**
	Switch Control	**Space, Enter, Esc, Tab, Up, Down, Left, Right**

Advanced Settings

The advanced setting allow you to (optionally) configure the control inputs further. Select **Advanced** to reveal the following options:

- **Stop Driving and Seating**
- **Input Port Debounce**
- **Monitored**
- **Stability Checking**
- **Normally Closed**
- **Enable Input**

Stop Driving and Seating: If this is set to **On**, then any activation on any slot related to this input results in driving and seating operations (if any) to stop before the system responds to the input.

For all inputs that use this feature, the user needs to activate the input twice to select the intended output if a driving or seating operation is in progress: the first activation stops the driving or seating operation, the second activation selects the intended output.

If no driving or seating operation is in progress, the intended output is selected by a single activation of the input.

Input Port Debounce: This setting is used to prevent false triggers, by determining when the controller responds to an input. This is useful when the controller needs to ignore spurious signals such as those, for example, generated by contact bounce (switch chatter) from a mechanical switch, or a ball switch when the wheelchair drives over rough terrain.

Set the **Input Port Debounce** time to an appropriate value.

- If it is set to zero seconds, no debounce is applied and the controller responds to a signal change on the input immediately.
- If it is set to a time greater than zero seconds, debounce is applied and the controller only responds to the signal present at the input after the time set by **Input Port Debounce**.

  The input signal must be stable for the duration of the debounce time, before the system responds to the input.

Monitored: If set to **Yes**, the input is able to detect open and closed circuits, as well as fault conditions: short circuit and no-circuit (disconnected) for all resistor-based circuits.

If set to **No**, the input is able to detect open and closed circuits but does not detect fault conditions.

Stability Checking: Sets whether this input is monitored for signal stability.

Instability on an input can trigger unwarranted errors that can be annoying for the user. Signals from mechanically-based switches, such as ball switches, especially, for example, when driving over rough terrain, can produce this type of instability. For systems that show this behaviour, stability monitoring on the input can be switched off.

Normally Closed: By default, switch inputs are considered Normally Open (NO). If a NO switch is used in the input circuit, leave this parameter set to **No**. If a Normally Closed (NC) switch is used in the input circuit, set this parameter to **Yes**.

Enable Input: This setting allows you to enable or disable the selected Input Type whilst retaining its control IO configuration.

When it is set to **Yes**, the system responds to the input according to the control IO configuration assigned to it. When it is set to **No**, the system does not respond to the input.

Note that the control IO configuration assigned to this input is retained when **Enable Input** is set to **No**. This is useful, for example, when you want to disable this input temporarily. However, if the Input Type setting is reset (by selecting **Not Connected**), then any configuration associated with this input type is deleted.

5.2.5 Control Input Types and Options

The following table shows the control inputs for each module in more detail, including the corresponding input types and available options.

Module	Module's Control Inputs	10–way Switch	Resistor Bands	Button	Power Button
Power module	CI pins 1 - 3	Switch 1 - 10	Band 1 - 10	Momentary, Short Press. Long Press, On Press	No
	Control Input/Output (set as input)	Switch 1 - 10	Band 1 - 10	Momentary, Short Press. Long Press, On Press	No
REM4xx	Left jack tip	Switch 1 - 10	Band 1 - 10	Momentary, Short Press. Long Press, On Press	Yes
	Left jack ring	Switch 1 - 10	Band 1 - 10	Momentary, Short Press. Long Press, On Press	No
	Right jack tip	Switch 1 - 10	Band 1 - 10	Momentary, Short Press. Long Press, On Press	No
	Right jack ring	Switch 1 - 10	Band 1 - 10	Momentary, Short Press. Long Press, On Press	No
	Left toggle forward	No	No	Momentary, Short Press. Long Press, On Press	Yes
	Left toggle back	No	No	Momentary, Short Press. Long Press, On Press	Yes
	Right toggle forward	No	No	Momentary, Short Press. Long Press, On Press	Yes
	Right toggle back	No	No	Momentary, Short Press. Long Press, On Press	Yes
	Multipurpose button 1	No	No	Momentary, Short Press. Long Press, On Press	No
	Multipurpose button 2	No	No	Momentary, Short Press. Long Press, On Press	No
REM 5xx	Left jack tip	Switch 1 - 10	Band 1 - 10	Momentary, Short Press. Long Press, On Press	Yes
	Left jack ring	Switch 1 - 10	Band 1 - 10	Momentary, Short Press. Long Press, On Press	No
	Right jack tip	Switch 1 - 10	Band 1 - 10	Momentary, Short Press. Long Press, On Press	No
	Right jack ring	Switch 1 - 10	Band 1 - 10	Momentary, Short Press. Long Press, On Press	No
	Multipurpose button 1	No	No	Momentary, Short Press. Long Press, On Press	No
	Multipurpose button 2	No	No	Momentary, Short Press. Long Press, On Press	No

Module	Module's Control Inputs	10–way Switch	Resistor Bands	Button	Power Button
TPI	CI pins 6, 8, 10, 25	No	No	Momentary, Short Press. Long Press, On Press	No
IN200	CI pins 1 - 6	No	No	Momentary, Short Press. Long Press, On Press	No
	Jack tip	Switch 1 - 10	Band 1 - 10	Momentary, Short Press. Long Press, On Press	Yes
	Jack ring	Switch 1 - 10	Band 1 - 10	Momentary, Short Press. Long Press, On Press	No
IN500	CI pins 5 - 6	No	No	Momentary, Short Press. Long Press, On Press	No
	Jack tip	Switch 1 - 10	Band 1 - 10	Momentary, Short Press. Long Press, On Press	Yes
	Jack ring	Switch 1 - 10	Band 1 - 10	Momentary, Short Press. Long Press, On Press	No
ACT200	CI pins 1 - 4	Switch 1 - 10	Band 1 - 10	Momentary, Short Press. Long Press, On Press	No
ACT400	CI pins 1 - 4	Switch 1 - 10	Band 1 - 10	Momentary, Short Press. Long Press, On Press	No
ASL Switched	CI pin 8	No	No	Momentary, Short Press. Long Press, On Press	No
ASL Proportional	CI pin 8	No	No	Momentary, Short Press. Long Press, On Press	No
Compact Remote	Mode button	No	No	Momentary, Short Press. Long Press, On Press	No

6 Suggested programming procedure

CAUTION!
Risk of injury or damage
– Perform following procedure in a large open environment, preferably outdoors. Make sure wheelchair cannot crash into other people or objects.
– Be prepared for unexpected wheelchair movement in event of a faulty installation.
– If wheelchair becomes uncontrollable, perform an emergency stop by turning LiNX system off.

The following outlines a suggested programming procedure for setting up the LiNX system. It is not prescriptive and should be used as a guideline only.

The following chapters show the preferred order in which to program the parameters, what effects the parameters have on the wheelchair and also how the various parameters interact with each other.

1. Power-up test
2. Check motor orientation
3. Set load compensation
4. Adjust speed settings
5. Adjust acceleration settings

The programming procedure is suitable for LiNX systems with or without a LiNX Gyro module fitted.

- For gyro-based systems, perform steps 1–3 without the gyro connected and then steps 4 and 5 with gyro connected.

6.1 Step 1 – Power-up test

Before programming, ensure that the system powers up successfully. Press and release the power button on the remote module. The status indicator should light green.

If the battery cable or loom has not been correctly connected, the status indicator does not turn on.

If the status indicator flashes red, check the motors and park brakes as they may not have been connected properly. For more information about error codes, refer to the user manual of the remote.

6.2 Step 2 – Check Motor Orientation

Step 2 ensures that the motors are configured correctly.

1.

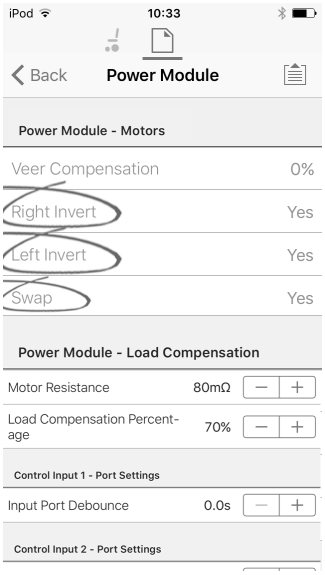


Fig. 6-1

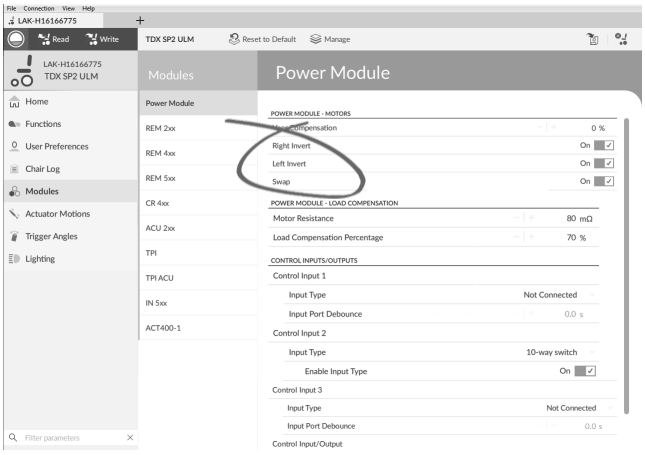


Fig. 6-2

Open **Modules** → **Power Module**.

Check for Motor Inversion

To detect motor inversion, deflect joystick slightly forwards.

- If wheelchair moves backwards instead of forwards, toggle both **Left Invert** and **Right Invert** parameters.
- If wheelchair turns on the spot, only one motor is inverted. To begin with, just toggle **Left Invert** parameter and deflect joystick forwards again. If wheelchair moves backwards, wheelchair now has both motors inverted. Toggle **Left Invert** and **Right Invert** parameters to fix this issue.

Before continuing, make sure that wheelchair moves correctly forwards and backwards.

Check for Motor Swap

To detect motor swap, deflect joystick to left. If wheelchair moves right, toggle **Swap** parameter.

Before continuing, make sure that wheelchair moves correctly forwards, backwards, left and right.

6.3 Step 3 – Set Load Compensation

Load compensation relies on accurate motor resistance values to work effectively. The motor resistance values can be calculated manually, from observation, or automatically with Adaptive Load Compensation (ALC).

Invacare recommends adding the motor resistance values automatically, using Adaptive Load Compensation. Adaptive Load Compensation is a process that learns the resistance value of each motor automatically, individually and with mΩ accuracy. Because a separate and accurate resistance value is applied to each motor, the wheelchair's drive performance is significantly improved.

Adaptive Load Compensation is enabled by default, so the Motor Resistance parameter value is not used.

For more information about ALC Calibration application with iOS tool, refer to *6.3.1 Calibrating Adaptive Load Compensation (iOS Tool), page 93*.

For more information about ALC Calibration application with PC tool, refer to *6.3.2 Calibrating Adaptive Load Compensation (PC tool), page 94*.

After learning the motor resistance values with ALC Calibration application, drive the wheelchair and observe its performance over various surfaces and at different speeds.

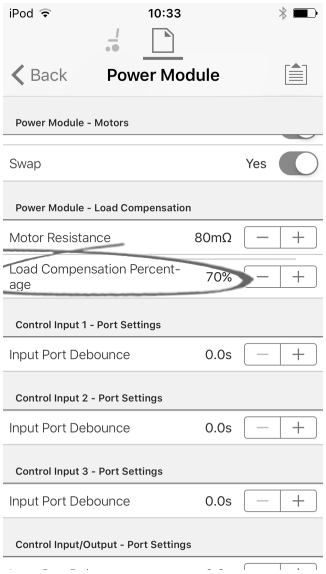


Fig. 6-3

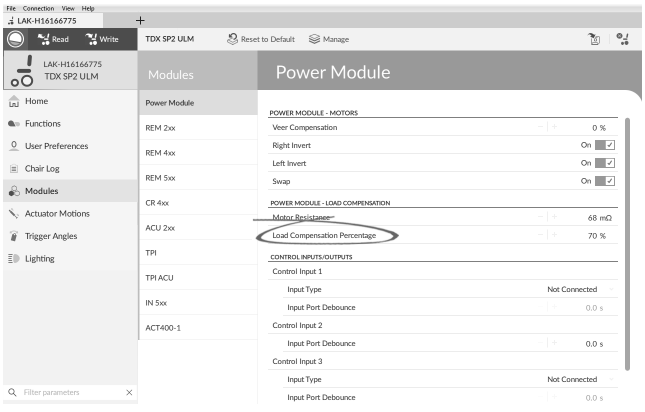


Fig. 6-4

Open **Modules** –> **Power Module**.

If the wheelchair does not perform as desired, the effect of the adaptive load compensation can be adjusted using the **Load Compensation Percentage** parameter:

- reduce value of this parameter if wheelchair drives more aggressively than anticipated.
- increase value of this parameter if wheelchair drives more sluggish than anticipated.

Load Compensation Percentage is only applied when **Adaptive Load Comp Enabled** is set to on.

6.3.1 Calibrating Adaptive Load Compensation (iOS Tool)

If the electronics or the motors have been changed, you need to calibrate the Adaptive Load Compensation (ALC).

1. From **Home** screen click on **Modules**.
2. Click on **Power Module**.

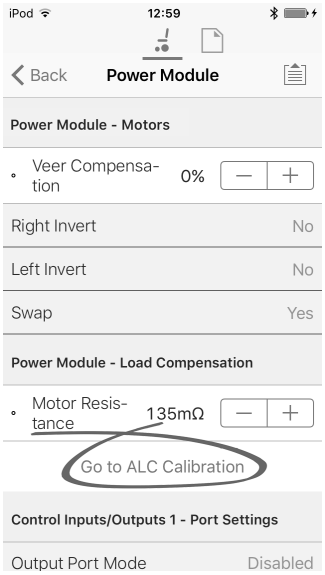
3. Scroll down to **Power Module – Load Compensation** section.
4. 

Fig. 6-5

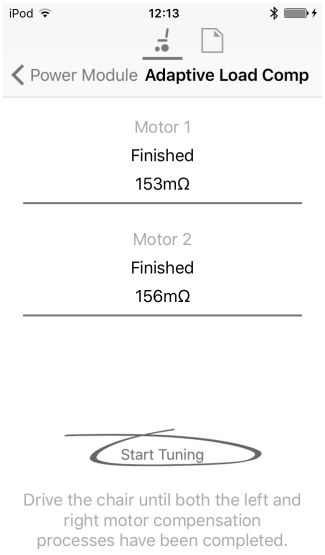
   Click on **Go To ALC Calibration**.
5. 

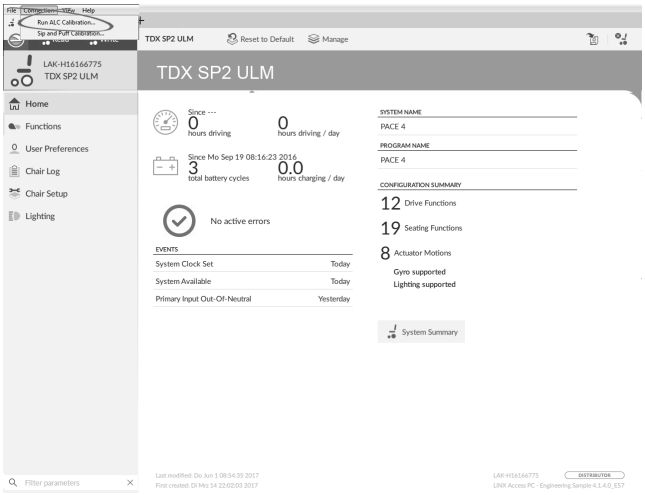
Fig. 6-6

   Tap on **Start Tuning**.
6. Follow instructions on the screen.

6.3.2 Calibrating Adaptive Load Compensation (PC tool)

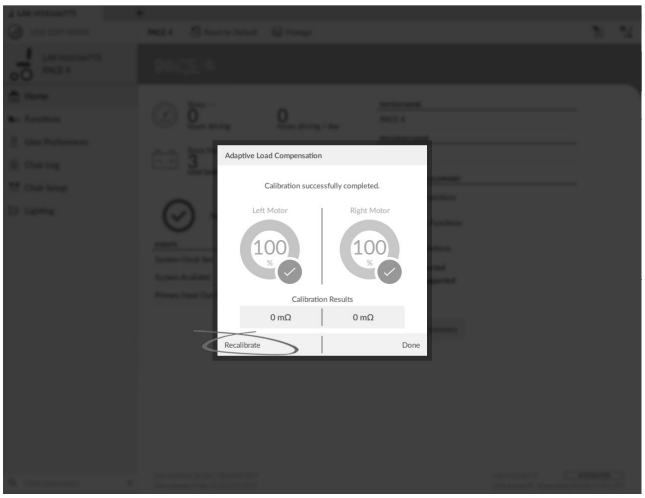
If the electronics or the motors have been changed, you need to calibrate the Adaptive Load Compensation (ALC).

1.



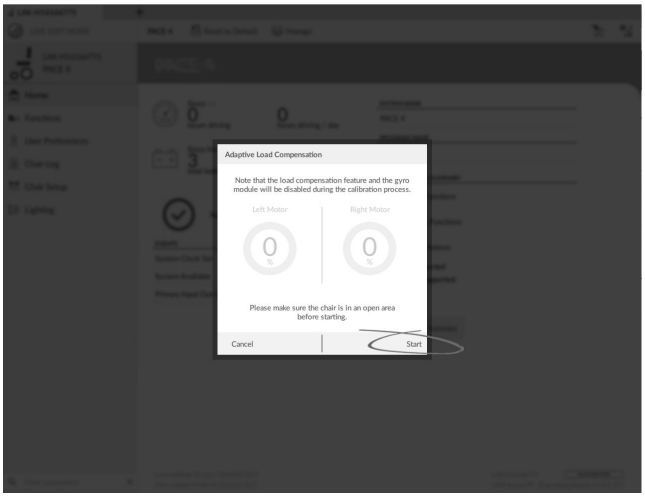
Click on **Connection** menu.
Select **Run ALC Calibration**.

2.



Click on **Recalibrate**.

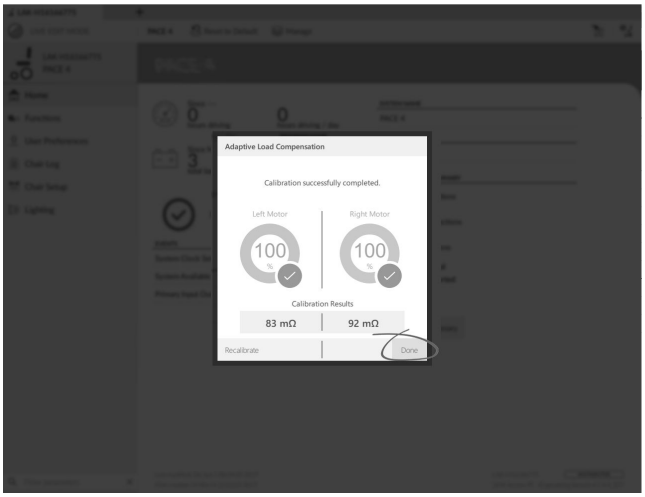
3.



Click on **Start**.

4.

Drive chair until both left and right motor compensation processes have been completed.

5. 

Click on **Done**.

6.4 Step 4 – Adjust Speed Settings

The following parameters must be set for each drive function.

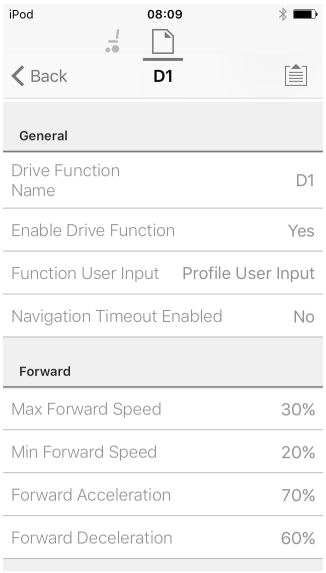


Fig. 6-7

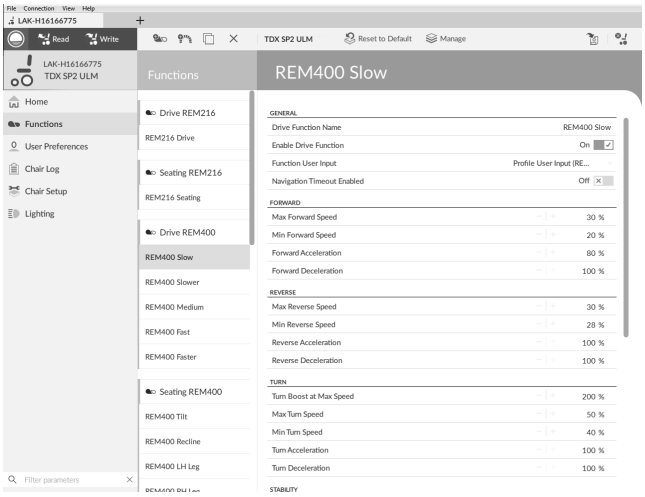


Fig. 6-8

1. Open **Functions** –> open desired drive function.

Adjust forward speed

Top speed of wheelchair can be reduced if desired. Set speed dial or slider to maximum and deflect joystick forward. Adjust **Max Forward Speed** parameter until forward speed seems like comfortable value.

Adjust reverse speed

There is nothing physically preventing motors from driving at same speed in reverse as forward. Set speed dial or slider to maximum and deflect joystick in reverse. Adjust **Max Reverse Speed** parameter to set how fast wheelchair drives in reverse for comfortable and safe ride. Default is 50 % of maximum forward speed.

Adjust minimum drive speeds

Set speed dial or slider to minimum and deflect joystick fully forward. Adjust **Min Forward speed** until desired minimum forward speed is reached.

Set speed dial or slider to minimum and deflect joystick fully in reverse. Adjust **Min Reverse speed** until desired minimum reversing speed is reached.

Adjust turn speed

Set speed dial or slider to maximum and deflect joystick either left or right to turn wheelchair on spot. Wait until wheelchair reaches a steady turning speed. Adjust **Max Turn Speed** parameter until turn speed seems like a comfortable maximum.

Set speed dial or slider to minimum position to adjust **Min Turn Speed**.

Adjust veer compensation

If wheelchair's motors do not perform exactly the same as each other, wheelchair does not drive in a straight line. To compensate differences between motors, adjust **Veer Compensation** parameter.

1.

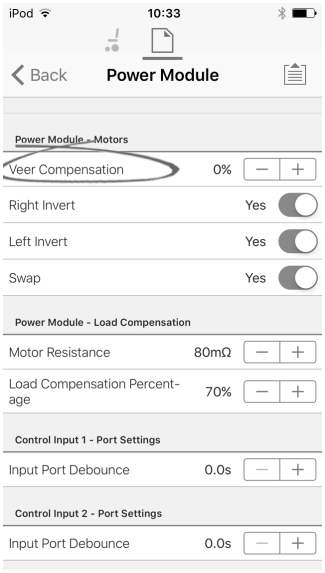


Fig. 6-9

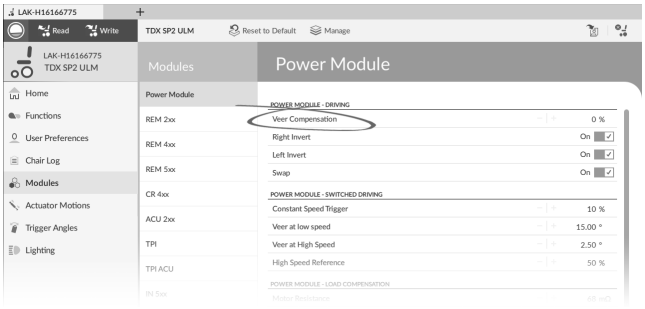
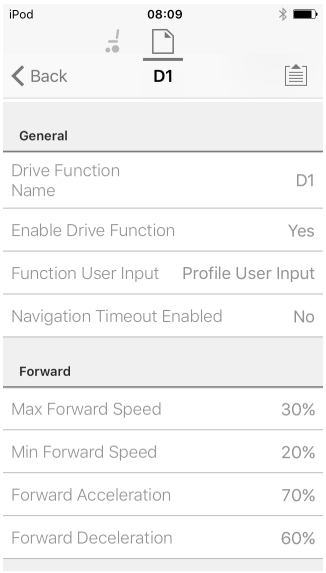


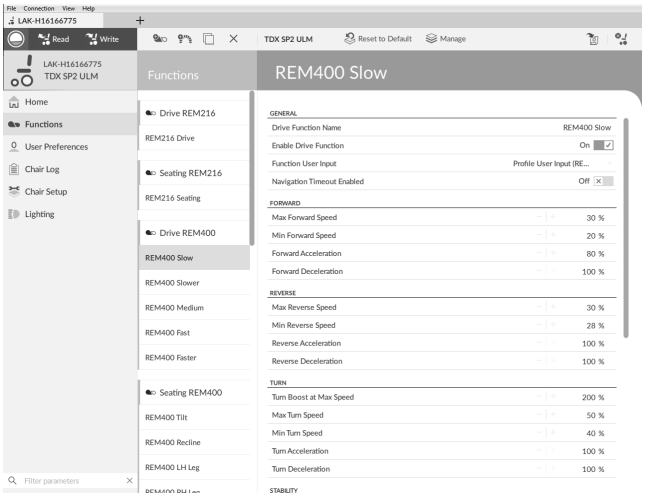
Fig. 6-10

Open **Modules** → **Power Module**.

6.5 Step 5 – Adjust acceleration settings

The following parameters must be set for each drive function.





1. Open **Functions** –> open desired drive function.

Adjust forward acceleration

Set speed dial or slider to maximum and deflect joystick fully forward. Wait until wheelchair reaches steady forwards speed. Adjust **Forward Acceleration** parameter if wheelchair gets up to steady speed too quickly or slowly. Repeat until acceleration feels comfortable and safe.

Adjust forward deceleration

To set deceleration rate in forward direction, release joystick once wheelchair has reached steady forward speed. Adjust **Forward Deceleration** parameter if wheelchair slows down too quickly or slowly. Repeat until deceleration feels comfortable and safe.

Adjust reverse acceleration

Set speed dial or slider to maximum and deflect joystick fully in reverse. Wait until wheelchair reaches steady reverse speed. Adjust **Reverse Acceleration** parameter if wheelchair gets up to steady speed too quickly or slowly. Repeat until acceleration feels comfortable and safe.

Adjust reverse deceleration

To set deceleration rate in reverse direction, release joystick once wheelchair has reached steady reverse speed. Adjust **Reverse Deceleration** parameter if wheelchair slows down too quickly or slowly. Repeat until deceleration feels comfortable and safe.

Adjust turn acceleration

Set speed dial or slider to maximum and deflect joystick either left or right to turn wheelchair on spot. Wait until wheelchair reaches steady turning speed. Adjust **Turn Acceleration** parameter if wheelchair gets up to steady turning speed too quickly or slowly. Repeat until acceleration feels comfortable and safe.

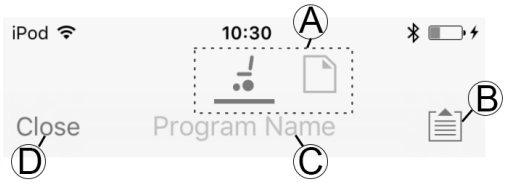
Adjust turn deceleration

To set deceleration rate when turning, release joystick once wheelchair has reached steady turning speed. Adjust **Turn Deceleration** parameter if wheelchair slows down too quickly or slowly. Repeat until deceleration feels comfortable and safe.

7 Using the LiNX Access iOS tool

7.1 Navigation bar

The navigation bar is located at the top of each screen. The content of the navigation bar changes depending on the screen you are viewing.



Ⓐ Context switch (switch between connection and file context mode)

Ⓑ Application menu button (edit button)

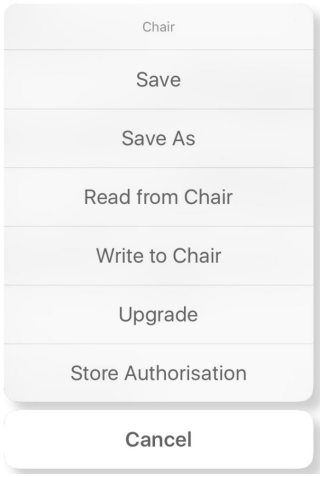
Ⓒ Program name / screen name

Ⓓ Close / navigate to previous screen

7.1.1 Application menu

The content of the application menu changes depending in which context mode you are working with: **Connection context** or **File context**.

Connection context

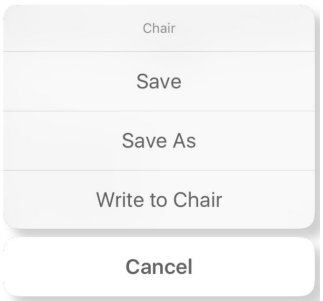


To work on a connected wheelchair, select **Connection context**. If you are not connected to a LiNX system the **Connect to device** screen is displayed. Otherwise, the last screen that you were working with, is displayed.

The following options are available in connection context:

- **Save** – save the configuration as a LiNX configuration file (.lci)
- **Save As** – save the configuration as a LiNX configuration file (.lci) with a different name
- **Read from Chair** – read the configuration from the connected LiNX system
- **Write to Chair** – write the configuration to the connected LiNX system
- **Upgrade** – go to firmware upgrade mode
- **Store authorization** – store an Access Level Certificate

File context

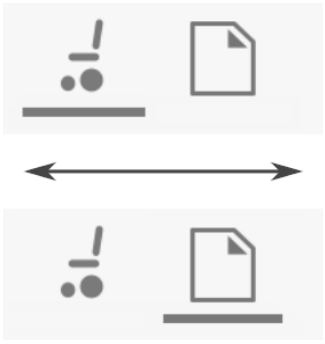


To work on a saved file, select **File context**. If you do not have a file open, the **Load from file** screen is displayed. Otherwise, the last screen that you were working on is displayed.

The following options are available in file context:

- **Save** – save the configuration as a LiNX configuration file (.lci)
- **Save As** – save the configuration as a LiNX configuration file (.lci) with a different name
- **Write to Chair** – write the configuration to the connected LiNX system

Selecting context mode



Click on the context switch at any time to toggle between **Connection context** and **File context**. The selected context displays a colored bar beneath the context switch icon.

7.1.2 Changing Program Name

By default, the program name and system name are composed of the wheelchair configuration. See *11 Structure of Program Names, page 209*

The program name can be changed to a more familiar name.

Fig. 7-1 Example of a standard program name. Marked areas and callouts correspond to the rules for program naming.

The program name in the picture was generated using the rules for program naming valid up to July 2018. It is for a Center Wheel drive TDX SP2 with a DLX-PM120AL, 8 km/h, seat lifter with powered tilt and CoG shift, REM1XX or REM2XX remote and LED light. The revision of the file is 00.

The new program name is saved depending on the mode you are working in.

- If you are working in **Connection context** and **Live edit** mode, changes are automatically written to the wheelchair.
- If you are working in **Connection context** and **Bulk edit** mode, click on **Write** button to save changes.
- If you are working in **File context**, click on **Save** button to save changes.

iOS Tool

Fig. 7-2

1. Click on **Program Name** in the navigation bar – a keyboard is displayed.
2. Edit program name.
3. Click **Return**.

PC Tool

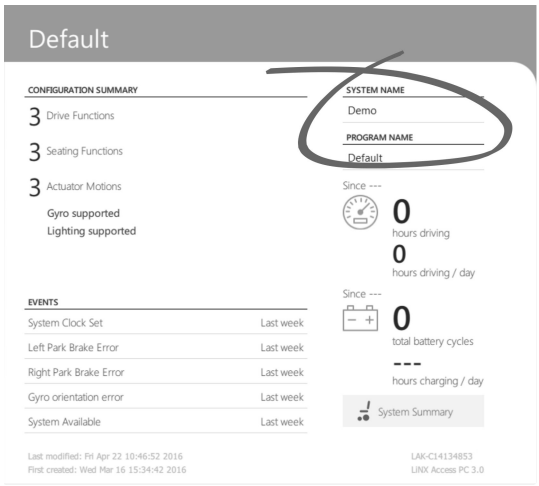


Fig. 7-3

1. From **Home** screen click on **Program Name** text box.
2. Edit program name.

7.2 Home Screen

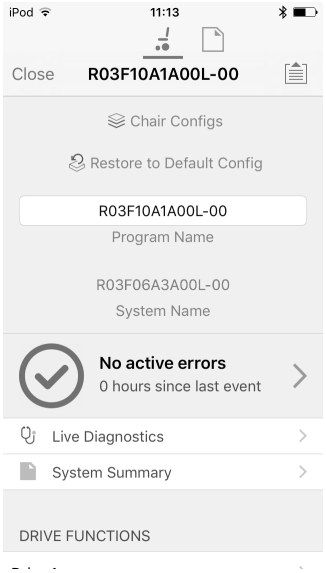


Fig. 7-4

The **Home** screen is the first screen you see after connecting to a wheelchair or opening a configuration file. From the **Home** screen you can access the following programming and information screens:

- Chair Configurations
- Active Errors / Chair Log
- Live Diagnostics (only in Connection context mode)
- System Summary
- Drive Functions
- Seating Functions
- Modules
- Actuator Motions
- Trigger Angles
- User Preferences
- Lighting

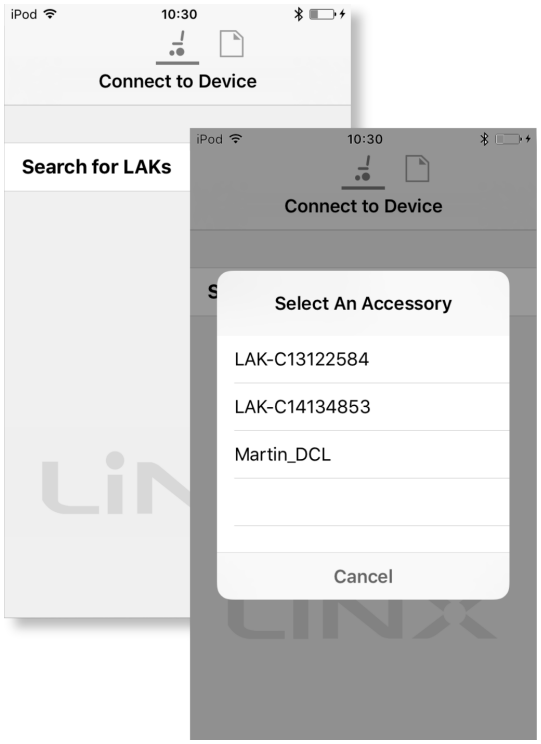
7.3 Connection context actions

The following tasks are only relevant for the **Connection context** mode. For tasks related to the **File context** mode, refer to *7.4 File context actions, page 108*

7.3.1 Connect to device screen

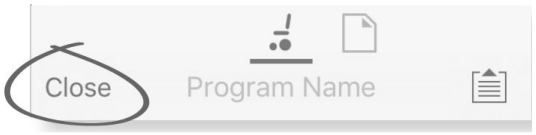
The **Connect to device** screen is displayed when you are in **Connection context** before connecting to a LiNX system. From this screen you can search for and connect to a LiNX Access Key (LAK).

Connecting the LiNX Access iOS tool with a wheelchair

1. Power up LiNX wheelchair system.
2. Insert LiNX Access Key into the remote module.
3. Open LiNX Access iOS tool application.
4. Select **Connection context** mode.
5. 

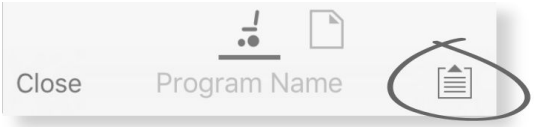
   Click on **Search for LAKs** and select one from dialogue box **Select an Accessory**.
6. A **Warning** screen is displayed. Read the warning and click on **I Agree** button to continue.

Disconnecting

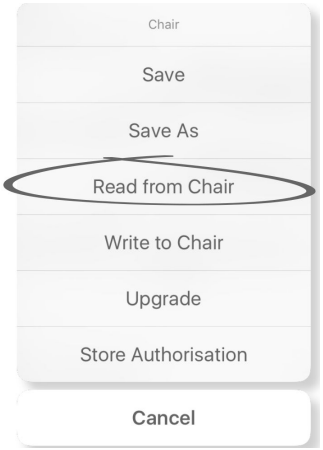
1. 

   Click on **Close** button.

7.3.2 Reading a program from the wheelchair

1. 

   Click on **Application menu** button.

2. 

   Select **Read from Chair**.

7.3.3 Restoring Default Wheelchair Configurations

The factory set-up for the power module provides one wheelchair configuration. If you order a power module as a spare part, it is provided with up to eight wheelchair configurations. Select the one you need.

1. Click on **Chair Configs** at the top of **Home** Screen. **Chair config** screen is displayed.
2. Click on named wheelchair configuration. A **Warning** screen is displayed.
3. Click on **Yes** to proceed with the selection.
4. Click on **Back** to return to**Home** screen.

When a new wheelchair configuration is selected, the system automatically power cycles before the wheelchair configuration becomes active.

7.3.4 Converting Configuration Files

Using older configuration files on wheelchairs can result in missing features which were introduced in later revisions of firmware, such as Switch Control. In most cases, converting these configuration files allows you to update user's configuration to latest release to enable all features.

In case configuration file is on current revision or incompatible, menu entry is shown greyed out.

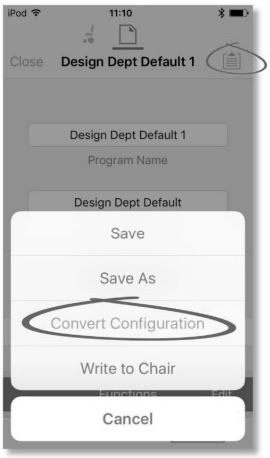
1. Connect with wheelchair.
2. Open Application menu.
3. 

Fig. 7-5

   Tap on entry **Convert Configuration** and follow screen prompts.

7.3.5 Modifying a Program

To modify a program, first select a parameter from one of the parameter sections listed on the **Home** screen:

- Drive functions
- Seating functions
- User preferences
- Modules
- Actuator Motions
- Trigger Angles

Parameters can be modified numerically or graphically, refer to *9 Modifying Wheelchair Configurations, page 128*

Parameters can be modified in live edit mode or in bulk edit mode.

Live Edit Mode

When in live edit mode, changes to parameters will take immediate effect, changing the performance of the wheelchair immediately.

There is no function to undo a change in live edit mode, so make sure, you save a copy of the existing program so that you can restore settings if you need to.

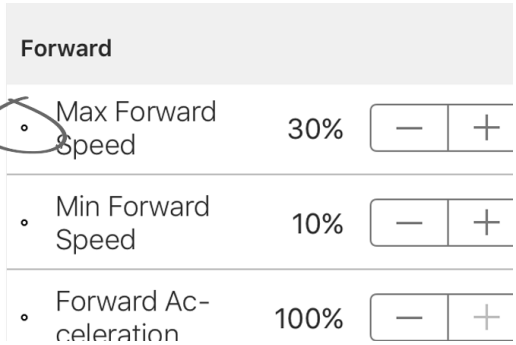


Fig. 7-6

Certain parameters can be updated in live edit mode. These are identified by a circular icon in front of the parameter name.

Live edit mode allows certain parameters to be written to the controller immediately. This is useful for speeding up the process of setting up or testing various applications and scenarios.

Bulk Edit Mode

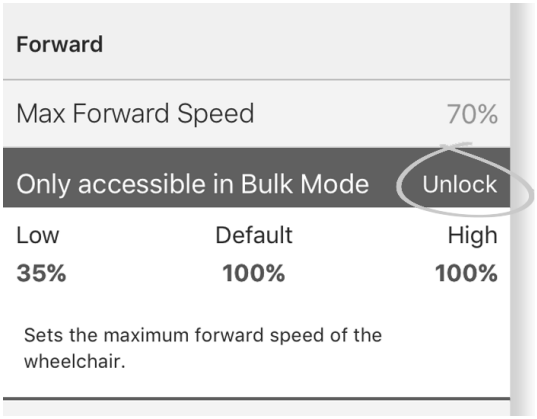


Fig. 7-7

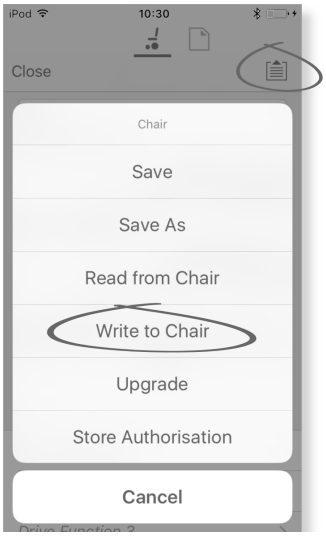
Certain parameters can only be edited in bulk edit mode. These are identified by a colored background. To edit these parameters, bulk edit mode must be unlocked before proceeding.

In bulk edit mode, parameters are not written to the controller immediately. They are written to the controller, when you select **Write to Chair**, refer to *7.3.6 Writing a program to the wheelchair, page 105*

By default, live edit mode is enabled every time the system is powered up, including after a power cycle. The application remains in live edit mode until bulk edit mode is unlocked. At this point the application changes to bulk edit mode while live edit mode is disabled. The application remains in bulk edit mode until the system is power-cycled.

7.3.6 Writing a program to the wheelchair

This feature is only available when a wheelchair is connected.



1. Click on **Application menu** button.
2. Select **Write to Chair**.

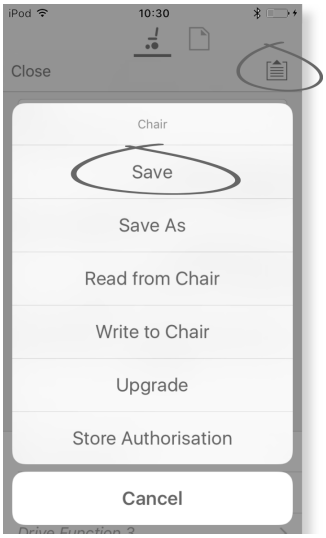
After writing to the wheelchair, the LiNX Access tool cycles the system's power and automatically reconnects to the system.

The **Application menu** dialogue in this picture shows all available options, when you are in **Connection context**. In **File context** the selection is more limited.

7.3.7 Saving programs

Wheelchairs with Serial Numbers before 18JE000303: If you are adding OUT500 or replacing a REM400A with a REM400B, contact Invacare Technical Service to have the existing files saved and the bundle files updated.

Using Save



1. Click on **Application menu** button.
2. Select **Save**.
3.

   When using **Connection context mode**, a **Save As** menu opens up automatically. Enter a file name or the program prompts the current program name with "–1" if already existing.
4. After saving the program, the LiNX Access tool displays a message with the file's name and that saving was successful.
5. Click on **Dismiss** to remove the message and continue.

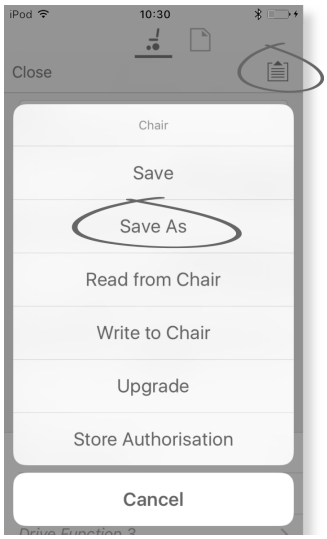
All files are saved with a .lci extension. If the Program name has been set, then the file is saved with the Program Name. If not, the file is saved with a date /time stamp as follows:

YYYYMMDD-HHMMSS.lci (YYYY is year, MM is month, DD is day, HH is hour, MM is minute, SS is second). Subsequent saves will retain the last saved file name and overwrite previously saved files. To save a file without overwriting an existing file, us Save As, refer to .

The **Application menu** dialogue in this picture shows all available options, when you are in **Connection context**. In **File context** the selection is more limited.

Using Save As

To save a program as file with a different name.



1. Click on **Application menu** button.
2. Select **Save As**. After saving the program, the LiNX Access tool displays a message with the file's name and that saving was successful.
3. Click on **Dismiss** to remove the message and continue.

All files are saved with a .lci extension. If the file has not been saved before, and if the program name has been set, then the file is saved with the program name. If the file has been saved before with the program name, then the file is saved with a numerical value appended to the program name. If the program name has been set, then the file is saved with the program name. If not, the file is saved with a date / time stamp as follows: YYYYMMDD-HHMMSS.lci (YYYY is year, MM is month, DD is day, HH is hour, MM is minute, SS is second).

The **Application menu** dialogue in this picture shows all available options, when you are in **Connection context**. In **File context** the selection is more limited.

7.3.8 Upgrading Firmware

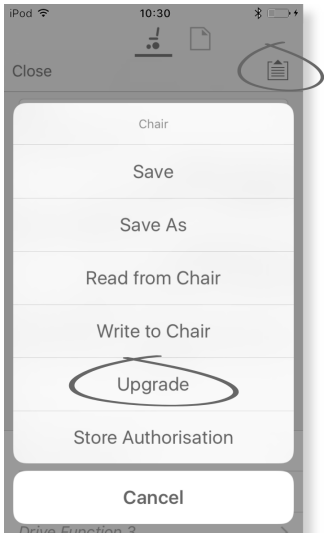


Fig. 7-8

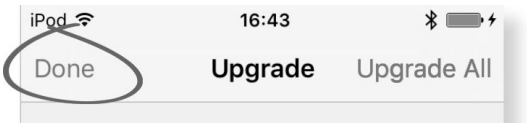
1. Tap on **Application menu** button.
2. Tap on **Upgrade**. The screen displays **Entering Firmware Upgrade Mode – please wait…**.
   If the connected modules are up to date, the screen displays **FIRMWARE UP TO DATE** with a list of the connected modules and their respective versions. If one or more modules need upgrading, these is displayed under **NEW FIRMWARE AVAILABLE**.
3. 

   Fig. 7-9

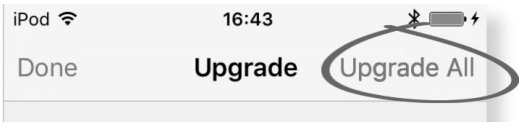
   If no modules require upgrading, tap **Done** button to finish.
4. 

   Fig. 7-10

   If one or more modules require upgrading, tap on single module to upgrade it or tap on **Upgrade All** button.
   During a module upgrade, a progress bar is displayed. Once the upgrade has completed, its status is displayed (succeeded or failed) to the side of the module name.
5. Tap **Done** button to finish.

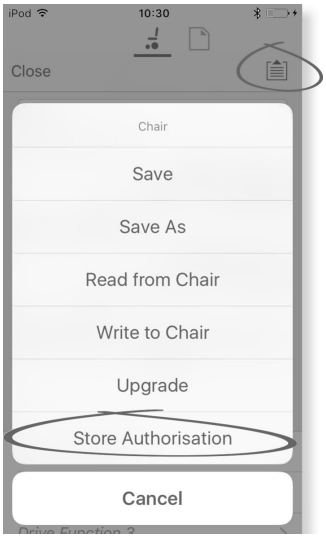
7.3.9 Storing the LAK certificate

The **Access Level Certificate** determines how you view and edit offline programs (.lci files) when in the **File context** mode. The **Access Level Certificate** is taken from a connected LiNX Access Key and provides the levels to your stored files.

To edit your files with a distributor's access level, you will need to store an **Access Level Certificate** from a distributor-level LiNX Access Key.

If you do not store your **Access Level Certificate** from your LiNX Access Key, you have read-only access to your stored files and you are not able to edit them.

Storing the certificate



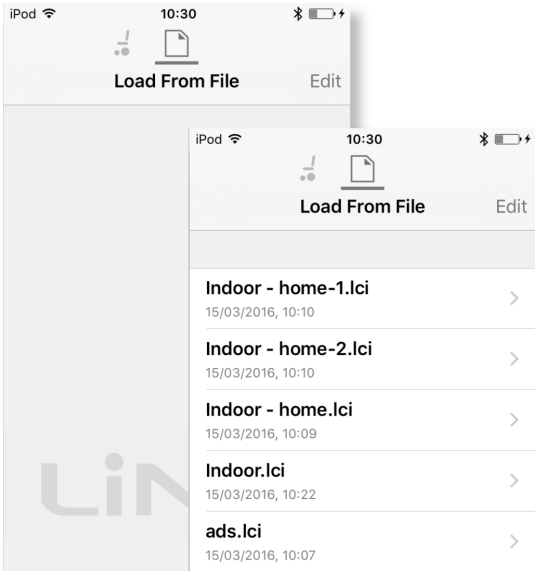
1. Connect to LiNX system.
2. Click on **Application menu** button.
3. Select **Store Authorisation** option. A message is displayed showing how many authorizations remain and if you want to continue. LiNX Access Keys only permit three **Store Authorisation** operations.
4. Click on **Store option** to continue or **Don't store** to cancel the action.

If the LiNX Access iOS tool application is removed from your iOS device, the **Access Level Certificate** is lost.

7.4 File context actions

The following tasks are only relevant when in the **File context** mode. For tasks related to the **Connection context** mode, refer to *7.3 Connection context actions, page 102*

7.4.1 Load from file screen



The **Load from file** screen is displayed when you are in **File context** before opening a file. If LiNX configuration files (.lci) exist on your device, then they are displayed. From this screen you can:

- View the available configuration files
- Open a configuration file for editing
- E-mail a configuration file
- Delete a configuration file

7.4.2 Writing Bundle Files

Bundle files can be written to a connected chair. Bundle files can include wheelchair configurations and/or firmware files.

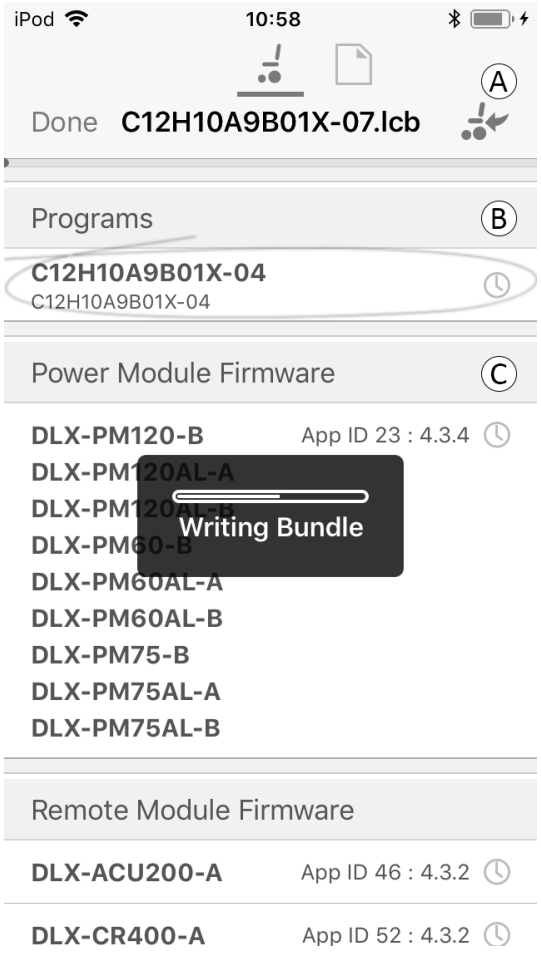


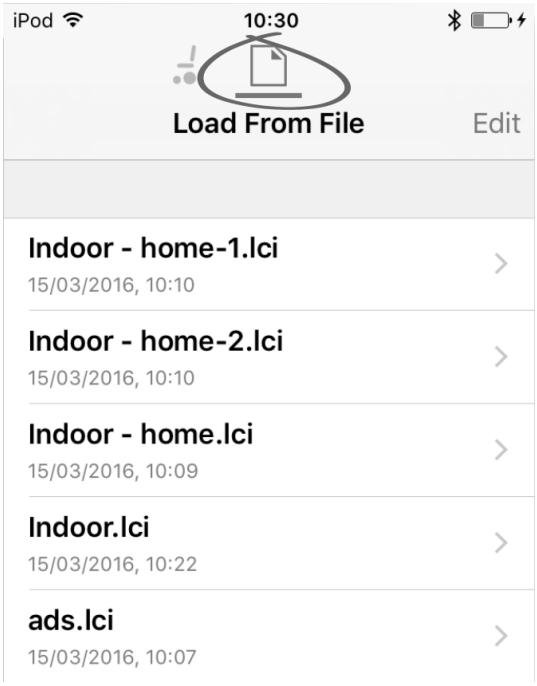
Fig. 7-11

1. Connect wheelchair.
2. Select File connection screen.
3. Choose bundle file from list displayed in Load From File screen.
4.

   Ensure to select the correct configuration. A wrong configuration can lead to unexpected behaviour and failures. For more information about the rules for program naming, see *11 Structure of Program Names, page 209*

   Select preferred configuration from section Ⓑ.
5. Check included firmware versions of components in section Ⓒ and below.
6. Write bundle file to wheelchair. Click button Ⓐ and wait until overlay Writing Bundle disappears.
7. Click button Done to return to File connection screen.

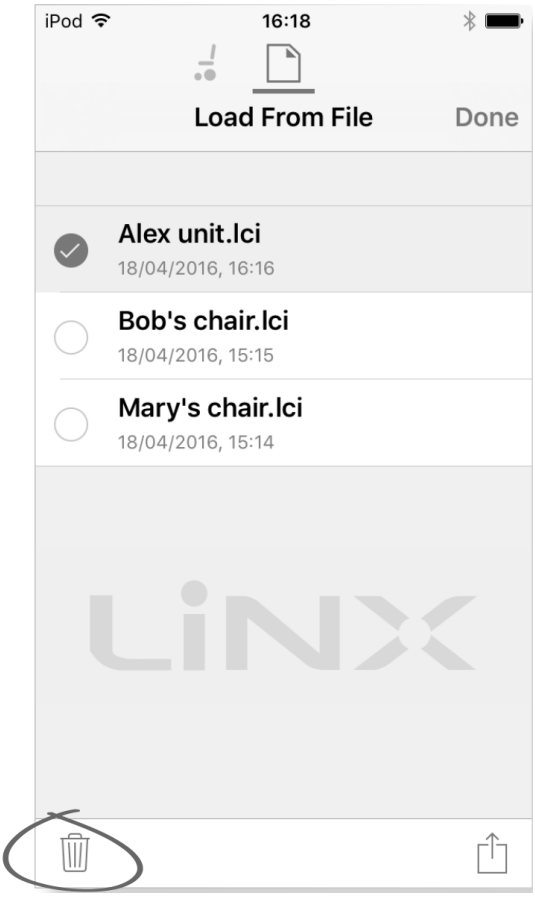
7.4.3 Opening files



1. Select **File connection** screen.
2. Choose file from the list displayed in the **Load From File** screen.

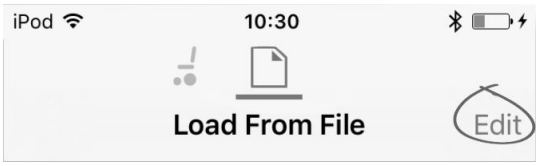
For information about saving files and writing to a wheelchair refer to *8.5.4 Save a program as a file, page 120* and *7.3.6 Writing a program to the wheelchair, page 105*.

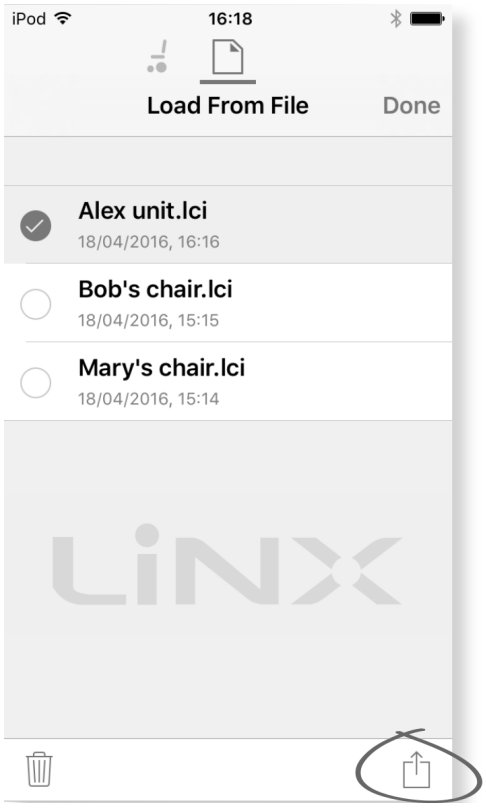
7.4.4 Deleting files



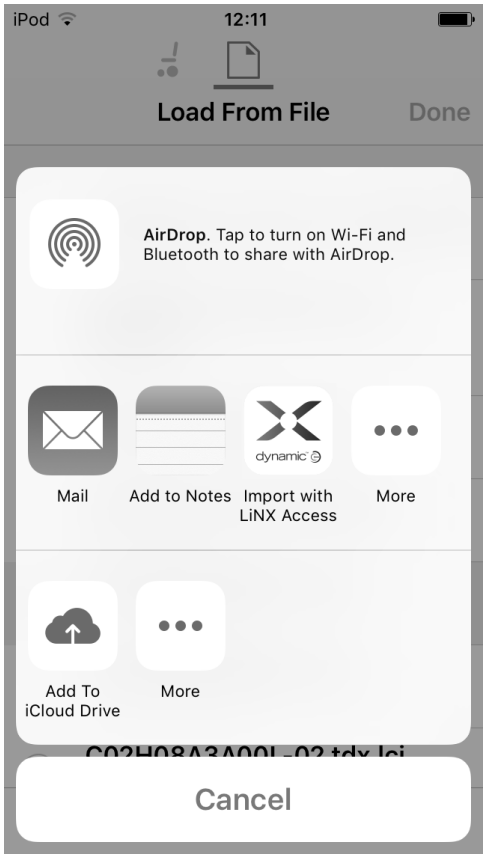
1. Select **Edit** from **Load from File** screen.
2. Select one or more files from the file list.
3. Click on trash can icon at the bottom of the screen.
4. Click on **Done** to finish.

7.4.5 E-mailing files

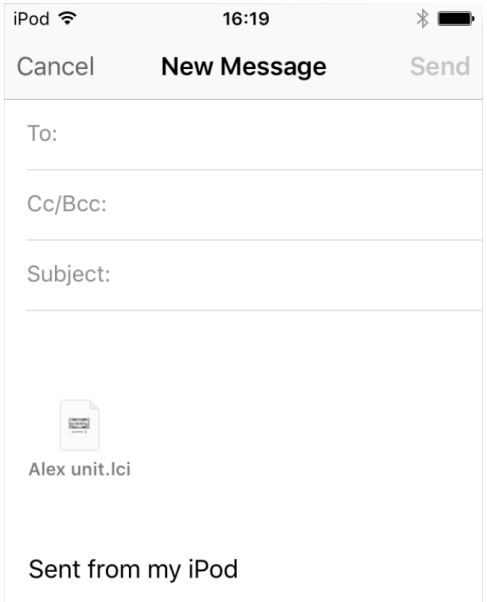
1. 

   Select **Edit** from **Load From File** screen.
2. Select one or more files from file list.
3. 

   Click on **E-mail** button.

4. 

   The iOS Share Sheet opens up. Select desired option.

5. 

   If you choose your mail client, selected program files are added as attachments to e-mail. Complete e-mail and click on **Send**.

6. Click on **Done** to finish.

8 Using the LiNX Access PC tool

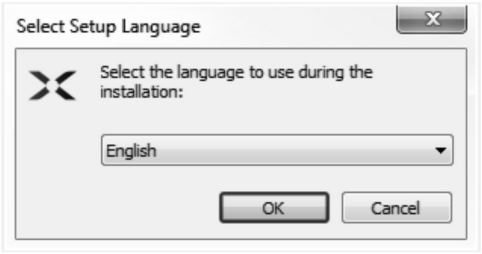
8.1 Installing the software

Double-click on the LiNX Access PC tool installation software and follow the on-screen instructions.

Step 1

Select the language to use during installation.

1.



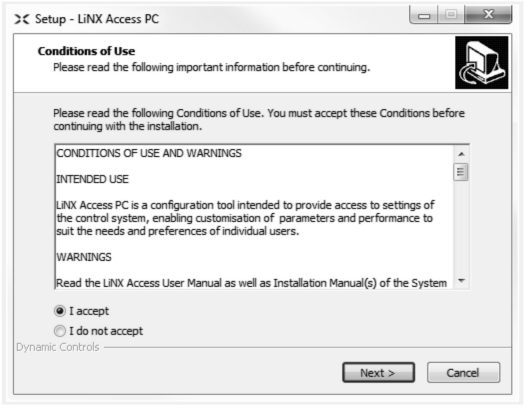
Select your choice of language from drop-down box.

2. Click **OK** to continue.

Step 2

Before proceeding, make sure that you read and fully understand the Conditions of Use and Warnings presented in the dialogue.

1.



Select **I accept** option.

2. Click **Next** button.

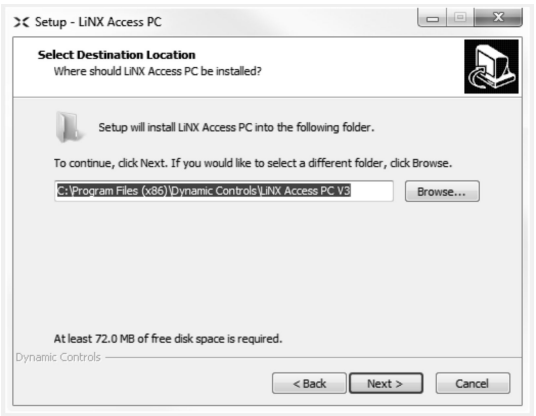
Step 3

For your convenience, the application can be saved to an alternative folder instead of the suggested folder.

If the suggested folder is suitable, click **Next** to continue with the set up.

If you want to change the folder:

1.



Click on **Browse** button and select different folder.

2. Click **Next** to continue.

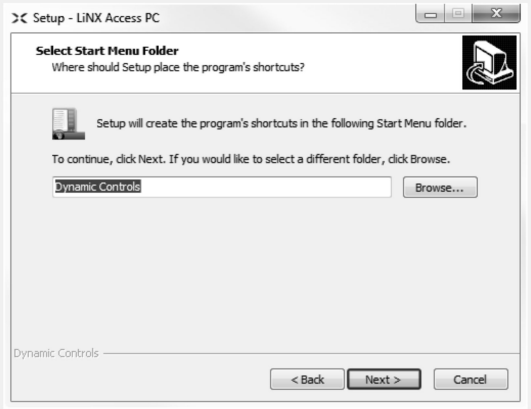
Step 4

The application's shortcut can be saved to an alternative folder also, instead of the suggested folder.

If the suggested folder is appropriate, click **Next** to continue with the set up.

If you want to change the folder:

1.



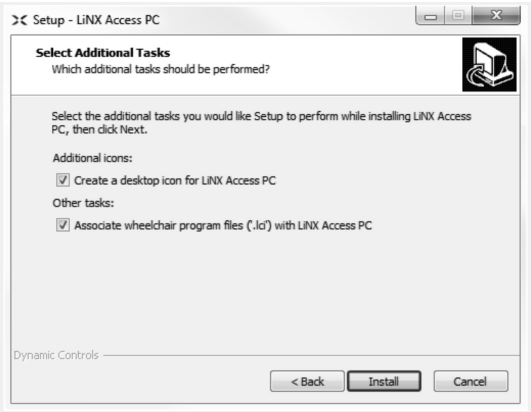
Click on **Browse** button and select different folder.

2. Click **Next** to continue.

Step 5

By default, a desktop icon will be added for the LiNX access PC tool and the wheelchair program files (*.lci) will be associated with the LiNX Access PC tool.

1.



Check / uncheck as appropriate.

2. Click **Install**.

Step 6

Click **Finish** to complete the installation.

8.1.1 Using Bluetooth on a computer

You need a Bluetooth connection to communicate between the LiNX Access PC tool and a LiNX system. You can use a computer's built-in Bluetooth adaptor (usually found on laptops) or an external USB Bluetooth adaptor.

Using built-in Bluetooth adaptor

Switch on the built-in Bluetooth adaptor (refer to computer's manual for help on this).

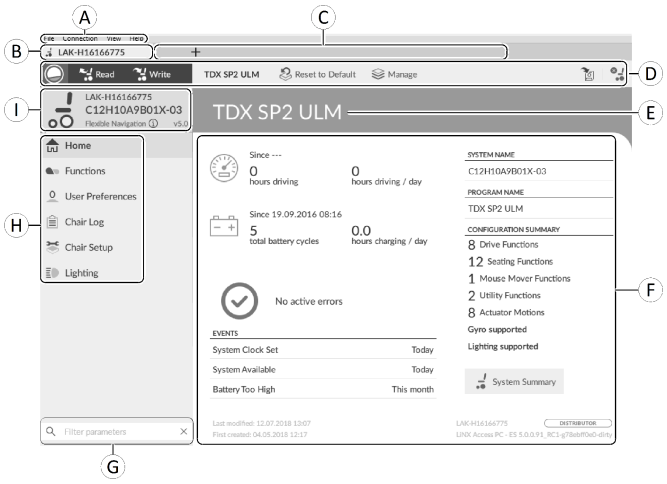
Using an USB Bluetooth adaptor

Plug in the external USB Bluetooth adaptor into a spare USB port. The Windows operating system detects and installs the appropriate drivers for the adaptor. Do not install any drivers that may have been provided with the adaptor.

8.2 Layout overview

Layout may change whether connected or not.

Home screen



Ⓐ Menu bar

Ⓑ Connection tab

Ⓒ File tabs

Ⓓ Tool bar

Ⓔ Main content header

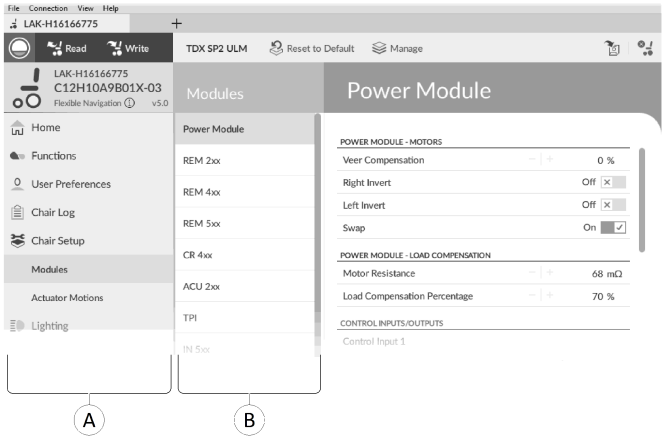
Ⓕ Main content

Ⓖ Filter parameters box

Ⓗ Primary navigation side bar

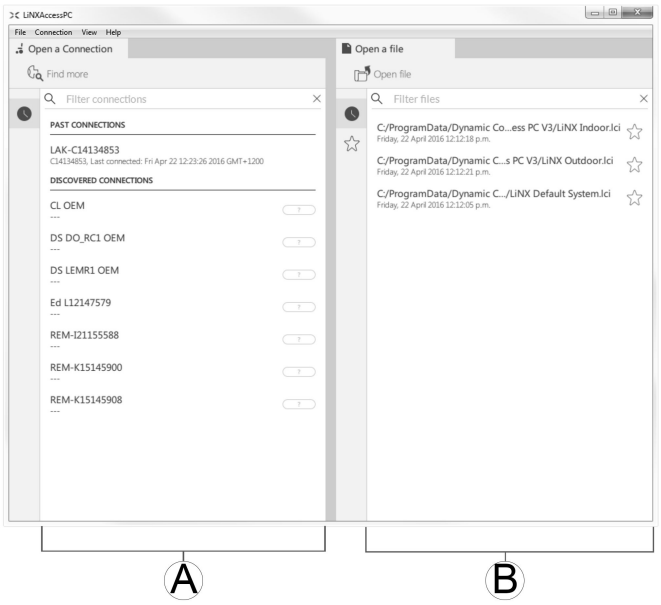
Ⓘ Tab context

Secondary navigation side bar



The secondary navigation bar Ⓑ is only displayed for certain primary navigation bar selections Ⓐ and provides a means to drill down further through the features, functions and parameters.

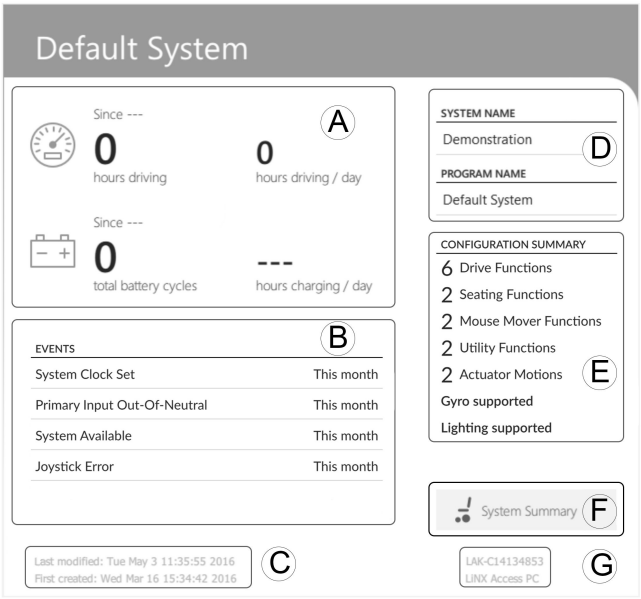
Opening



Ⓐ Open a connection

Ⓑ Open a file

System information



Ⓐ	Driving / battery information	Displays time statistics for driving and battery use.
Ⓑ	Events	Displays overview of events.
Ⓒ	File information	Displays time stamps for when the configuration was created and last modified.
Ⓓ	System name and program name	Displays the system and program name.
Ⓔ	Configuration summary	Overview of modules, features and functions for the connected system.
Ⓕ	System summary	Click to view version information about the modules in the connected system.
Ⓖ	LiNX Access information	Displays LiNX Access Key and application details.

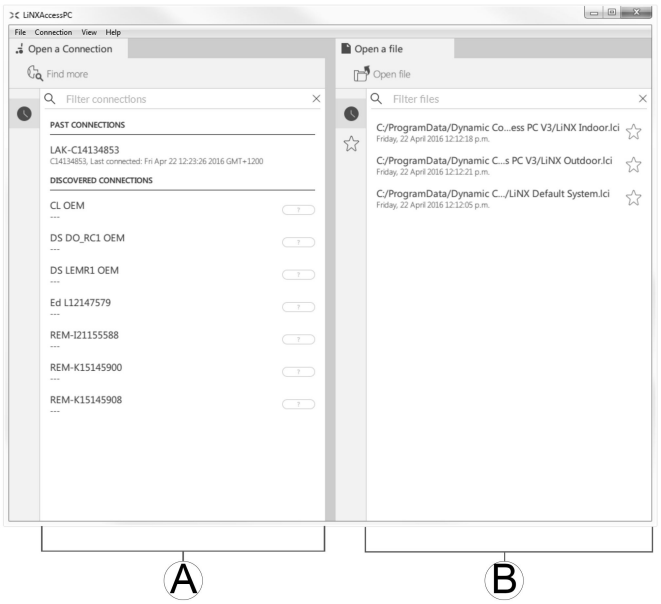
8.3 Concepts

The LiNX Access PC tool provides many tools and features to simplify configuring and programming LiNX modules and systems.

Two important concepts are:

- context modes
- editing modes

Context modes



The context modes allow you to work with configuration files both online (that is with a connected system) and offline (that is with files stored on your computer) simultaneously. There are two context modes:

- **Connection context** Ⓐ. The PC tool interacts with a connected system. From the Open a connection tab, you can connect to a wheelchair through a LiNX Access Key.
- **File context** Ⓑ. The PC tool interacts with stored files on your computer. From the Open a file tab, you can access a file stored on your computer.

The connection tab is always found on the left side of the application's screen. You can only have one connection tab open at any time.

File tabs are always placed to the right of the application's screen. The application allows multiple file tabs to be open at any time.

Editing modes

The LiNX Access PC tool offers two parameter editing modes that define when parameters are written to the wheelchair. These modes are:

- **Live edit** (connection context only).
- **Bulk edit**.

For more information about the editing modes, refer to *7.3.5 Modifying a Program, page 105*

8.4 Checking and Getting Latest Version

The LiNX Access PC tool automatically checks for updated software and firmware. This operation requires an Internet connection and is only performed in a 24 hour period. If application updates are available, a notification is displayed asking if you want to download the updates. Click on **Yes** button to continue. After the application updates have been downloaded, a notification is displayed, asking if you want to install the updates. Click on **Yes** button to continue.

To manually check for updates, you can either:

- check the Dynamic Controls website at www.dynamiccontrols.com or
- from the main menu on the LiNX Access PC tool, click on **Help** and then on **Check for updates**.

To view which version you have installed, click on **Help** on the menu bar and then click on **About**.

An Internet connection is required when checking for updates. If an Internet connection is unavailable, the following message is displayed:

Failed to check for updates. The software was unable to connect to the Internet. Check that your network settings are correct and try again.

If your computer uses a proxy server to connect to the Internet, then you need to configure your Internet settings.

If Internet access is available but the LiNX Access PC tool is not able to check for updates, it is possible that your organisation's network policy does not permit to unapproved websites. In this case you need to have the following URL added to your organisation's network whitelist: https://mage.dynamiccontrols.com/

Configuring Internet Settings

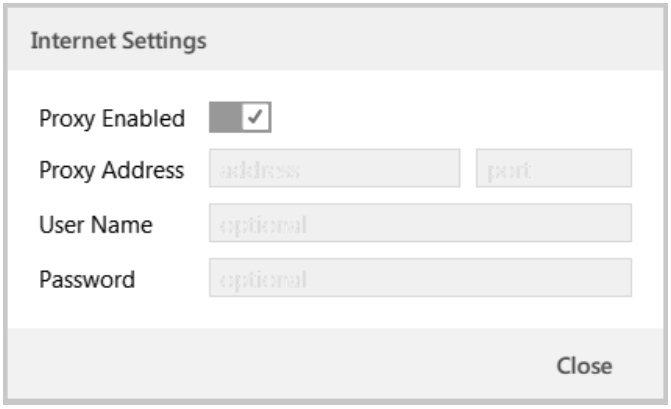
1. Click on **Help** and select **Internet Settings**.
2. 

Fig. 8-1

   Enable proxy settings by clicking on **Proxy Enabled** switch.
3. Add following details (you may need to consult your IT department for this information):
   - **Proxy address and port**
   - **User name**
   - **Password**
4. Click on **Close** button.

8.5 Connection context actions

The following tasks are only relevant for the **Connection context** mode. For tasks related to the **File context** mode, refer to *7.4 File context actions, page 108*

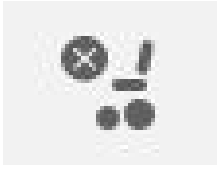
8.5.1 Connecting/Disconnecting the LiNX Access PC tool

Connecting to a wheelchair

1. Power up LiNX system.
2. Insert LiNX Access Key into remote module.
3. Open LiNX Access PC tool application.
4. From the **Open a connection** tab:
   a. Select LiNX Access Key from list under **PAST CONNECTIONS**, or
   b. click **Find more** button (top left) to force application to search for more LiNX Access Keys, or
   c. if list is too long to read, enter LiNX Access Key into **Filter connections** text box to locate LiNX Access Key in list.

After selecting a LiNX Access Key, the LiNX Access PC tool connects to the wheelchair and reads its configurations.

Disconnecting from a wheelchair



To disconnect from a connected wheelchair, click the **Disconnect** icon on the right-hand side of the tool bar.

8.5.2 Write a program to a wheelchair

There is no need to write a program to a wheelchair if you are in connection context and working in live edit mode, because all parameter changes are written to the wheelchair instantly.

If you are working in bulk edit mode, you can write to the wheelchair by clicking on the **Write** button in the tool bar.

After clicking **Write**, the LiNX Access PC tool will perform the following tasks:

- Write the program to wheelchair.
- Power cycle wheelchair.
- Read program from wheelchair.
- Read diagnostic information from wheelchair.

After the Write operation, the LiNX Access PC tool reverts to live edit mode.

8.5.3 Read a program from a wheelchair

The configuration program is automatically read from a wheelchair system when you connect to it. However, you can manually read the configuration program from the connected wheelchair by placing the LiNX Access PC tool in bulk edit mode or file context mode.

To read configuration from bulk edit mode

1. Change to bulk edit mode by unlocking bulk edit parameter.
2.

   Click on **Read** (from wheelchair) icon in tool bar.

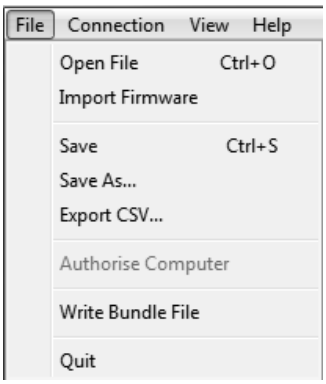
To read a configuration from file context

1. Open file by clicking on **New file** tab (+) and selecting existing file.
2. Click on **Read** (from wheelchair) icon in tool bar.

8.5.4 Save a program as a file

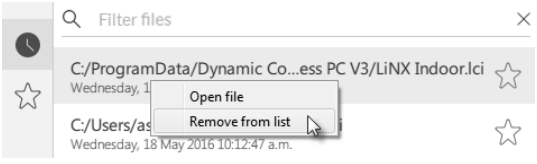
Wheelchairs with Serial Numbers before 18JE000303: If you are adding OUT500 or replacing a REM400A with a REM400B, contact Invacare Technical Service to have the existing files saved and the bundle files updated.

1.



   Click on **Save to file** button or click on **File** in menu bar and select either **Save** or **Save As...** from menu.
2. **Save File As** dialogue opens.
3. Select appropriate folder.
4. Enter name into **File name** box.
5. Click on **Save** button to finish. The file is saved with .lci extension.

Remove a file from the file list

1. 

   Right-click on file in **Open file** dialogue and select **Remove from list**.

8.5.5 Storing the LAK certificate

To edit files offline, you need to authorize your computer by storing the LiNX Access Key (LAK) certificate.

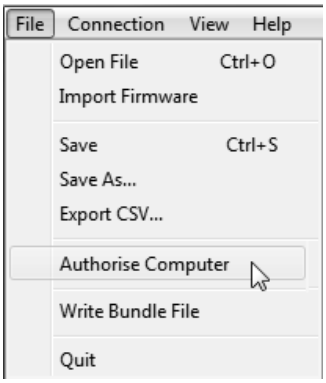
The LAK certificate determines how you view and edit offline programs (.lci files) and is taken from a connected LiNX Access Key to provide one of two levels of access, that are:

- Distributor and
- Read-only.

To edit your files with a Distributor's access level, you need to store an LAK certificate from a LiNX Access Key.

If you do not store you LAK certificate from your LiNX Access Key, you have read-only access to your stored files and therefore you are not able to edit them.

To store LAK certificate:

1. Connect to LiNX system.
2. Click on **File** menu.
3. 

   Select **Authorise Computer** option. A message is displayed telling you how many authorizations remain (you can only perform this operation three times) and asks if you want to continue.
4. Click on **Authorise** button to continue.
5. A message is displayed when the authorization is complete. Click on **OK** button to finish.

8.5.6 Upgrading Firmware

IMPORTANT!
Before upgrading firmware, make sure the battery level is not low.
Make sure the wheelchair is in a safe and stable state.
– Place the wheelchair on blocks to elevate it from the ground.
– Do not upgrade firmware when the wheelchair is on a slope.
– Do not upgrade firmware when the park brakes are disengaged.

- Oblong wooden blocks (at least 14 x 14 x 30 cm)

To access module firmware upgrade screen:

1. Ensure system is in connection context.
2. Click **Home** menu item in navigation sidebar.
3. Click **System Summary** button.

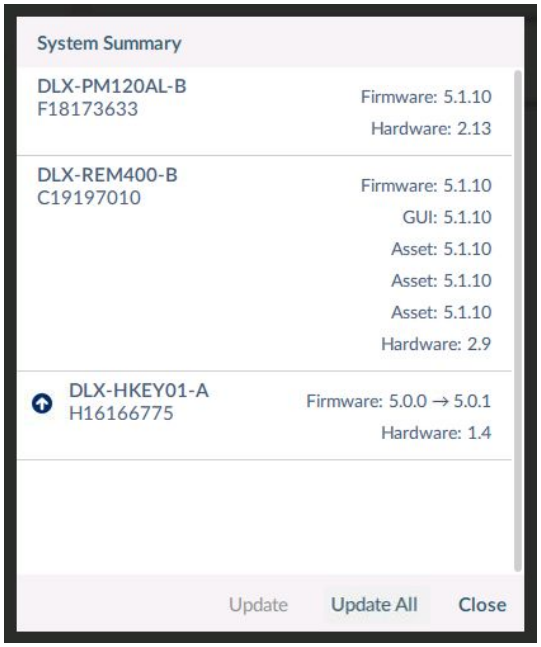


Fig. 8-2

The system summary displays each module with its firmware status:

- A white arrow on a blue background indicates the firmware is out-of-date and an upgrade is available.

Firmware can be upgraded on modules individually or all at once.

To upgrade individually:

1. Select single module and click **Update** button.

To upgrade all at once:

1. Click **Update All**.

8.5.7 Restoring Default Wheelchair Configurations

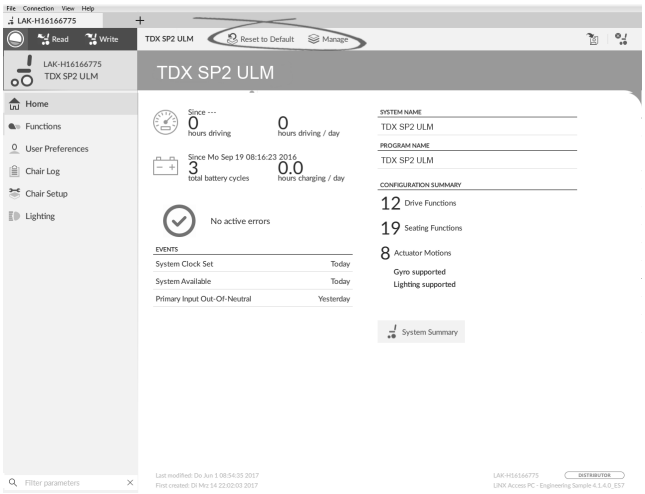
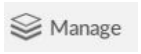


Fig. 8-3

Loading stored Wheelchair Configurations



1. Click **Manage** to open wheelchair configuration list.
2.

Fig. 8-4

Click on icon Ⓐ behind desired wheelchair configuration.

3.

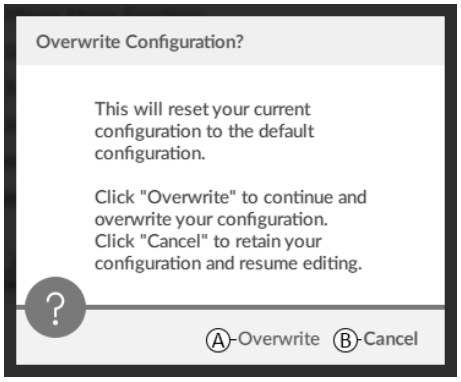
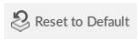


Fig. 8-5

A message is displayed warning you, that current configuration will be overwritten.
Click **Overwrite** (Ⓐ) to finish operation. Otherwise, click **Cancel** (Ⓑ) to abort operation.

Loading Default Wheelchair Configuration



To reset the connected wheelchair configuration to the selected default wheelchair configuration:

1. Click on **Reset to Default** button on the tool bar.
2.

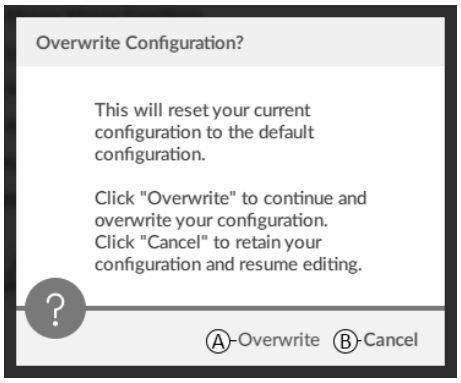


Fig. 8-6

A message is displayed warning you, that current configuration will be overwritten.
Click **Overwrite** (Ⓐ) to finish operation. Otherwise, click **Cancel** (Ⓑ) to abort operation.

Default chair configuration means last connected configuration.

If chair configurations are not supported by wheelchair, such as in LiNX LE systems, **Reset to Default** and **Manage** are not displayed.

8.5.8 Loading Default Configurations

1. Open LiNX Access tool.
2.

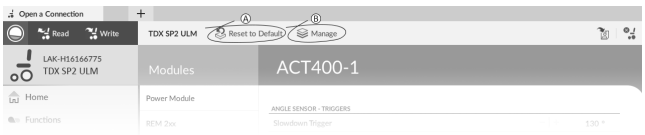


Fig. 8-7

Click either on button **Reset To Default** (Ⓐ) or **Manage** (Ⓑ) in tool bar.

3.

Fig. 8-8

If chosen **Manage**, you will see a list with default configurations stored on power module. Click on icon Ⓐ behind the preferred configuration. Otherwise, click button Ⓑ to abort.

4.

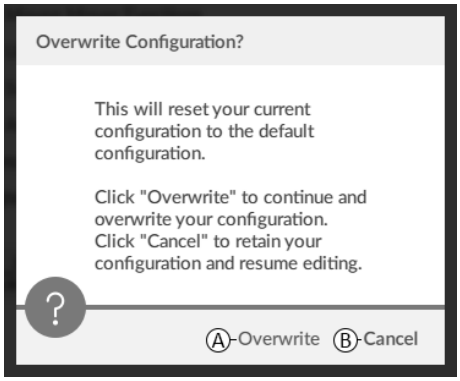


Fig. 8-9

A message box appears. Confirm the reset by clicking on button **Overwrite** (Ⓐ). Otherwise, click on button **Cancel** (Ⓑ) to abort.

5. Modify parameters, especially lighting functions (see *9.7 Modifying Lighting Parameters, page 143*) and gyro status (see *9.6 Modifying Gyro Support in Drive Functions, page 142*).

8.5.9 Converting Configuration Files

Using older configuration files on wheelchairs can result in missing features which were introduced in later revisions of firmware, such as Switch Control. In most cases, converting these configuration files allows you to update user's configuration to latest release to enable all features.

In case configuration file is on current revision or incompatible, menu entry is shown greyed out.

1. Connect with wheelchair.
2. Click on **File** in menu bar.
3.

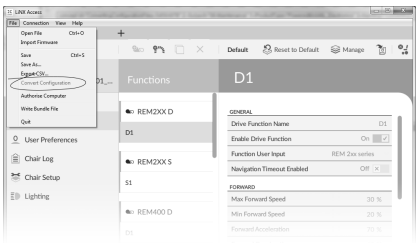


Fig. 8-10

Select entry **Convert Configuration** and follow screen prompts.

8.6 File context actions

The following tasks are only relevant when in the **File context** mode. For tasks related to the **Connection context** mode, refer to *8.5 Connection context actions, page 119*.

8.6.1 Open/Close a file

If the LiNX Access PC tool is not open

1. Open LiNX Access PC tool.
2. From **Open a file** tab:
   a. select file from list, or
   b. click **Open file** button (top left) to open the **Open file** dialogue, or
   c. if list is too long to read, enter file name into **Filter files** text box to locate file in list.
3. Select file.

If the LiNX Access PC tool is already open

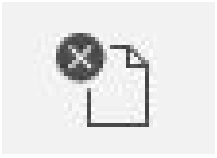
1. Click on **New file** tab (+).
2. From this tab:
   a. select file from list, or
   b. click **Open file** button (top left) to open the **Open file** dialogue, or
   c. enter file name into **Filter files** text box to locate file in list.
3. Select file.

Open via File menu

1. Click on **File** menu.
2. Select **Open file** to open the **Open file** dialogue.
3. Select file.

After selecting a file, the LiNX Access PC tool opens the file under its own tab. The tab is named with the file name.

Close a file

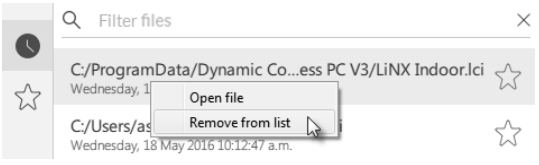


Close a file using the **Close file** button, located on the right-hand side of the tool bar. If you attempt to close a file with changes pending, a dialogue opens with the options to:

- **Save** — save the changes before closing
- **Discard** — discard the changes and close the file
- **Cancel** — cancel the file close action

For information about modifying parameters, refer to *9 Modifying Wheelchair Configurations, page 128*. For information about saving files, refer to *8.5.4 Save a program as a file, page 120*. For information about reading a program, refer to *8.5.3 Read a program from a wheelchair, page 120* and for information about writing a program to a wheelchair, refer to *8.5.2 Write a program to a wheelchair, page 120*.

8.6.2 Remove a file from list



Right-click on a file in the open file dialogue and select **Remove from list**.

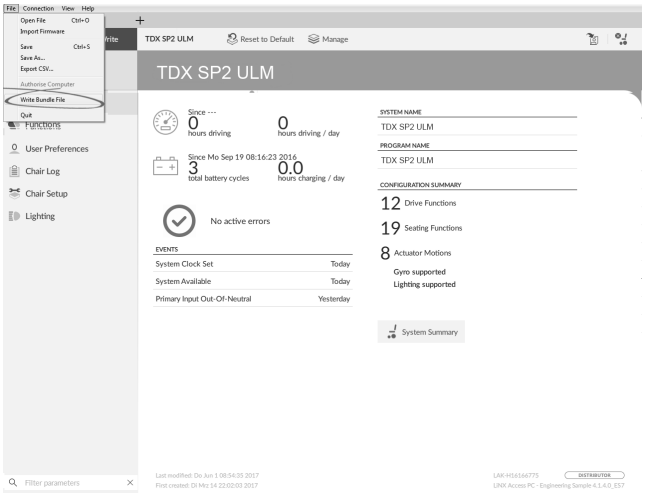
8.6.3 Writing bundle files to a chair

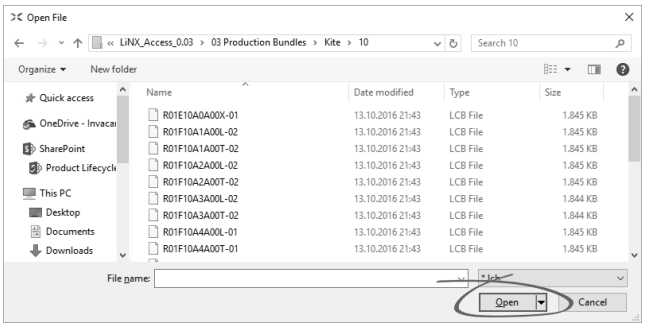
Bundle files can be written to a connected chair. Bundle files can include wheelchair configurations and/or firmware files.

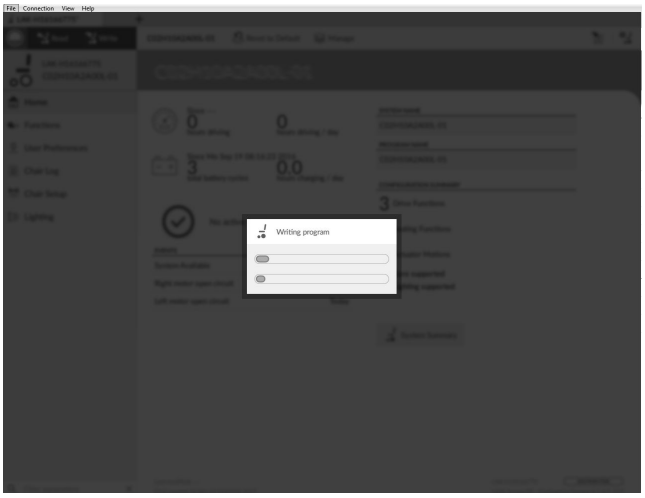
Updating the bundle files sets configuration and included parameters back to default settings.

Invacare recommends making a backup of configuration files prior to updating a bundle file. See *8.5.4 Save a program as a file, page 120*.

Wheelchairs with Serial Numbers before 18JE000303: If you are adding OUT500 or replacing a REM400A with a REM400B, contact Invacare Technical Service to have the existing files saved and the bundle files updated.

1. Contact Invacare Technical Services to obtain the bundle file.
2. 

   Click on **File** menu.
   Select **Write Bundle File**.
3. 

   Select desired bundle file and click **Open**.
4. 

   Bundle file is written to chair.

9 Modifying Wheelchair Configurations

9.1 Profile and Function Actions

9.1.1 Change Profile And Function Actions with iOS Tool

In bulk edit mode:

- profiles can be added and deleted,
- functions can be added, deleted, duplicated and moved.

A system always includes a REM2xx Drive Function profile and a REM2xx Seating Function profile. These cannot be moved or deleted.

Screen Overview

1. Tap **Edit** in functions title bar.

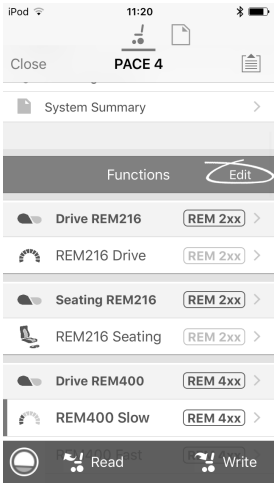


Fig. 9-1

2. Select desired profile or function action.

Ⓐ Delete function or profile

Ⓑ Add Function

Ⓒ Add Profile

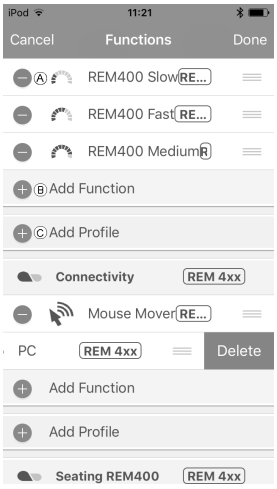


Fig. 9-2

3. Tap **Done** to return to **Home** screen.

Add Profile

1. Tap on icon Ⓒ **Add Profile**.
   Enter profile name.
   Select **User Input**.
2. Add function to profile, see description below.
3. Tap **Done** to return to **Home** screen.

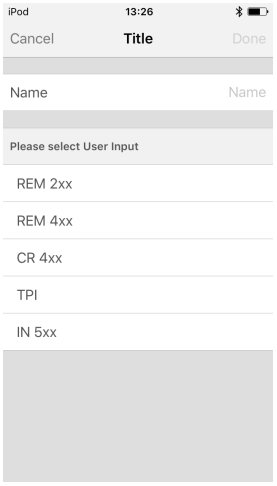


Fig. 9-3

User Navigation Error is displayed as long as no function is added to the new profile.

Add New Function

1. Tap on icon Ⓑ **Add Function**.
2. Enter function name.
3. Select **function type**.
   Tap on icon Ⓓ to add drive function.
   Tap on icon Ⓔ to add seating function.
   Tap on icon Ⓕ to add mouse mover function.
   Tap on icon Ⓖ to add utility function.
   Tap on icon Ⓗ to add switch control function.

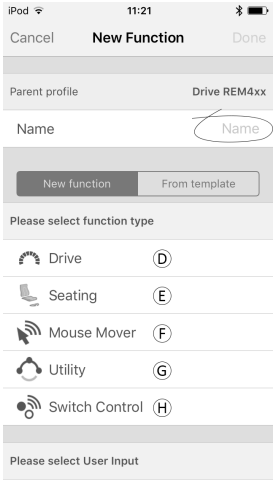


Fig. 9-4

4. Select **User Input**.
   Tap **Done**.
5. Tap **Done** to return to **Home** screen.

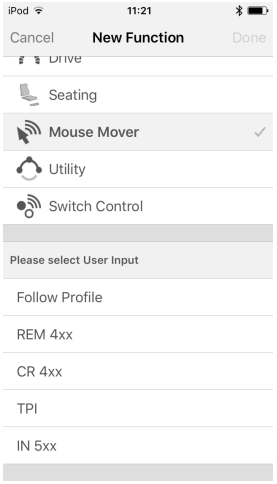


Fig. 9-5

For more information about modifying the drive parameters, see *9.3 Modifying Drive Parameters, page 137*.

For more information about modifying the seating parameters, see *9.8 Modifying Seating Parameters, page 143*

For more information about setting up a mouse mover or switch control, see user manual of remote.

Add New Function From Template

1. Tap on icon Ⓑ **Add Function**.
2. Enter function name.
3. Tap **From template**.
   Select desired template.
   Tap **Done**.

Fig. 9-6

Duplicate Function

1. Tap on function you want to duplicate.
2. Tap on **Duplicate**.
   Duplicated function appears directly under original function.

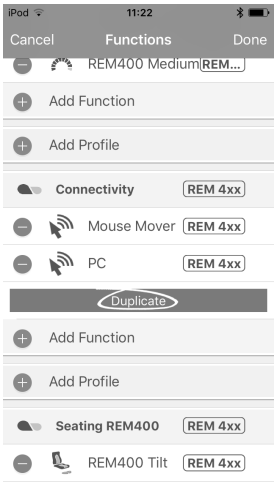


Fig. 9-7

Move Function

Functions can be reordered by dragging and dropping inside a profile or between profiles.

1. Tap and hold function you want to move.
   Function moves slightly up and to the right.
2. Drag function to required position in same or another profile.

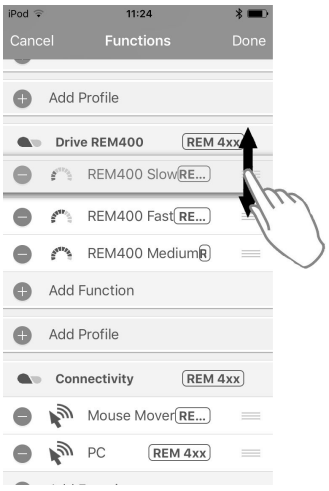


Fig. 9-8

Delete Function or Profile

ⓘ A profile cannot be deleted until its functions are deleted.

1. Select function or profile you want to delete.
2. Tap on icon Ⓐ.
3. Confirm action with tapping **Delete** button that appears next to function or profile.

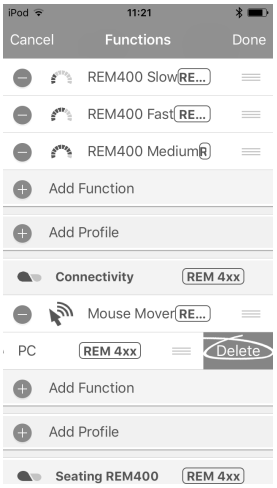


Fig. 9-9

Delete or Duplicate Function (Quick Access)

1. Select function you want to delete or duplicate from **Home** screen.
2. Tap and pull function to left.

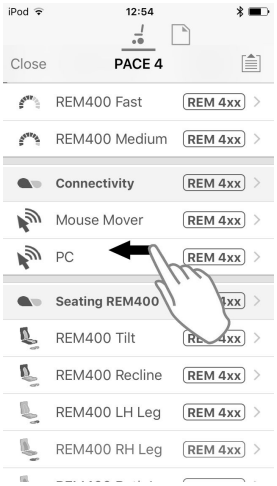


Fig. 9-10

3. Tap **Duplicate** or **Delete**.

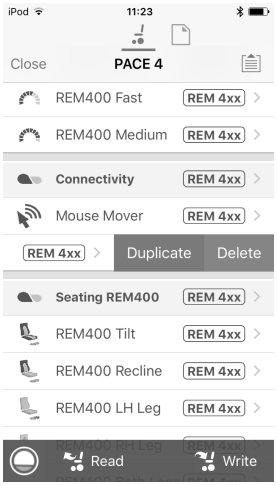


Fig. 9-11

4. Confirm, if you want to delete function. Otherwise, click **Cancel**

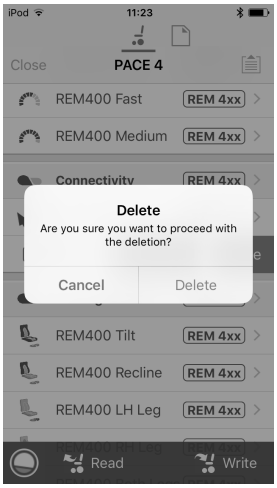


Fig. 9-12

9.1.2 Change Profile and Function Actions with PC Tool

In bulk edit mode:

- profiles can be added and deleted,
- functions can be added, deleted, duplicated and moved.

Ⓐ New Profile

Ⓑ New Function

Ⓒ Duplicate Function

Ⓓ Delete Profile or Function

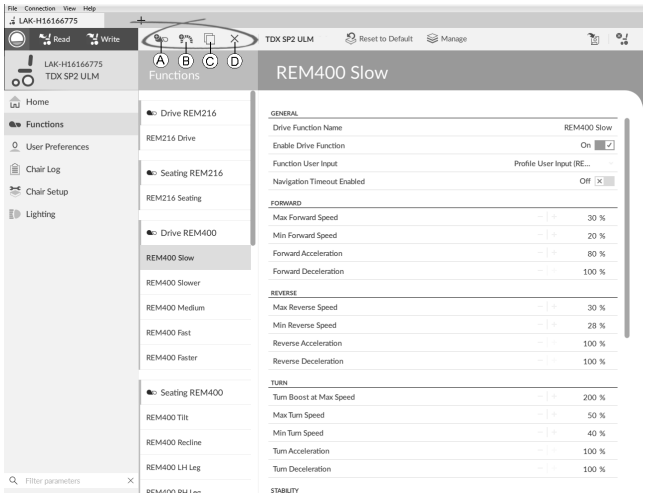


Fig. 9-13

ⓘ A system always includes a REM2xx Drive Function profile and a REM2xx Seating Function profile. These cannot be moved or deleted.

1. Open **Functions**.
2. Select desired profile or function action in the toolbar.

Add New Profile

1. Click on icon Ⓐ.
   New profile is displayed in **Functions**.

Fig. 9-14

2. Change name of profile. See *9.2 Modifying Function and Profile Names, page 135*
3. Add at least one function. See *Add User Function, page 133*

   ⓘ New profile is displayed as invalid as long as no function is added to the profile.

Add User Function

ⓘ When creating a new function all parameters will be set to their default values and will require modification. It might be easier to duplicate an already existing function and move it to current profile.

1. Click on icon Ⓑ.

Fig. 9-15

2. Click on icon to add desired function. Dialog box is displayed.

Icon	Action
Ⓔ	Add new drive function
Ⓕ	Add new seating function
Ⓖ	Add new mouse mover function
Ⓗ	Add new utility function
Ⓘ	Add new switch control function

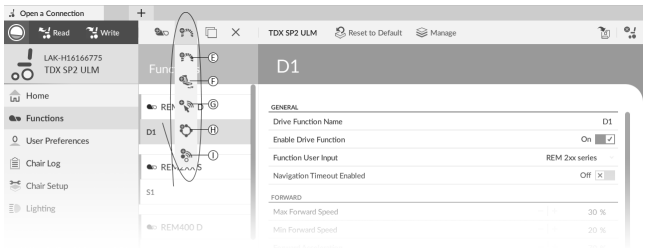


Fig. 9-16

3. Enter a function name.
4. Select **User Input** from list.
5. Click **Create** to proceed. Otherwise, click **Cancel**.

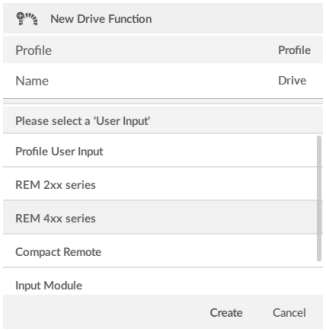


Fig. 9-17

For more information about modifying drive parameters, see *9.3.1 Modifying Drive Parameters Numerically, page 137*.

For more information about modifying seating parameters, see *9.8 Modifying Seating Parameters, page 143*.

For more information about setting up mouse mover, see user manual of remote.

Duplicate Function

1. Select function you want to duplicate.
2. Click on icon Ⓒ.
   Duplicated function appears directly under original function.
3. Edit function as required.

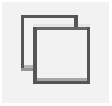


Fig. 9-18

Move Function

Functions can be reordered by dragging and dropping inside a profile or between profiles.

1. Click and hold function you want to move.
   Function moves slightly up and to the right and a dashed box appears beneath it.
2. Drag function to required position in same or another profile.

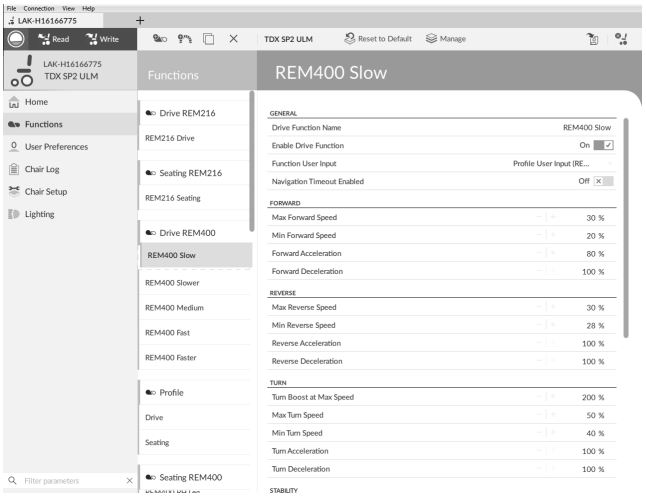


Fig. 9-19

Delete Function of Profile

A function is deleted immediately when the delete button is clicked.

A profile cannot be deleted until its functions are deleted.

1. Select function or profile you want to delete.
2. Click on icon Ⓓ.

Fig. 9-20

9.2 Modifying Function and Profile Names

Only changing **Drive Function Name** displayed. Changing **Seating Function Name**, **Mouse Mover Function Name** or **Profile Name** works the same way.

PC Tool

1. Click on function name.
2. Enter new function name.

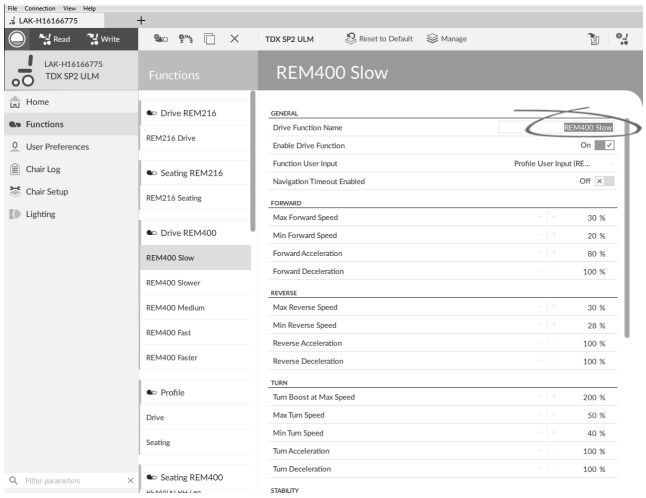


Fig. 9-21

iOS Tool

Function Names

1. Open function. Tap on field with function name.

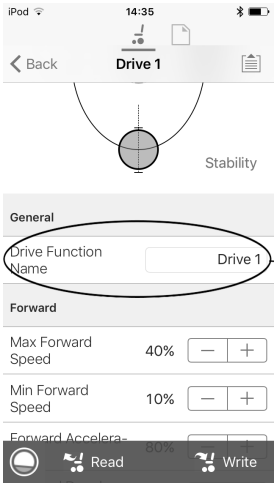


Fig. 9-22

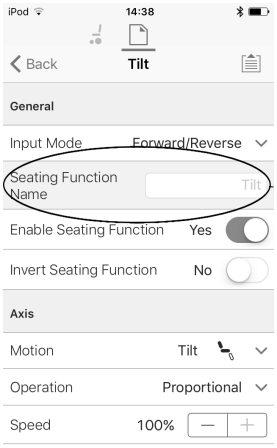


Fig. 9-23

2. Unlock **Bulk Mode** before modifying the name.
3. Enter new name.

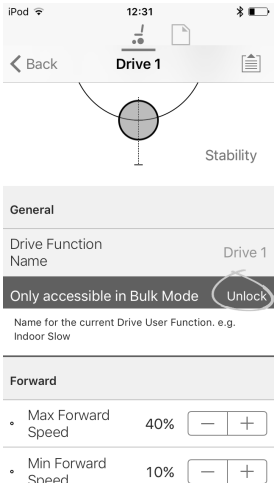


Fig. 9-24

4. Tap on **Back**.

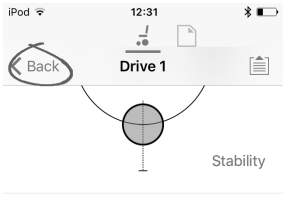


Fig. 9-25

Profile Names

1. Open profile. Tap on field with function name.
2. Enter new name.
3. Tap on **Back**.

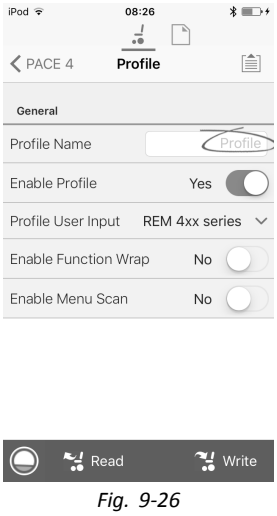


Fig. 9-26

9.3 Modifying Drive Parameters

9.3.1 Modifying Drive Parameters Numerically

1. Select a parameter to edit.
2. Click on the parameter's name to open the parameter's details. Default, minimum and maximum values will be displayed, as well as the parameter's summary.
3.

iOS Tool

Fig. 9-27

PC Tool

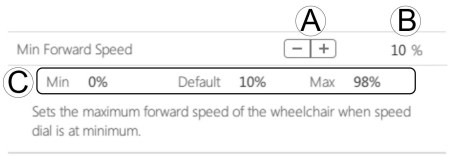


Fig. 9-28

There are different ways to modify the parameters:

a. Increment and decrement the parameter with the plus (+) and minus (-) buttons Ⓐ. Click these buttons to change the value in discrete steps or click and hold the buttons to change the value more quickly.
b. Double-click on the value Ⓑ and change it directly via the keyboard — press **Enter** to set the value.
c. Set the parameter value by clicking on the **Low/Min**, **Default** or **High/Max** buttons Ⓒ.

When you edit a parameter's value, its background color will change to indicate that it has changed from its previous value. Once the value is written to the controller (or file), the background will revert to white.

When in live edit mode, it might be difficult to see the parameter background changing since the live edit operation can take place very rapidly.

Drop-Down List (PC Tool Only)

Fig. 9-29

1. Click on the drop-down list to select an option.

9.3.2 Modifying Drive Parameters Graphically (iOS Tool Only)

A number of drive parameters can be edited graphically only with the iOS Access Tool. The speed graph is shown at the top of the parameter list. All other graphs are accessed from this screen, as detailed in the following sections.

Modifying Speed Settings

The Speed graph allows you to adjust the speed.

Ⓐ **Maximum Forward Speed**

Ⓑ **Maximum Turn Speed**

Ⓒ **Maximum Reverse Speed**

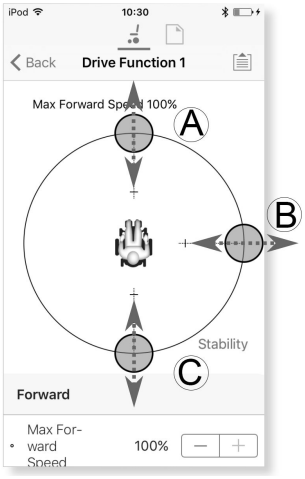


Fig. 9-30

1. Tap and drag the colored circles inwards or outwards to decrease or increase parameter values.

   The exact value for each parameter is shown at the top of the screen when adjusting the parameter and it is also displayed in the parameter list.

   If a gyro module is enabled, the graphic in the center of the graph changes from a person in a wheelchair to a gyroscope to indicate that the parameter being changed are gyro-specific.

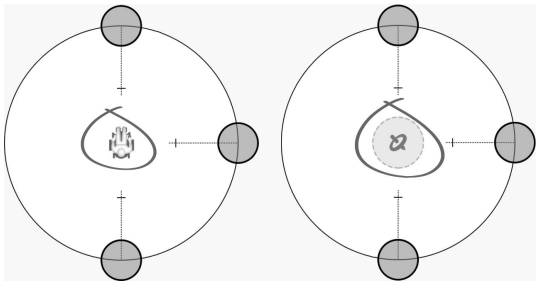


Fig. 9-31

Modifying Acceleration / Deceleration Settings

The acceleration / deceleration parameters are only accessible through the Speed graph screen.

1. To modify one of the acceleration or deceleration settings, press and drag one of the colored circles in the Speed graph screen.
   a. Press and hold the **Maximum Forward Speed** circle to be taken to the Forward acceleration Ⓐ / deceleration Ⓑ screen.
   b. Press and hold the **Maximum Turn Speed** circle to be taken to the Turn acceleration Ⓒ / deceleration Ⓓ screen.
   c. Press and hold the **Maximum Reverse Speed** circle to be taken to the Reverse acceleration Ⓔ / deceleration Ⓕ screen.

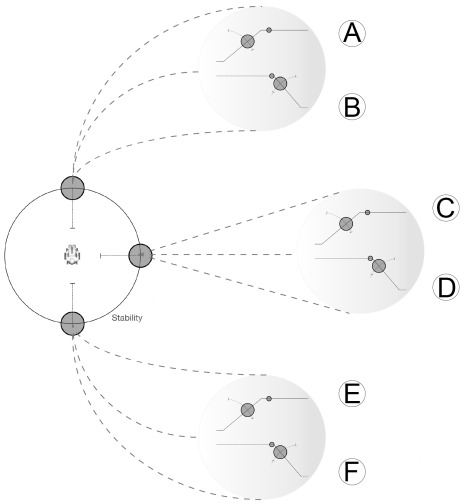


Fig. 9-32

9.4 Adjust Quadrant Operation

This parameter sets the drive function's user input to operate in 3–quadrant (3Q)or 4–quadrant (4Q) mode. Typically, the 4Q mode is chosen with joystick-based inputs or arrays, that provide 4 quadrants, for example, a Sip and Puff array. The 3Q mode is chosen for user inputs that provide 3 quadrants, for example, a head array.

iOS Tool

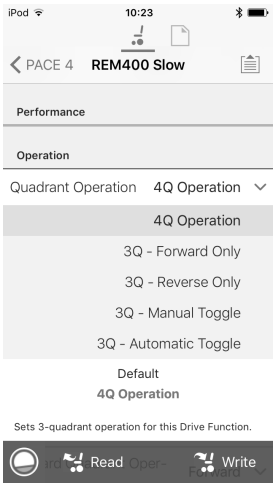


Fig. 9-33

PC Tool

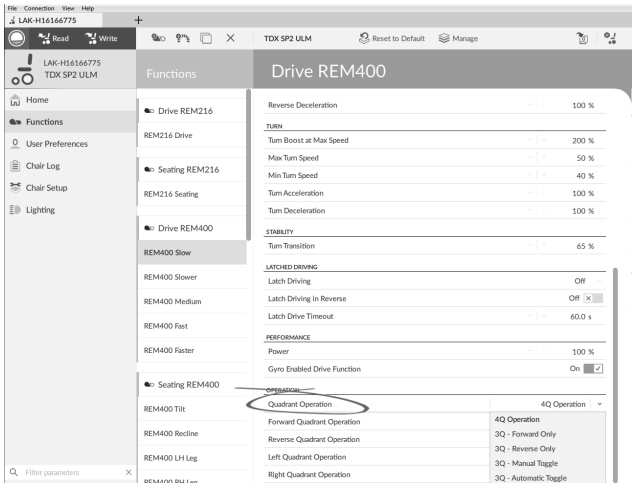


Fig. 9-34

The options are:

- **4Q Operation**
- **3Q - Forward Only**
- **3Q - Reverse Only**
- **3Q - Manual Toggle**
- **3Q - Automatic Toggle**

4Q Operation

When **4Q Operation** is selected, each quadrant is assigned a unique direction from forward, reverse, left and right, this is the default mode. To change these default directions, the quadrants can be reassigned with a different direction by setting the following parameters:

- **Forward Quadrant Operation**
- **Reverse Quadrant Operation**
- **Left Quadrant Operation**
- **Right Quadrant Operation**

It is not necessary that all quadrants are assigned unique directions. If required, one or more quadrants can share the same direction. For example, **Forward Quadrant Operation** and **Reverse Quadrant Operation** can both be set to **Forward**. For more information about adjusting the drive direction, refer to *9.4.1 Adjust Drive Directions, page 140*

3Q - Forward Only

When **3Q - Forward Only** is selected, the user input can drive the wheelchair forward, left and right.

If required, each quadrant can be reassigned with a different direction. Note that the **Reverse Quadrant Operation** parameter is not applicable in **3Q - Forward Only** mode.

3Q - Reverse Only

When **3Q - Reverse Only** is selected, the user input can drive the wheelchair reverse, left and right.

If required, each quadrant can be reassigned with a different direction. Note that the **Reverse Quadrant Operation** parameter is not applicable in **3Q - Reverse Only** mode.

3Q - Manual Toggle

When **3Q - Manual Toggle** is selected, the user input can drive the wheelchair forward, reverse, left and right. The forward and reverse directions are controlled by the user toggling an external switch.

If required, each quadrant can be reassigned with a different direction. Note that the **Reverse Quadrant Operation** parameter is not applicable in **3Q - Manual Toggle** mode.

3Q - Automatic Toggle

When **3Q - Automatic Toggle** is selected, the user input can drive the wheelchair forward, reverse, left and right. The forward and reverse directions are controlled by the user toggling the forward quadrant.

If required, each quadrant input can be reassigned with a different direction. Note that the **Reverse Quadrant Operation** parameter is not applicable in **3Q - Automatic Toggle** mode.

9.4.1 Adjust Drive Directions

iOS Tool

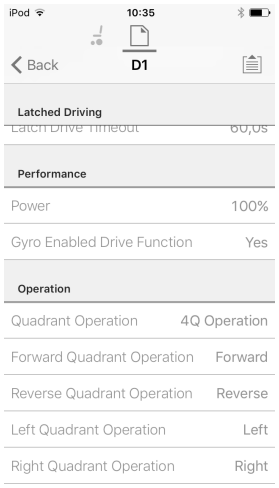


Fig. 9-35

PC Tool

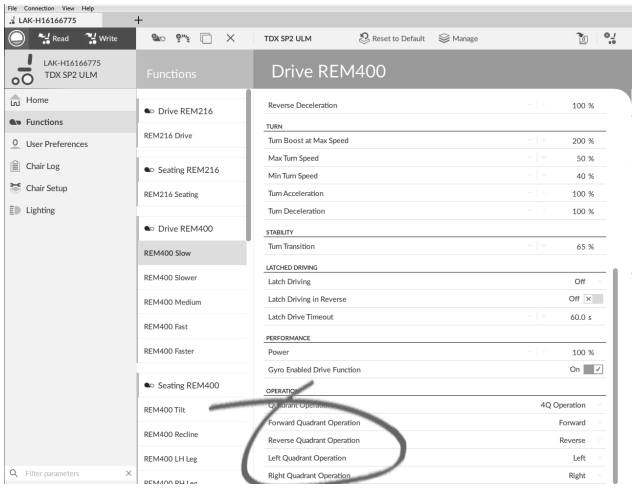


Fig. 9-36

Forward Quadrant Operation

This parameter sets the direction that the wheelchair moves when the forward quadrant of the user input is selected. Options available are:

- **Forward**
- **Reverse**
- **Left**
- **Right**
- **Ignored**

If **Ignored** is selected, the wheelchair does not move in any direction when the input's forward quadrant is selected.

Reverse Quadrant Operation

This parameter sets the direction that the wheelchair moves when the reverse quadrant of the user input is selected. Options available are:

- **Forward**
- **Reverse**
- **Left**
- **Right**
- **Ignored**

If **Ignored** is selected, the wheelchair does not move in any direction when the input's reverse quadrant is selected.

This parameter is not available when quadrant operation is set to any of the 3Q modes.

Left Quadrant Operation

This parameter sets the direction that the wheelchair moves when the left quadrant of the user input is selected. Options available are:

- **Forward**
- **Reverse**
- **Left**
- **Right**
- **Ignored**

If **Ignored** is selected, the wheelchair does not move in any direction when the input's left quadrant is selected.

Right Quadrant Operation

This parameter sets the direction that the wheelchair moves when the right quadrant of the user input is selected. Options available are:

- **Forward**
- **Reverse**
- **Left**
- **Right**
- **Ignored**

If **Ignored** is selected, the wheelchair does not move in any direction when the input's right quadrant is selected.

9.5 Setting up System for Latched Driving

To set up a wheelchair for latched driving, an external stop switch must be fitted to the wheelchair. Ideally, the external stop switch should be highly visible and easily accessible to provide an extra level of safety and security for the user.

Connect the external stop switch to a control input. Invacare recommends to connect the external stop switch to the input module. The external stop switch should be a single pole, normally-open switch. Mostly latched driving is used in combination with a Sip and Puff array, where the lip switch serves as external stop switch.

Configure External Stop Switch Parameters

Configure following parameters to set up the external stop switch.

1. Open **Modules** –> desired input to which external stop switch is connected.
2. Set **Input Type** to desired input, for example, **Momentary**.

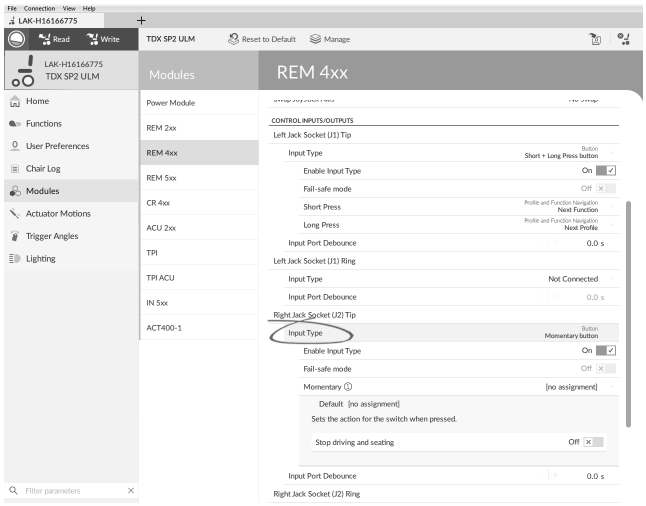


Fig. 9-37

3. Click on information icon next to **Momentary**. Enable **Stop driving and seating**.

   You do not need to assign a function to the switch.

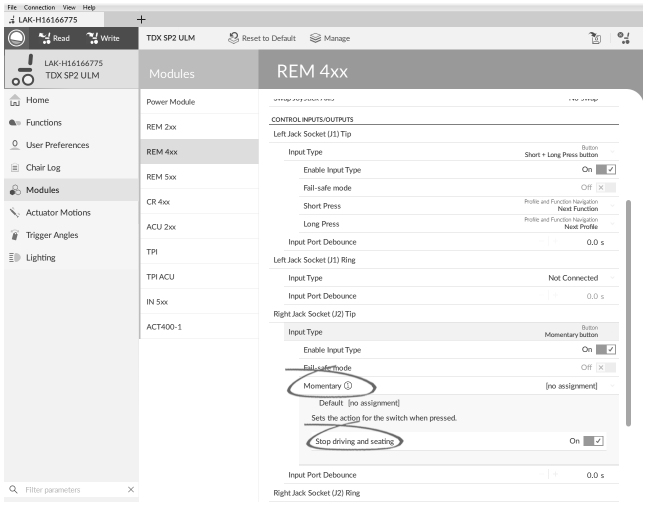


Fig. 9-38

Configure Latch Drive Parameters

The following parameters can be set individually for each drive function.

1. Open **Functions** –> desired drive function.
2. Set type of latched driving with **Latch Driving**. For more information about types of latched driving, refer to user manual of remote.

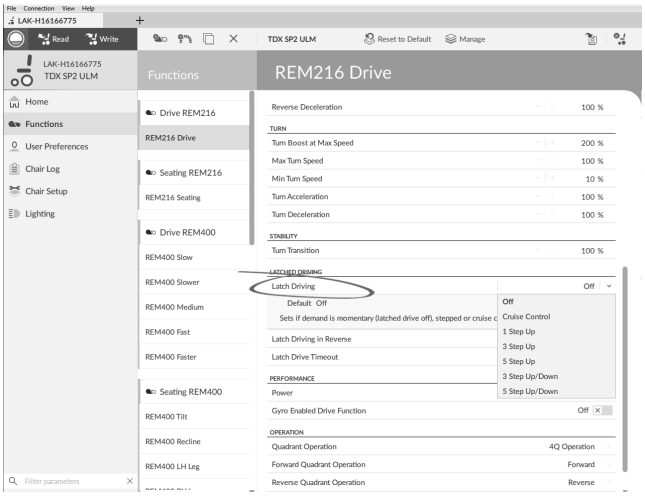


Fig. 9-39

3. Set **Latch Driving in Reverse** parameter to **On**, to allow latched driving in reverse.
4. Set maximum time that driving is latched without input from user with **Latch Drive Timeout** parameter.
5. Set gentler deceleration rate with **Latch Driving Demand Ramp-Down Rate**.

> If set to 100%, the deceleration is not extended and determined from the function's drive settings **Forward Deceleration** and **Reverse Deceleration**.

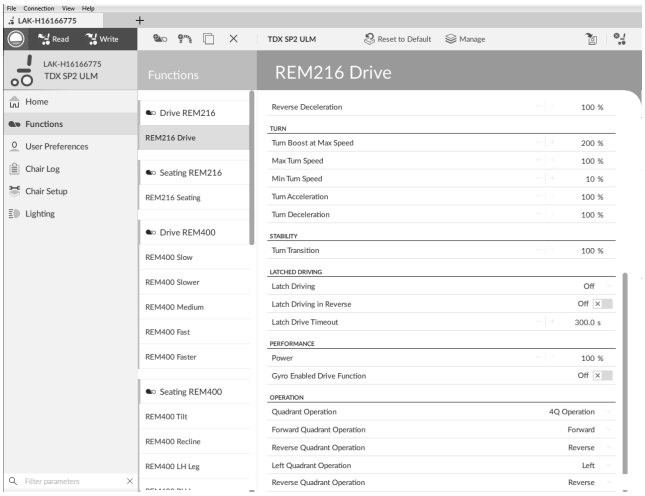


Fig. 9-40

9.6 Modifying Gyro Support in Drive Functions

By default, Gyro support is enabled in drive functions. The following instructions show you how to disable the Gyro support for drive functions or to hide Gyro symbol on screen if no Gyro is installed on wheelchair.

iOS Tool

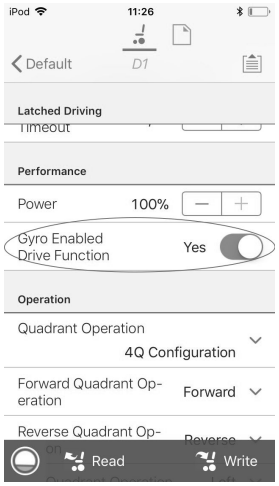


Fig. 9-41

PC Tool

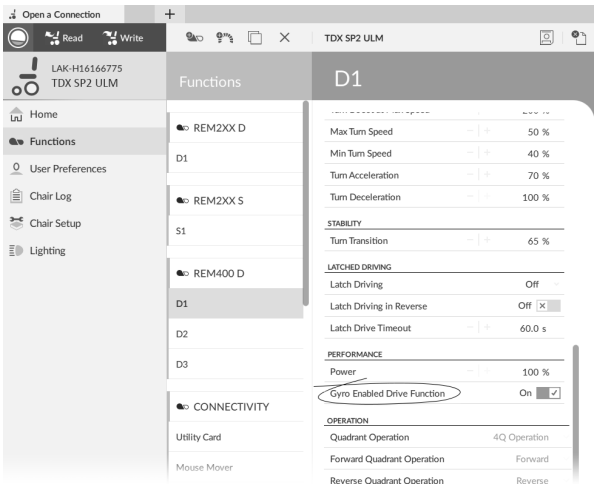


Fig. 9-42

1. Open desired drive function.
2. Set **Gyro Enabled Drive Function** to **Yes/On**, to provide enhanced stability control for this drive function. Otherwise, set to **No/Off** to disable gyro support for this function.

9.7 Modifying Lighting Parameters

When installing lighting system, replacing power module or resetting default configuration from power module it can be necessary to adjust lighting settings. In some configurations lighting functions are disabled by default and need manual activation.

1. If necessary, reset wheelchair configuration. See *8.5.8 Loading Default Configurations, page 124*
2.

iOS Tool

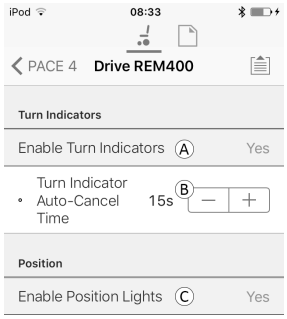


Fig. 9-43

PC Tool

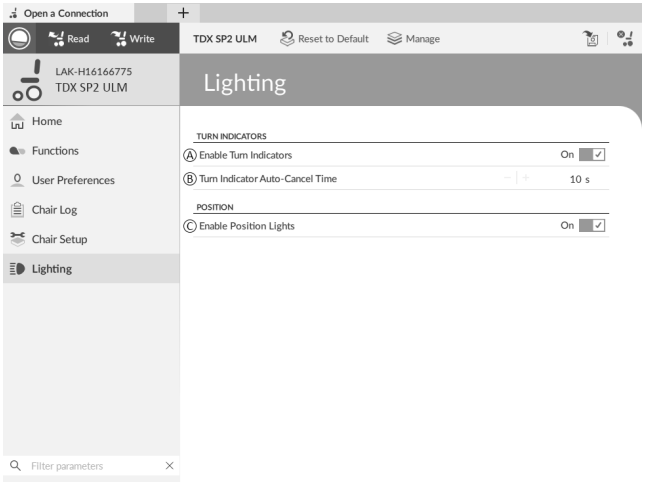


Fig. 9-44

Open **Lighting**.

3. Edit parameters according following table.

	Parameter	Description	Values
Ⓐ	**Enable Turn Indicators**	Allows system to use turn indicators	**No/Yes** **Off /On**
Ⓑ	**Turn Indicator Auto-Cancel Time**	Sets length of time a turn indicator will be on before being automatically turned off	0 s ... 30 s
Ⓒ	**Enable Position Lights**	Allows system to use position lights	**No/Yes** **Off/On**

9.8 Modifying Seating Parameters

Seating Motion

iOS Tool

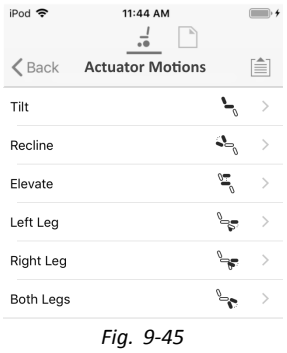


Fig. 9-45

PC Tool

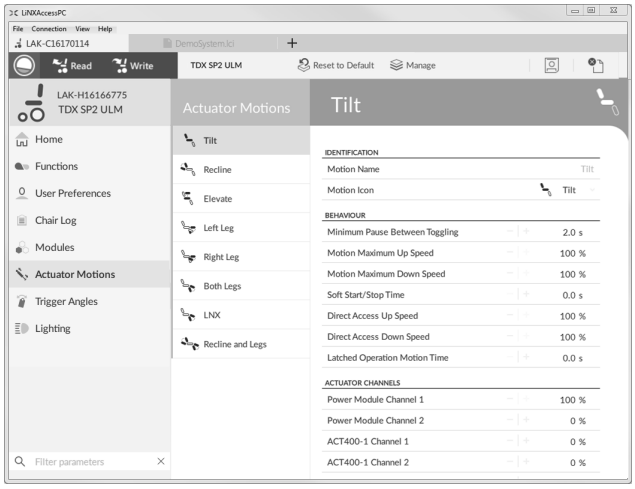


Fig. 9-46

1. Open **Actuator Motions** –> desired seating motion.

Changing Motion Name

iOS Tool

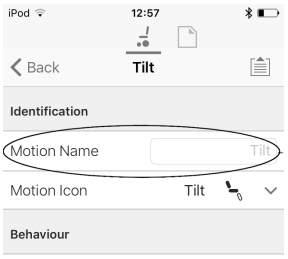


Fig. 9-47

PC Tool

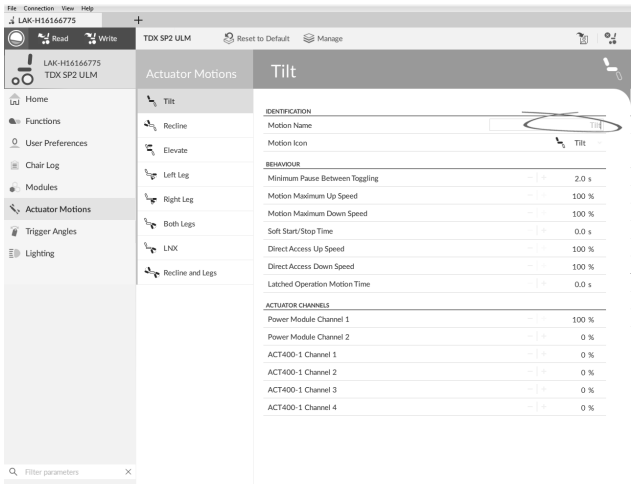


Fig. 9-48

1. Select **Motion Name**.
2. Unlock **Bulk Mode** before modifying name.
3. Enter new motion name.

Seating Function

This parameter sets how the joystick operates a motion. The joystick can control the motion as a switch or as a proportional controller. There are four switch-type modes and one proportional-type mode.

1. Open desired seating function.
2.

iOS Tool

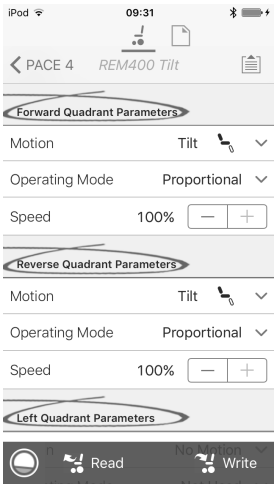


Fig. 9-49

PC Tool

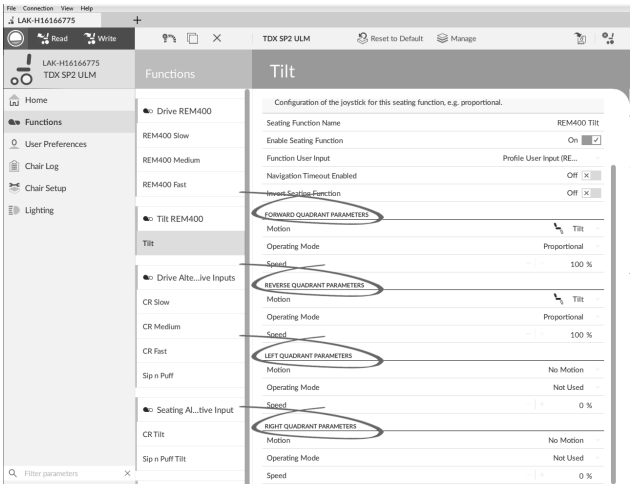


Fig. 9-50

Input Mode: Configuration of user input for this seating function.

- **Forward/Reverse**: Moving joystick forward or reverse to control motion.
- **Left/Right**: Moving joystick left or right to control motion.
- **Four Quadrant**: Using all four joystick quadrants to control motions.

If **Four Quadrant** is selected, all quadrant parameters can be edited individually.

3.

iOS Tool

Fig. 9-51

PC Tool

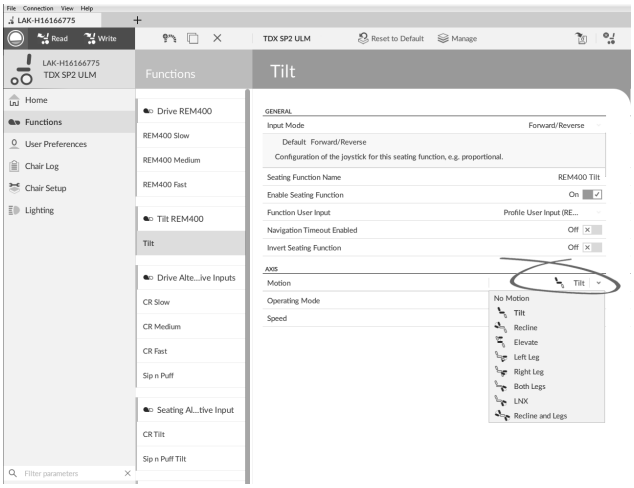
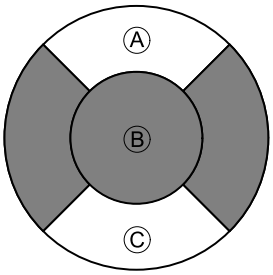
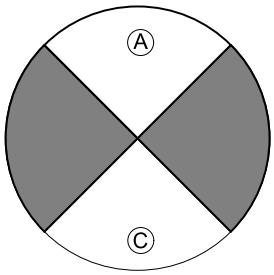


Fig. 9-52

Motion: If the joystick is used to control a motion, then select the motion from the list of available motions. If the joystick is not used to control a motion, then select **No Motion** from the list.

4.

Switch Type	Proportional Type
 *Fig. 9-53*	 *Fig. 9-54*
Switched	Proportional
Latched	
Toggle (only available in Four Quadrant operation)	
Toggle / latch (only available in Four Quadrant operation)	

Operating Mode:
Choose one of the switch-type modes to operate the motion at a fixed speed. The motion is activated when the joystick is deflected past the **Joystick Switch Threshold** Ⓑ into either the forward Ⓐ or backward Ⓒ quadrants. See *9.11 Joystick Switch Threshold, page 153* how to modify the **Joystick Switch Threshold**.
Choose the proportional-type mode to operate the motion at a speed that is proportional to the joystick's position. The motion is activated when the joystick is deflected out of neutral into either the forward Ⓐ or backward Ⓒ quadrants.
If the joystick is not used to control this motion, then set this parameter to **Not Used**.

Operation	Purpose
Switched	Activates the motion in the extend / retract direction for the duration that the joystick is deflected forwards / backwards and its position is greater than Joystick Switch Threshold. The motion is deactivated when it reaches its end-of-travel or when the joystick's position is less than the Joystick Switch Threshold
Latched	Activates and latches the motion in the extend /retract direction when the joystick is momentarily deflected forwards / backwards across the Joystick Switch Threshold. The motion is deactivated when the motion reaches its end-of-travel or the joystick is deflected again across the Joystick Switch Threshold.
Toggle	Activates the motion in one direction (extend or retract) for the duration that the joystick's position is greater than Joystick Switch Threshold. The motion is deactivated when it reaches its end-of-travel or when the joystick's position is less than Joystick Switch Threshold. The direction of the motion toggles between extend and retract for each new activation.
Toggle / latched	Activates and latches the motion in one direction (extend or retract) by momentarily deflecting the joystick across the Joystick Switch Threshold. The motion is deactivated when the motion reached its end-of-travel or the joystick is deflected again across the Joystick Switch Threshold.
Proportional	Deflecting the joystick forwards /backwards activates the motion in the extend / retract direction for the duration that the joystick is deflected. The motion is deactivated when it reaches its end-of-travel or when the joystick is returned to the neutral position. The speed of this motion is controlled by the amount of deflection from the neutral position and scaled further by using the Speed parameter.
Not Used	No operation.

5. **Speed**: For the switch-type operations (Switched, Latched, Toggle, Toggle / latched), this parameter applies the speed of the motion when the joystick crosses the **Joystick Switch Threshold**.
For the proportional operation, this parameter sets the maximum speed at which the motion will travel when the joystick is deflected to 100 % of its travel. For all other positions of joystick deflection the applied speed will be scaled down accordingly.

9.8.1 Trigger Angles (iOS Tool)

Angle sensor-triggers allow you to modify factory default angle triggers of wheelchair to accommodate specific user needs.

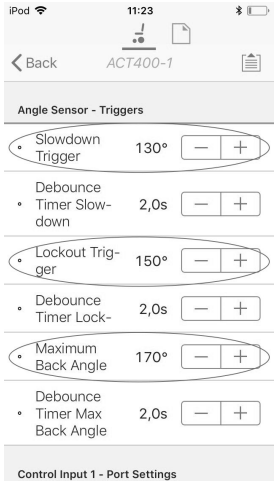


Fig. 9-55

Parameter	Description
Slowdown Trigger	Sets the angle sensor's trigger angle to slow down the driving speed
Lockout Trigger	Sets the angle sensor's trigger angle to lock out drive
Maximum Back Angle	Sets the angle sensor's trigger angle to stop further movement of the backrest.

1. From **Home** screen tap on **Trigger Angles**.
2. Set parameters to user's needs.

9.8.2 Trigger Angles (PC Tool)

Angle sensor-triggers allow you to modify factory default angle triggers of wheelchair to accommodate specific user needs.

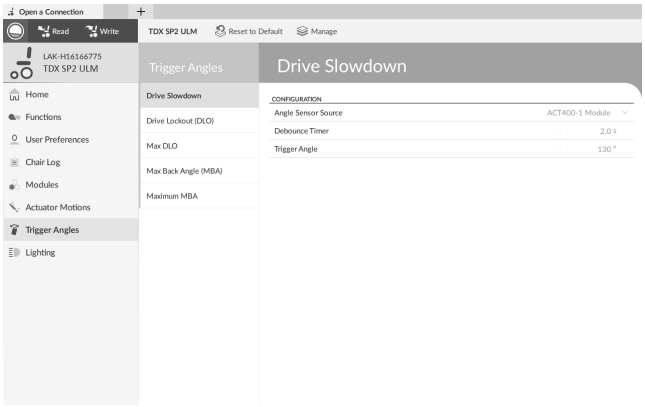


Fig. 9-56

Trigger Angles	Configuration	Description
Drive Slowdown	**Angle Sensor Source** **Debounce Timer** **Trigger Angle**	Specifies the connection location or source of the angle sensor. Applies a debounce time to the trigger angle. The debounce time is applied only whilst driving. Sets the trigger angle value.
Drive Lockout (DLO)		
Max DLO		
Maximum Back Angle (MBA)		
Maximum MBA		

1. Open **Trigger Angles**. Select your type of trigger angle, for example **Drive Slowdown**.
2. Set parameters to user's needs.

9.9 Modifying Attendant Parameters

Attendant profiles allow an attendant to control drive functions and seating functions of wheelchair. Currently two User Inputs are available, Attendant Control Unit (DLX-ACU200) and Intuitive Dual Control (Invacare IDC).

Attendant Control Unit (DLX-ACU200)

Input allows programming drive functions and seating functions. Parameters of functions are identical to primary remotes. See *9.3 Modifying Drive Parameters, page 137* and *9.8 Modifying Seating Parameters, page 143*

Intuitive Dual Control (Invacare IDC)

Input allows programming maximum one drive function.

Add New Attendant Function

Tool allows you to add all function types to Attendant profile. In case of an invalid function, like Switch Control, you will get error prompt with further instructions to solve error.

When creating a new function all parameters will be set to their default values and will require modification. It might be easier to duplicate an already existing function and move it to current profile.

1. Open **Functions**.
2. Select profile **Attendant** from list. Otherwise, both user inputs are not available.
3. Add new function or duplicate existing function. See *9.1 Profile and Function Actions, page 128*
4. Modify other parameters.

9.10 Modifying Utility Functions

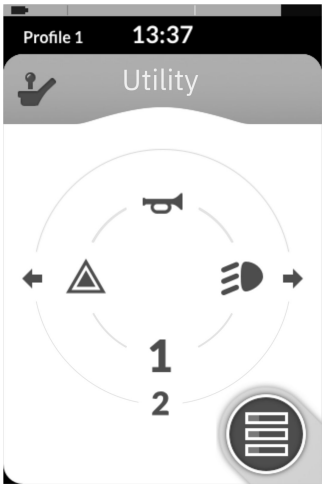


Fig. 9-57

The utility function allows the user to operate outputs (lights, horn, etc.) as well as accessories connected to control outputs, such as those available on the LINX Output module.

The utility function is suitable for both 3Q and 4Q navigation and can be operated from a range of system control inputs such as remote modules, switches and head arrays.

Utility functions can be added to any profile, except the attendant profile and can be configured to operate:

- the horn
- the hazard lights
- the position lights
- the indicators
- control outputs (on LiNX Output module)

Allowing Multiple Outputs

The number of outputs that can be switched by a single system control input demand is controlled by **Allow Multiple Quadrants**.

Fig. 9-58

By default, a single output is switched from a single quadrant.

Fig. 9-59

However, if **Allow Multiple Quadrants** is set to **On/Yes**, then two outputs can be switched simultaneously by selecting two adjacent quadrants.

Adjacent quadrants are selected by deflecting a joystick-based system control input diagonally (between quadrant) or selecting the following switch combinations with a switch-based system control input: forward/left, forward/right, reverse/left, reverse/right.

Adding Outputs

The procedure to add an output to a utility function is as follows:

- assign an output to a switch,
- set the output behaviour and
- select a display icon for the switch.

Assign Output to Switch

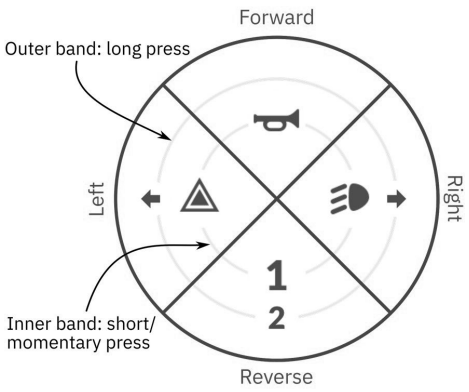


Fig. 9-60 Activation quadrants and bands

Switches are represented on a utility card with icons located on two circular activation bands within four quadrants. The quadrant and the position of the icons in the bands indicates to the user how to select and operate the switches with the system control input.

The inner and outer activation bands correspond to one oh the three switch types: short press, lang press and momentary press. Short and momentary presses are placed on the inner band and long presses are placed on the outer band.

The terms *short press* and *long press* refer to the duration that the system control input is activated, not how far it is deflected. The activation time to distinguish between short press and long press can be changed in user preferences, see *5.2.2 Overview User Preferences, page 80*.

Because it is difficult to discern the difference between a long press and a momentary press, a quadrant configured for a momentary press (inner band) cannot be configured also with a long press (outer band) switch. This means, for any quadrant configuration with a momentary switch, the outer band will be empty. The configuration options are shown below.

Fig. 9-61 Short press only

Fig. 9-62 Long press only

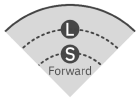


Fig. 9-63 Short and long press

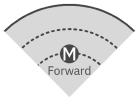


Fig. 9-64 Momentary only

Set Output Behaviour

Set how the output behaves when switched, based on the switch's quadrant and activation ring position. Each output can be configured as a latching or non-latching output type. There are three latching types and one non-latching type.

Non-latching	Latching
Momentary	Latch ON, Latch OFF, Toggle

Choose:

- **Momentary** to activate an output for the duration that the switch is selected.
- **Latch ON** to activate an output and remain activated when the switch is deselected.
- **Latch OFF** to deactivate an output and remain deactivated when the switch is deselected.
- **Toggle** to change the current output state (activated –> deactivated or deactivated –> activated) and remain in the new state when the switch is deselected.

Select Display Icon for Switch

None	Left Arrow	Left Turn Signal	Latched Up
1 One	Forward Arrow	Right Turn Signal	Latched Right
2 Two	Right Arrow	Hazard Lights	Latched Down
3 Three	Reverse Arrow	Horn	Left-Right Arrow
4 Four	Select	Momentary Left	Up-Down Arrow
5 Five	Next	Momentary Up	Mouse Click Left
6 Six	Previous/Back	Momentary Right	Mouse Click Right

7		
Seven	Home	Momentary Down
8		
Eight	Position Light	Latched Left

To represent the output, select a display icon for the switch in either the inner or outer activation band in one of the system control input's four quadrants (forward, reverse, left or right)

Example of Adding Output

The following instruction shows you how to program the first control output of DLX-OUT500 using a short/momentary press forwards as an example.

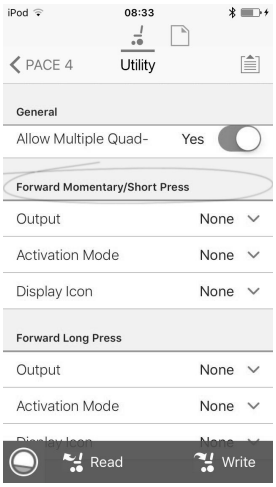
1. Open **Functions**.
2. Add new utility function or open existing utility function. See *9.1.2 Change Profile and Function Actions with PC Tool, page 132*
3. 

Fig. 9-65

   Scroll to section about your desired input command, like **Forward Momentary/Short Press**.
4.

iOS Tool

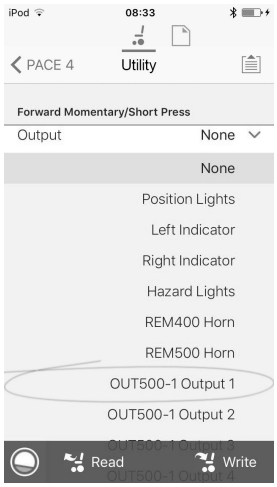


Fig. 9-66

PC Tool

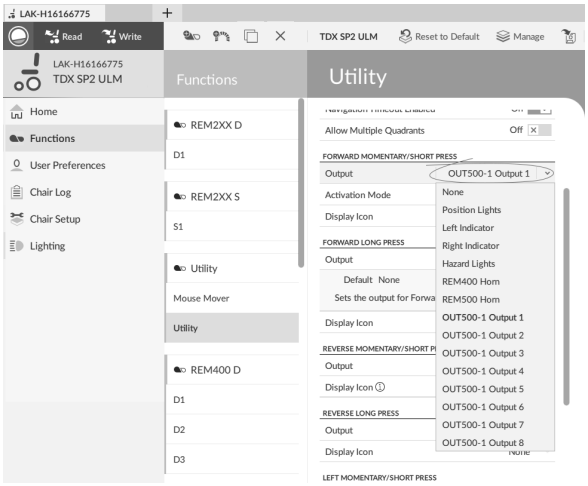


Fig. 9-67

   Assign output **OUT500–1 Output 1** to parameter **Output**.

5.

iOS Tool

Fig. 9-68

PC Tool

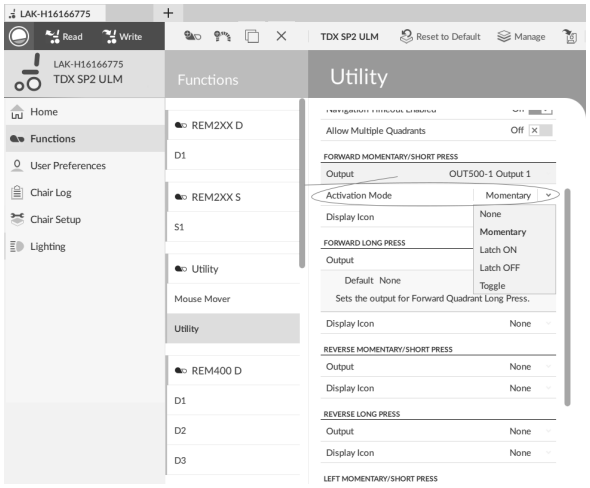


Fig. 9-69

Set parameter **Activation Mode** to desired value.

6.

iOS Tool

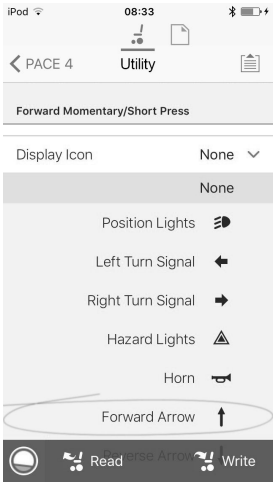


Fig. 9-70

PC Tool

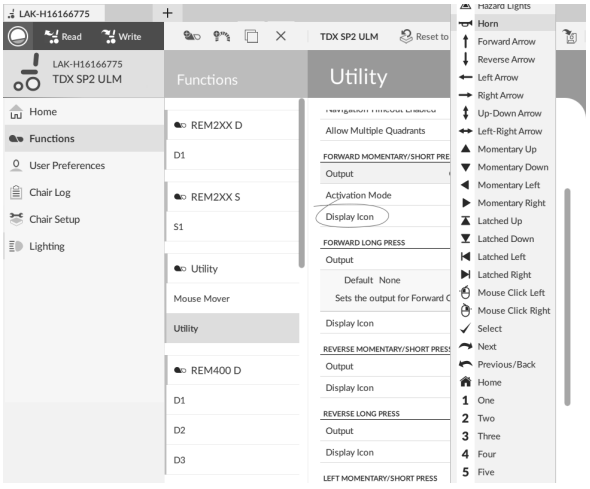


Fig. 9-71

Set parameter **Display Icon** to desired value. Select a display icon from list of available icons.

7. Modify parameters for the other commands.

8. Scroll to section **General**.
9.

iOS Tool

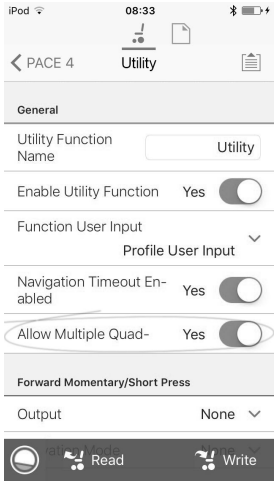


Fig. 9-72

PC Tool

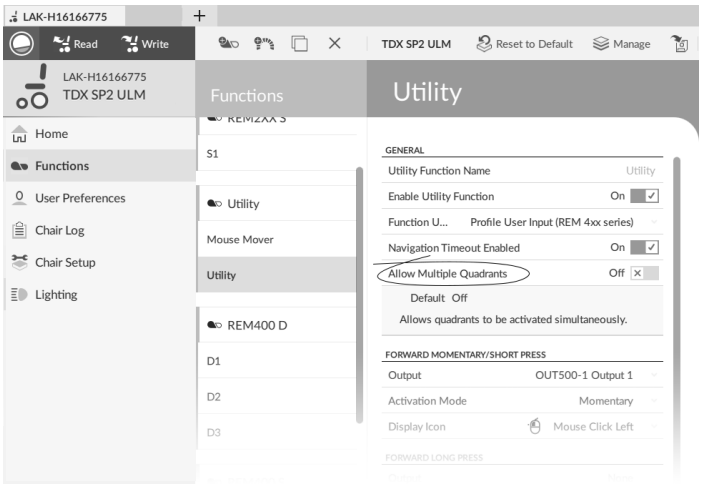


Fig. 9-73

Set parameter **Allow Multiple Quadrants** to **Yes/On** to allow switching two outputs simultaneously.

9.11 Joystick Switch Threshold

Sets the percentage of joystick movement required to activate an output when the joystick is operating as a switched input device.

When the joystick is used as a switched input device, this parameter specifies how far the joystick has to be pushed before its state changes (OFF Ⓑ to ON Ⓐ) and activates an output. The **Joystick Switch Threshold** value is a percentage of the joystick's full travel and should be set according to the user's needs. For example:

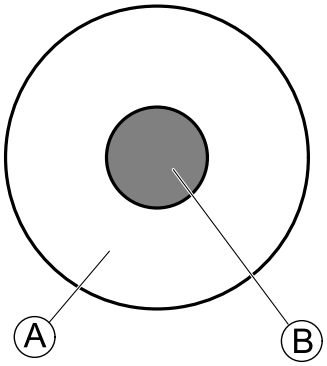
- 

Fig. 9-74

for users that have difficulty moving the joystick , set **Joystick Switch Threshold** to a low value, such as 40 % or less,

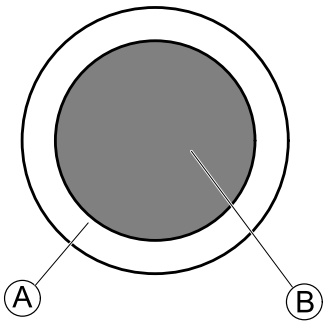
- 

Fig. 9-75

for users that lack fine motor control or are subject to hand tremors, set **Joystick Switch Threshold** to a high value, such as 80 %, to avoid unintentional switching.

iOS Tool

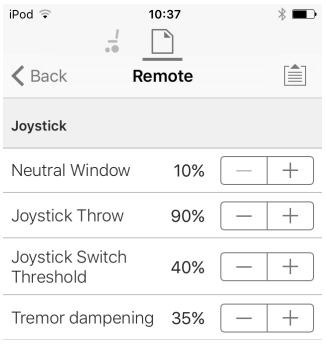


Fig. 9-76

PC Tool

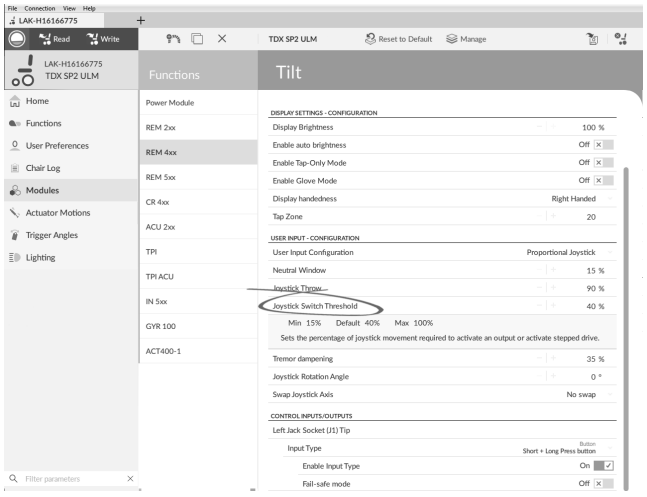


Fig. 9-77

1. Open **Modules** –> desired remote.
2. Set the desired percentage.

Tremor Dampening

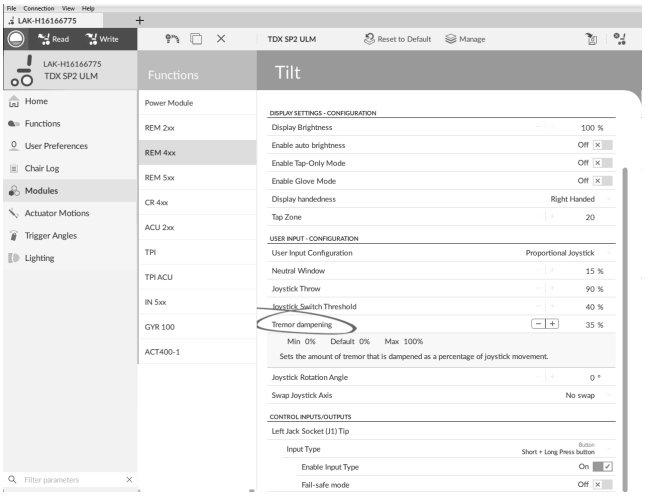


Fig. 9-78

Use this parameter to reduce the effect of hand tremors on the joystick. Low values are suitable for users with low frequency (slow) tremors. Higher values will suit users with higher frequency (fast) tremors. Setting the parameter value to 0 % results in no tremor dampening.

9.12 Joystick Shaping

Using Parameters

1. Open **Modules** –> desired module.
2.

iOS Tool

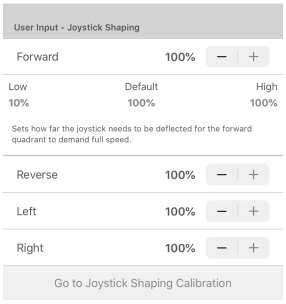


Fig. 9-79

PC Tool

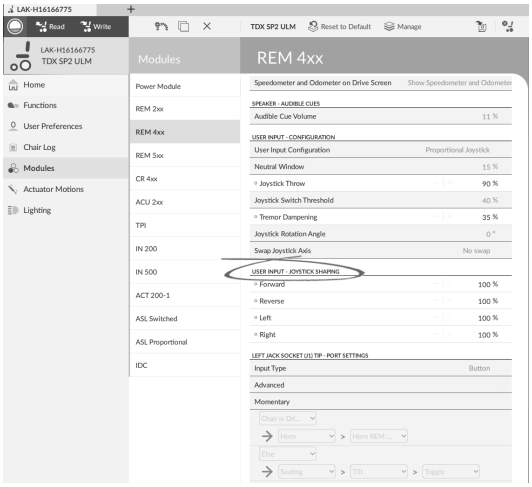


Fig. 9-80

   Go to **User Input — Joystick Shaping**.
3. Set each quadrant's parameter according to user's ability and comfort.

Using Calibration Screen

1. Open **Modules** –> desired module.
2. Go to **User Input — Joystick Shaping**.
3.

iOS Tool

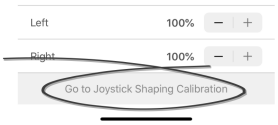


Fig. 9-81

PC Tool

Fig. 9-82

   Select **Go to Joystick Shaping Calibration** (iOS Tool).
   Open **Connection** and select **Joystick Shaping** (PC Tool).
4.

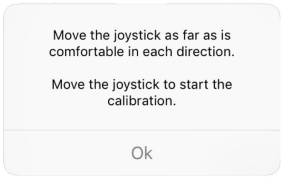


Fig. 9-83

   Instruction pop-up opens, explaining how to perform calibration.
   Choose **OK** or deflect joystick to start calibration.

Using Graphical Interface

The calibration screen comprises the graphical interface in the upper part of the screen and the parameter interface in the lower part. Around the screen, there are three user buttons.

- Select **Cancel** at any time to exit calibration screen without saving any changes.
- Select **Restart** at any time to reset calibration screen and display the configuration's existing values.
- Select **Done** to exit calibration screen and save any changes.

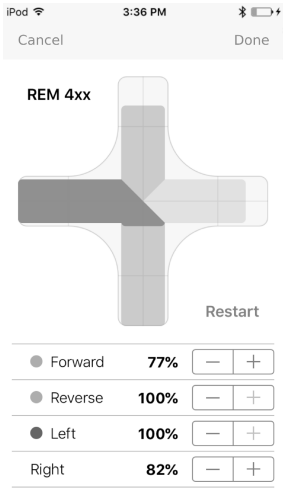


Fig. 9-84

The graphical interface displays the four-quadrant graph. Each quadrant's existing joystick shaping parameter values are displayed as grey bars.

As a guide, the 50% and 100% points are shown. The exact value of each bar is displayed in the parameter interface below the graph.

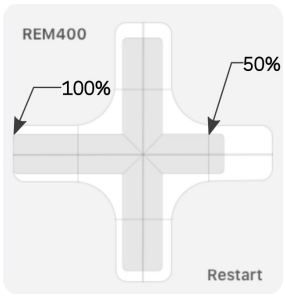


Fig. 9-85

1. Ask user to deflect joystick in all four directions.
   User can deflect joystick in any direction and in any order but only to the point that is comfortable and repeatable.
   Grey bar Ⓐ indicates value used in current configuration.
   Dark blue bar Ⓑ displays deflection in real time.
   Light blue bar Ⓒ indicates maximum value reached in quadrant.
2. If user is ready, joystick needs to be in neutral position.
3. Select **Done** button to save values and exit configuration screen.
   Done button cannot be selected until at least one value is changed.

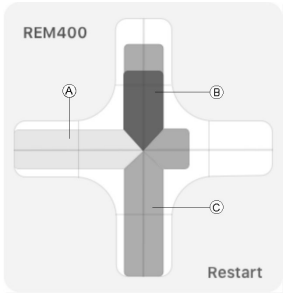


Fig. 9-86

Using Parameter Interface

In the lower part of the calibration screen, the parameter interface displays the exact numerical value of the four quadrant parameters. Whenever the joystick is deflected, its value is updated in the parameter interface.

When calibration starts, all parameters are grey.

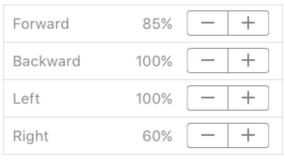


Fig. 9-87

During calibration, both dots and parameters are automatically updated to display current value and status of deflection.

- grey: no change in value
- light blue: maximum value
- dark blue: active deflection in real time

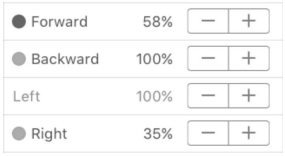


Fig. 9-88

Whenever joystick returns to neutral position, dots become light blue, if value is changed during calibration.

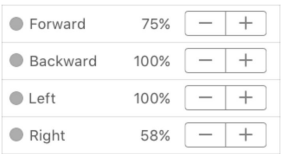


Fig. 9-89

Parameters can be updated manually and independently of the graphical interface, at any time when in the calibration screen. This is useful for recording or fine tuning specific values.

1. Use parameter stepper control, located next to each parameter, to adjust value.

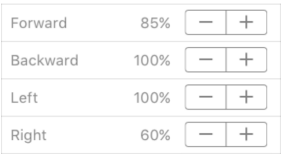


Fig. 9-90

9.13 Configuring Rest

Setting Up Timeout to Enter Rest

1. Open **Functions** –> desired profile.
2.

iOS Tool

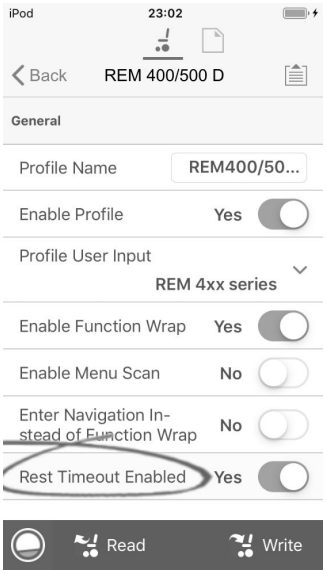


Fig. 9-91

PC Tool

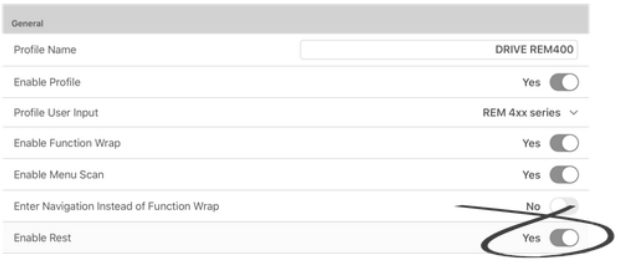


Fig. 9-92

Set **Rest Timeout Enabled/Enable Rest** to **Yes**.

3. Open **User Preferences**.
4.

iOS Tool

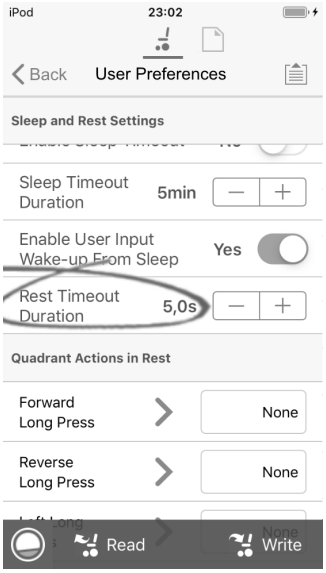


Fig. 9-93

PC Tool

Fig. 9-94

Set **Rest Timeout Duration** to desired value.

If a system is configured for both timeout into menu navigation and timeout into rest, consider setting the duration of the timeout into rest longer than that of the timeout into menu navigation, otherwise menu navigation cannot be entered.For example if timeout into menu navigation is set to five seconds and timeout into rest is set to four seconds, the timeout into rest expires first and the system never enters menu navigation. If timeout into menu navigation is set to five seconds and timeout into rest is set to six seconds, timeout into menu navigation expires first and the system enters menu navigation after five seconds. If there is no subsequent activity for the duration set for timeout into rest, that is a further six seconds in this example, rest is entered.

Setting Up Control Input to Enter Rest

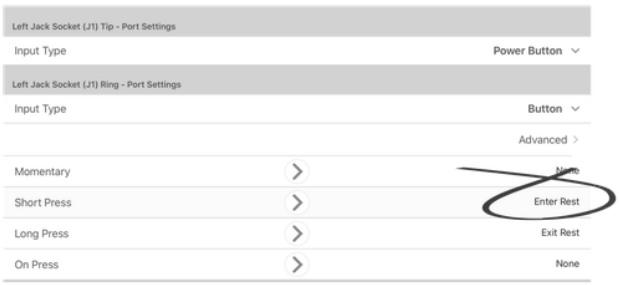


Fig. 9-95

Set up a short-press button, connected to the ring connection of the left jack socket on the REM400, as an example.

1. Open **Modules –> REM 4xx**.
2. Go to **Left Jack Socket (J1) Ring - Port Settings**.
3. Go to **Input Type** and select **Button**.

4.

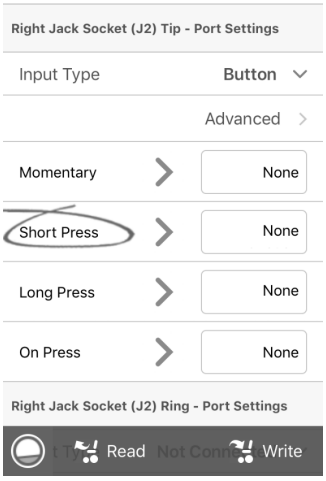


Fig. 9-96

Go to**Short Press** slot.

5.

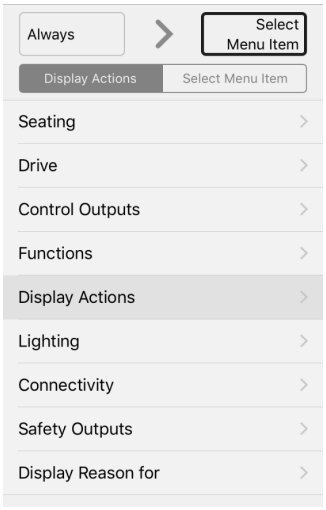


Fig. 9-97

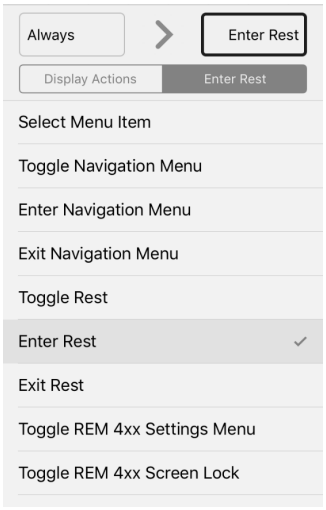


Fig. 9-98

Select **Display Actions** –> **Enter Rest**.

6. Select **Done**.

Setting up Control Input to Exit Rest

Set up a long-press button, connected to the ring connection of the left jack socket on the REM400, as an example.

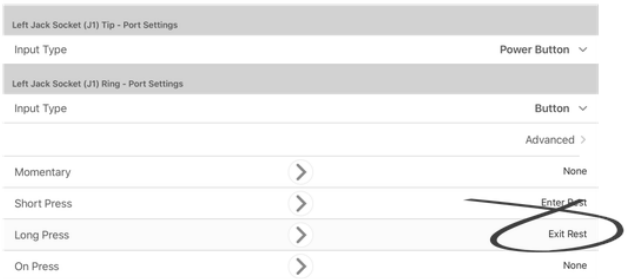


Fig. 9-99

1. Open **Modules** –> **REM 4xx**.
2. Go to **Left Jack Socket (J1) Ring - Port Settings**.
3. Go to **Input Type** and select **Button**.

4.

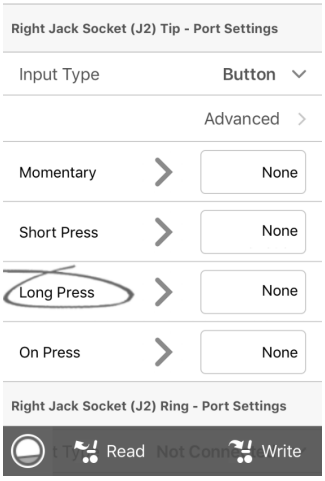


Fig. 9-100

Go to **Long Press** slot.

5.

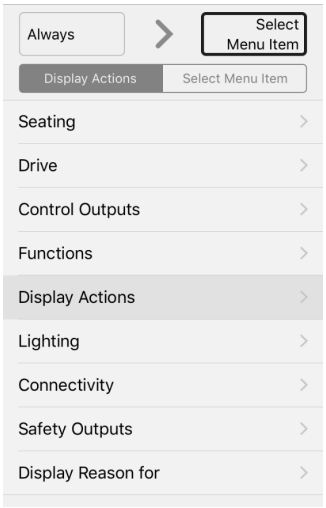


Fig. 9-101

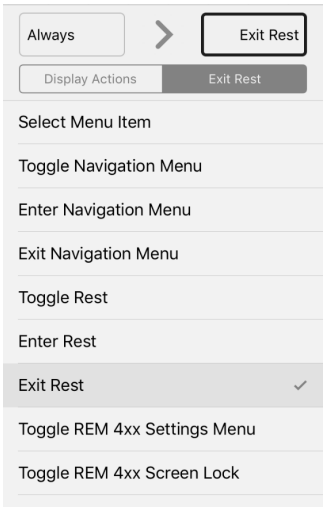


Fig. 9-102

Select **Display Actions** –> **Exit Rest**.

6. Select **Done**.

9.14 Enable Indirect Navigation

Depending on which type of indirect navigation should be activated for user, different main parameters must be enabled.

Types of indirect navigation are:

- Menu Select
- Menu Scan

Parameter	Menu Scan	Menu Select
Navigation Type	Menu Scan	Menu Select
Enable Menu Scan	On	Off
Navigation Timeout Enabled	On / Off	On / Off

For the iOS tool, there is only **Menu Scan** with **Navigation Timeout** available at the moment.

Enabling Menu Scan / Menu Select

Steps 3 to 5 must be made for each desired profile and function.

1.

iOS-Tool

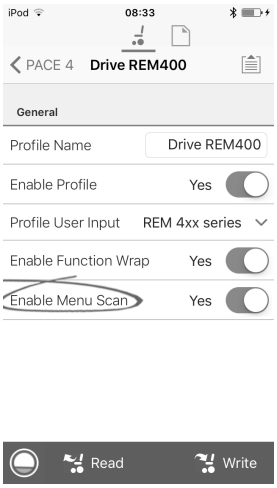


Fig. 9-103

PC-Tool

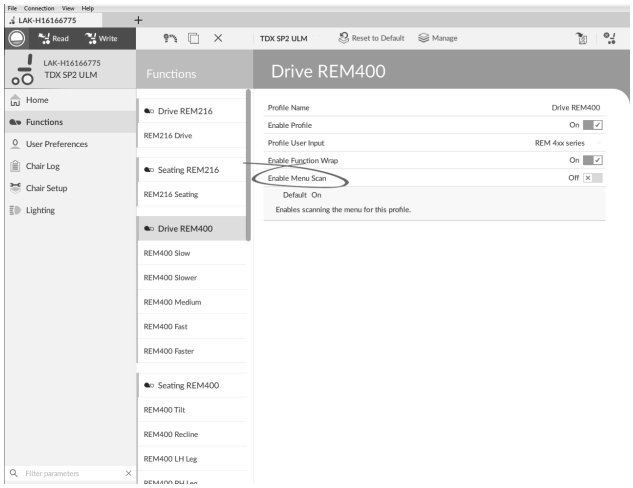


Fig. 9-104

Open **Functions** → desired profile.
Set parameter **Enable Menu Scan** according to above table.

2. Open **User Preferences**.
3.

iOS-Tool

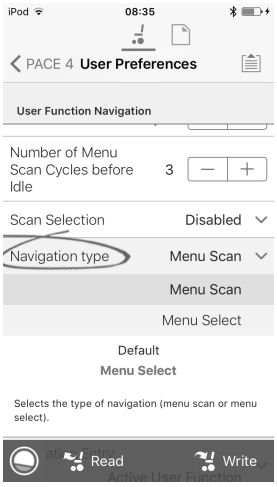


Fig. 9-105

PC-Tool

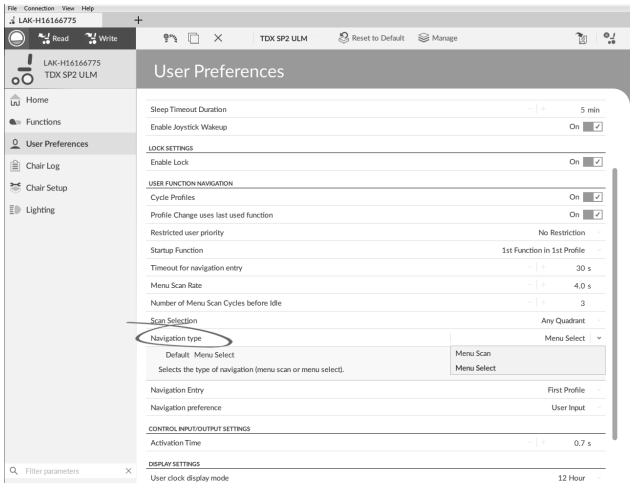


Fig. 9-106

Set parameter **Navigation Type** according to above table.

4. Set other parameters for indirect navigation to user's needs.
5. If parameter **Enable Timeout for Navigation Entry** is set to **Yes/On**, also parameter **Navigation Timeout Enabled** must be set to **Yes/On** (see step 6).

6.

iOS-Tool

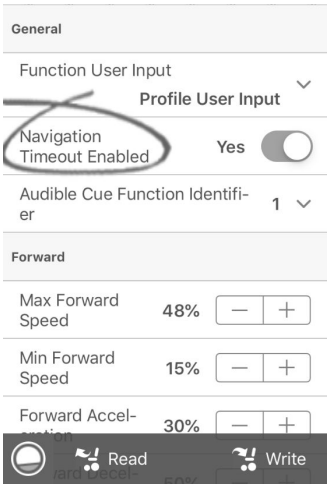


Fig. 9-107

PC-Tool

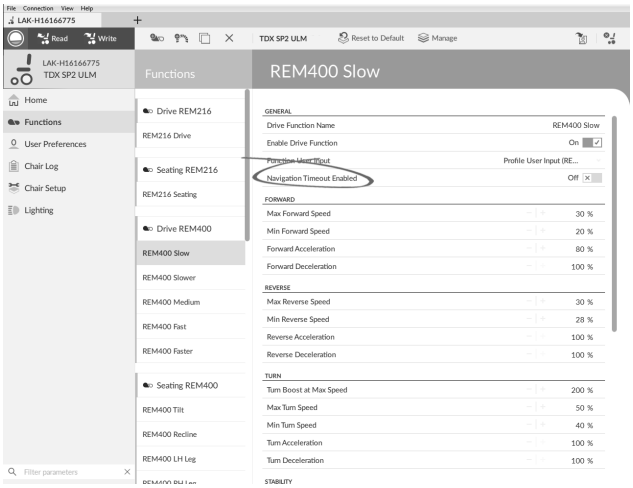


Fig. 9-108

Open desired function within current profile.

7. Set parameter **Navigation Timeout Enabled** to **Yes**/**On**.
   a. If **Enable Timeout for Navigation Entry** and **Navigation Timeout Enabled** are set to **No**/**Off**, program an external switch to enter navigation mode. See *9.15.6 Configuring External Switches, page 175*

Other Parameters in User Preferences

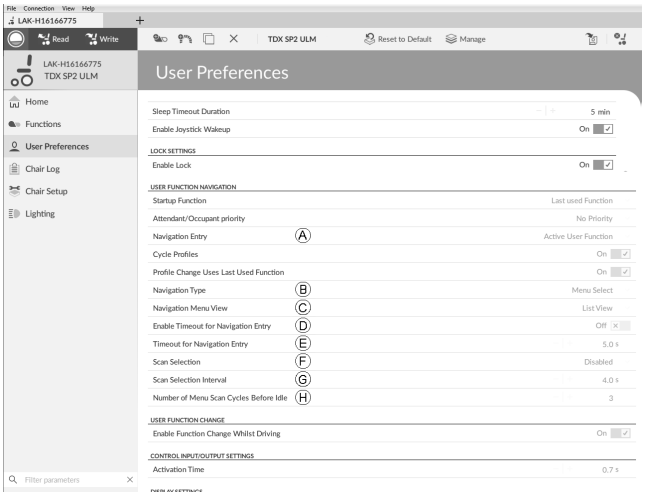


Fig. 9-109

Ⓐ	**Navigation Entry**: Sets entry point to menu.
Ⓑ	**Navigation Type**: Selects type of navigation.
	Navigation Menu View: Selects the navigation view (list or grid).
Ⓒ	**Enable Timeout for Navigation Entry** : Determines whether the LiNX system, in conjunction with a function's **Navigation Timeout Enabled** parameter, will time out into navigation mode. Both parameters must be set to On for the given function to time out.
Ⓓ	**Timeout for Navigation Entry**: Sets inactivity time required before system enters navigation mode. Navigation Timeout is indicated by ring symbol on remote's display. When **Timeout for Navigation Entry** is set to very low values, timeout indicator is not displayed.
Ⓔ	**Navigation Preference**: Selects whether navigation using touch interface has preference over navigation using user input. If user input is selected, display highlights current selection.
Ⓕ	**Scan Selection**: Configures which quadrants of Primary input can be used to make selections in**Menu Scan**.
Ⓖ	**Scan Selection Interval**: Sets the time available to make a selection after each menu option is presented during **Menu Scan**.
Ⓗ	**Number of Menu Scan Cycles before Idle**: Number of times menu is iterated through before going to idle, assuming no user selection, for **Menu Scan** only.

9.15 Configuring Control Input/Output (Control IO)

9.15.1 Configuring Control IO (iOS Tool)

For detailed information about Control IO, refer to *5.2.4 Overview Control Input / Output (Control IO), page 84*.

Select and Configure Control Input

1. From **Home** screen scroll down and tap on **Modules**.

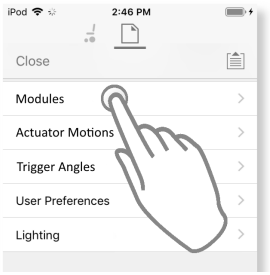


Fig. 9-110

2. Select module your system control input is connected to.
   For example, if you have a buddy button connected to one of CI pins on power module, select **Power Module**. If you want to use one of multipurpose buttons on REM400, select **REM 4xx**.

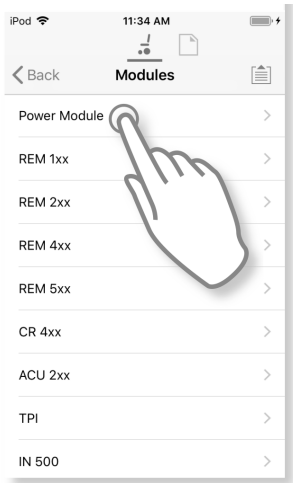


Fig. 9-111

3. Scroll down to **Port Settings** for control input.
   For example, if you want to add a power button to the left jack socket on a REM400, scroll down to **Left Jack Socket (J1) Tip — Port Settings**.

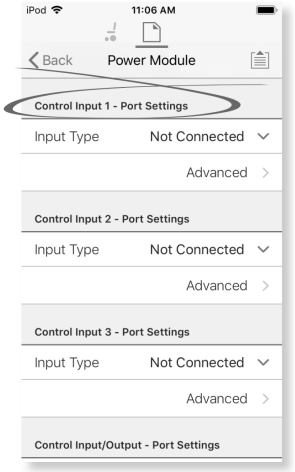


Fig. 9-112

4. Under **Port Settings** tap on **Input Type** to reveal which input types are available.
   Input types differ depending on module and your LiNX Access Key level. Input types available are one or more of following:

   - **Not Connected**
   - **10–Way Switch**
   - **Resistor Bands**
   - **Button**
   - **Power Button**
   - **Function Key**

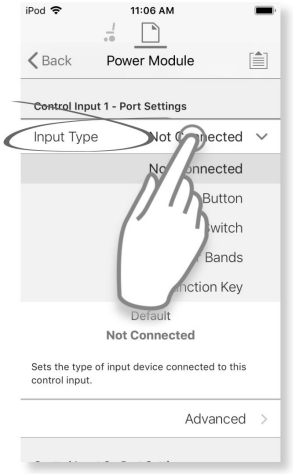


Fig. 9-113

5. Tap on one of displayed input types to reveal its control IO slot.

   - If **10–Way Switch** is selected, ten slots named **Switch 1** to **Switch 10** are displayed.
   - If **Resistor Bands** is selected, ten slots named **Band 1** to **Band 10** are displayed.
   - If **Button** is selected, four slots (button types) are displayed: **Momentary**, **Short Press**, **Long Press** and **On Press**.
   - If **Power Button** or **Function Key** is selected, no slots are displayed and no further action is required.

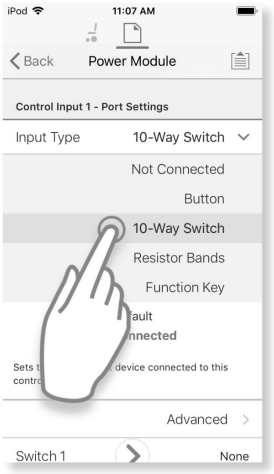


Fig. 9-114

6. Select and tap on desired slot to begin assigning system control output and action to selected control input.
   For more information about slot icons, refer to *5.2.4 Overview Control Input / Output (Control IO), page 84*.

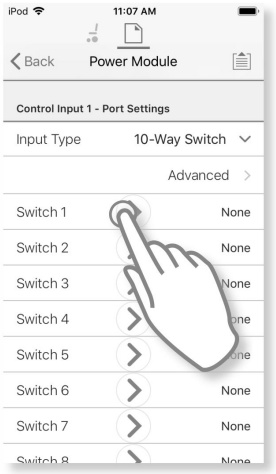


Fig. 9-115

Assign System Control Output and Action

7. Tap on one of displayed available system control outputs.

   - **Seating**
   - **Drive**
   - **Control Outputs**
   - **Functions**
   - **Navigation**
   - **Lighting**
   - **Horn**
   - **Connectivity**

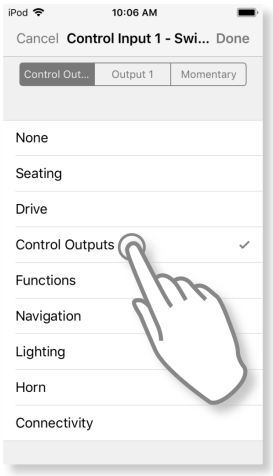


Fig. 9-116

8. Drill down through choices that follow to describe action for system control output. Note that system control output may have one or two choices to drill down through.

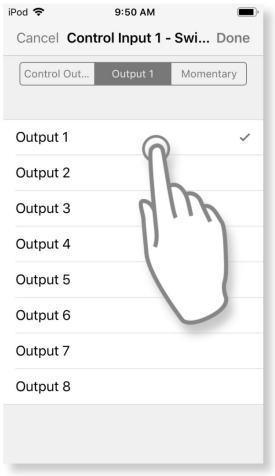


Fig. 9-117

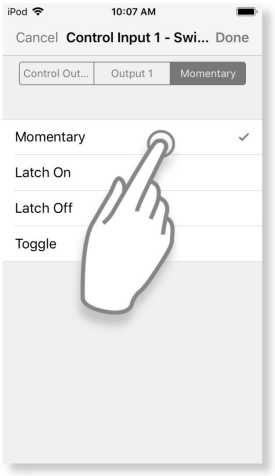


Fig. 9-118

9. When completed tap on **Done** (top right-hand corner). Summary of choices is displayed in output's slot.

Fig. 9-119

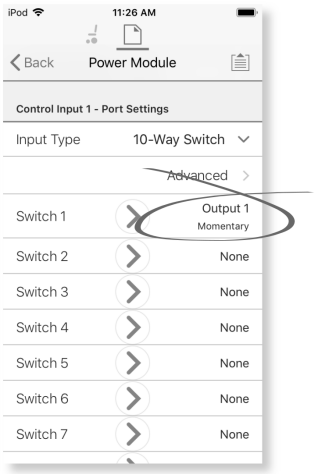


Fig. 9-120

9.15.2 Configuring Control IO (PC Tool)

For detailed information about Control IO, refer to *5.2.4 Overview Control Input / Output (Control IO), page 84*.

Select and Configure Control Input

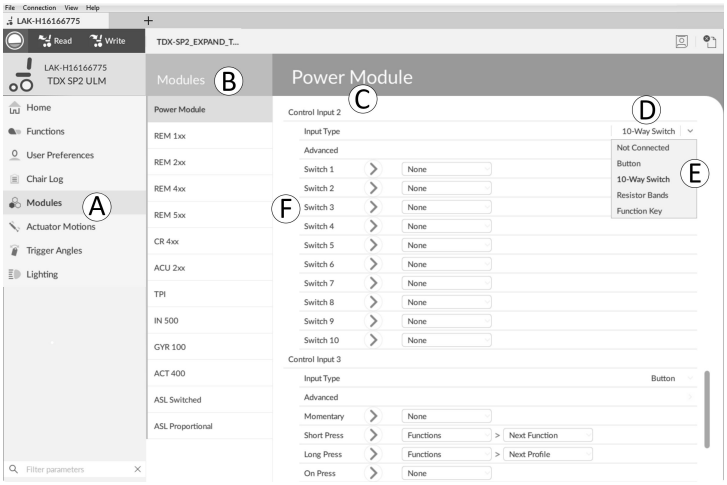


Fig. 9-121

1. Open **Modules** in first navigation sidebar Ⓐ.
2. From **Modules** sidebar Ⓑ select module your system control input is connected to.
   For example, if you have a buddy button connected to one of CI pins on power module, select **Power Module**. If you want to use one of multipurpose buttons on REM400, select **REM 4xx**.
3. Scroll down to **Port Settings** Ⓒ for control input you want to configure.
   For example, if you want to add a power button to the left jack socket on a REM400, scroll down to **Left Jack Socket (J1) Tip — Port Settings**.
4. Under **Port Settings** click on **Input Type** Ⓓ to reveal which input types are available.
   Input types differ depending on module and your LiNX Access Key level. Input types available are one or more of following:
   - **Not Connected**
   - **10–Way Switch**
   - **Resistor Bands**
   - **Button**
   - **Power Button**
   - **Function Key**
5. Click on one of displayed input types Ⓔ to reveal its control IO slot.
   - If **10–Way Switch** is selected, ten slots named **Switch 1** to **Switch 10** are displayed.
   - If **Resistor Bands** is selected, ten slots named **Band 1** to **Band 10** are displayed.
   - If **Button** is selected, four slots (button types) are displayed: **Momentary**, **Short Press**, **Long Press** and **On Press**.
   - If **Power Button** or **Function Key** is selected, no slots are displayed and no further action is required.
6. Select and click on desired slot Ⓕ to begin assigning output and action to selected control input.
   For more information about slot icons, refer to *5.2.4 Overview Control Input / Output (Control IO), page 84*.

Assign Output and Action

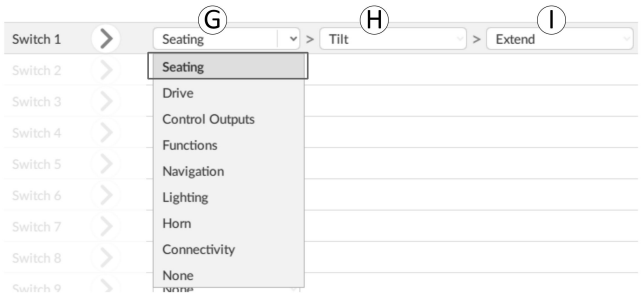


Fig. 9-122

7. Output and action are configured from one or more drop-down menus displayed in control IO slot. Click on first (left-most) drop-down menu Ⓖ to reveal available outputs.
   - **Seating**
   - **Drive**
   - **Control Outputs**
   - **Functions**
   - **Navigation**
   - **Lighting**
   - **Horn**
   - **Connectivity**
8. After selecting output, further one or two drop-down menus Ⓗ and Ⓘ are revealed. Moving left to right open each menu and select appropriate action for output.
   Note that output may have one or two menus to drill down through.

9.15.3 Configuring External Power Button

In this example, an external button is configured to be used as a power button. The external button is connected to the jack socket on the input module (IN500).

iOS Tool

1. From **Home** screen scroll down and tap on **Modules**.

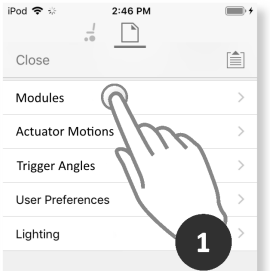


Fig. 9-123

2. Select **IN 500** module.

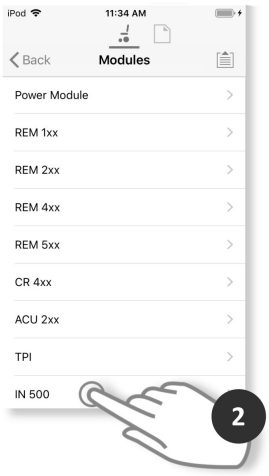


Fig. 9-124

3. Scroll down to **Jack Socket Tip — Port Settings** and tap on **Input Type**.

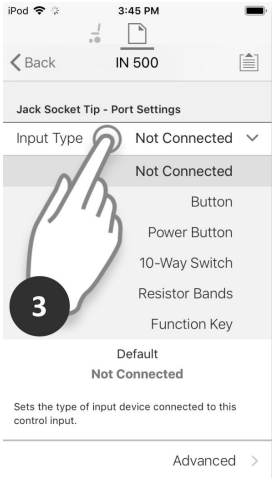


Fig. 9-125

4. Tap on **Power Button**.

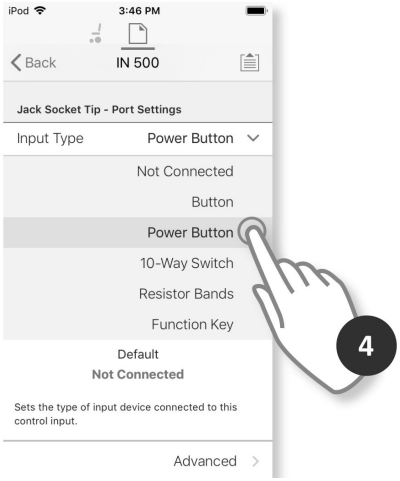


Fig. 9-126

The setup is complete. No more configuration is required.

PC Tool

1. Open **Modules** → **IN 500**.
2. Scroll down to **Jack Socket Tip**.

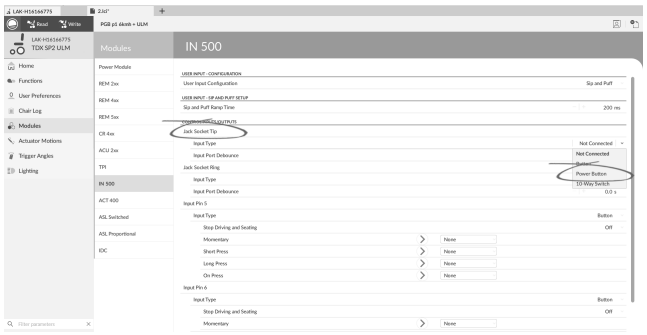


Fig. 9-127

3. Set **Input Type** to **Power Button**.

For more information about the other parameters such as **Input Port Debounce**, refer to *9.15.2 Configuring Control IO (PC Tool), page 165*

9.15.4 Configuring Mouse Clicks

In this example a buddy button is configured to perform a double left-click mouse operation. The buddy button is connected to the left jack socket on the REM400.

iOS Tool

Select and Configure Input

1. From **Home** screen scroll down and tap on **Modules**.

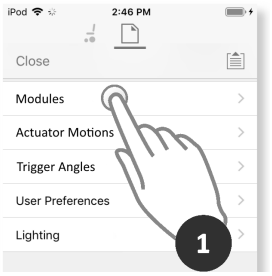


Fig. 9-128

2. Select **REM 4xx** module.

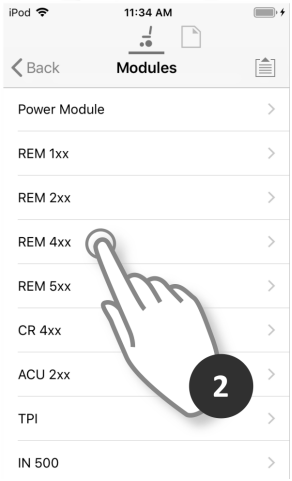


Fig. 9-129

3. Scroll down to **Left Jack Socket (J1) Tip — Port Settings** and tap on **Input Type**.

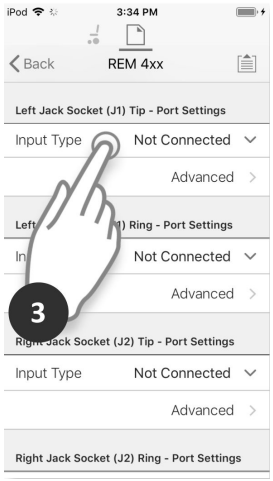


Fig. 9-130

4. Tap on **Button**.
5. Tap on **Momentary**.

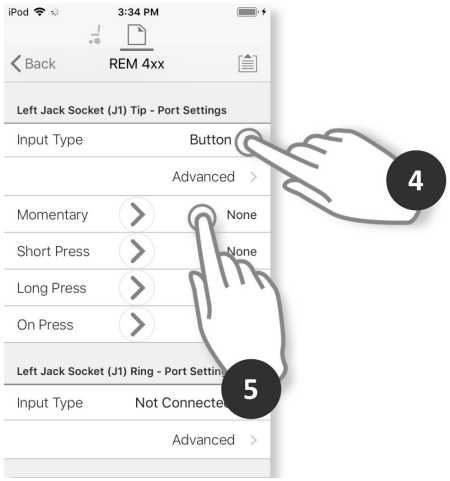


Fig. 9-131

Assign Output

6. Tap on **Connectivity**.

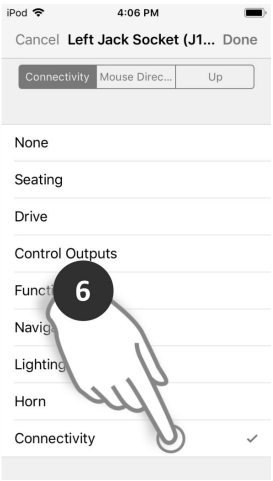


Fig. 9-132

7. Tap on **Mouse Left Click**.

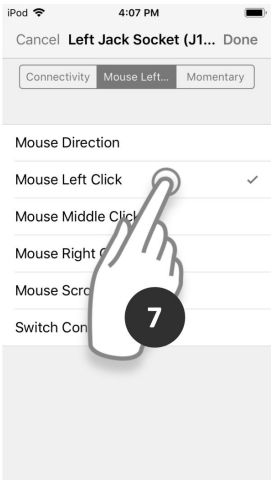


Fig. 9-133

8. Tap on **Double**.

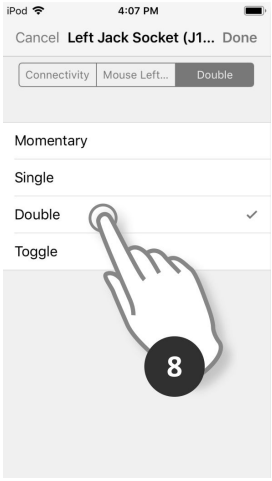


Fig. 9-134

9. Tap on **Done**.

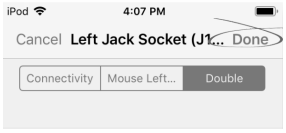


Fig. 9-135

The setup is complete. No more configuration is required.

PC Tool

1. Open **Modules** → **REM 4xx**.
2. Scroll down to **Input Type** of **Left Jack Socket (J1) Tip**.

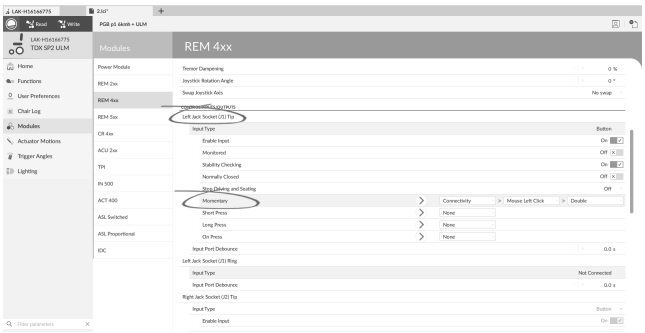


Fig. 9-136

3. Choose **Input Type**.
   Options are:
   - **Not Connected**
   - **Button**
   - **Power Button**
4. Click on **Button** to reveal control IO slots.
5. Choose **Momentary** slot.
6. Set displayed drop-down menus to **Connectivity** → **Mouse Left Click** → **Double**.

ⓘ For more information about the other parameters such as **Input Port Debounce**, refer to *9.15.2 Configuring Control IO (PC Tool), page 165*

9.15.5 Configuring Toggle Switches

ⓘ Left Toggle Forward and Right Toggle are set with a default configuration, that can be changed.

In this example, the left toggle button on the REM400 is configured to control output pin 3 on the output module (OUT500). For the duration that the left toggle button is pushed forward, pin 3 on the output module will be active.

iOS Tool

Select and Configure Input

1. From **Home** screen scroll down and tap on **Modules**.

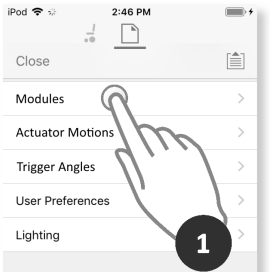


Fig. 9-137

2. Select **REM 4xx** module.

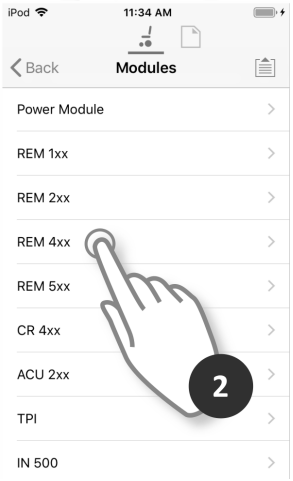


Fig. 9-138

3. Scroll down to **Left Toggle Forward — Port Settings** and tap on **Input Type**.

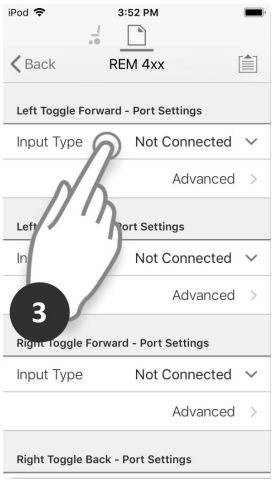


Fig. 9-139

4. Tap on **Button**.
5. Tap on **Momentary**.

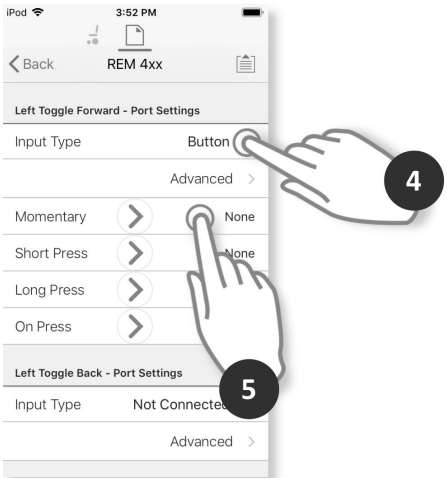


Fig. 9-140

Assign Output

6. Tap on **Control Outputs**.

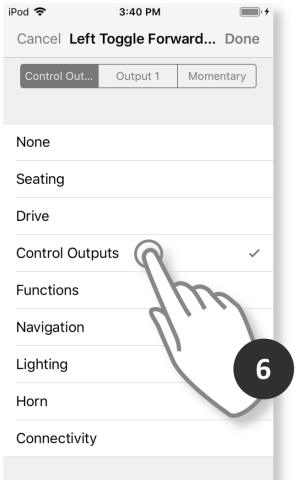


Fig. 9-141

7. Tap on **OUT 3**.

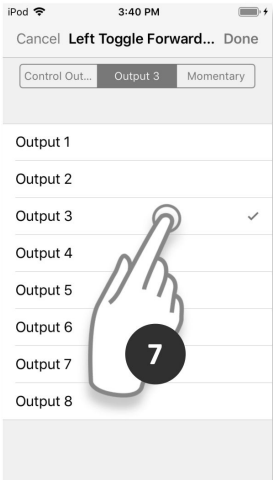


Fig. 9-142

8. Tap on **Momentary**.

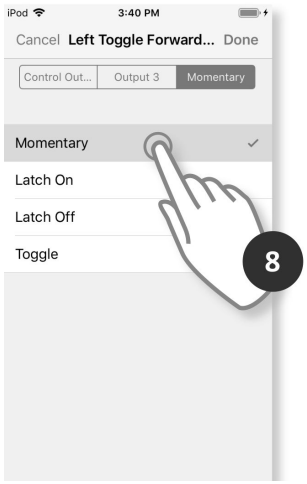


Fig. 9-143

9. Tap on **Done**.

Fig. 9-144

PC Tool

1. Open **Modules** → **REM 4xx**.
2. Scroll down to **Input Type** of **Left Toggle Back**.

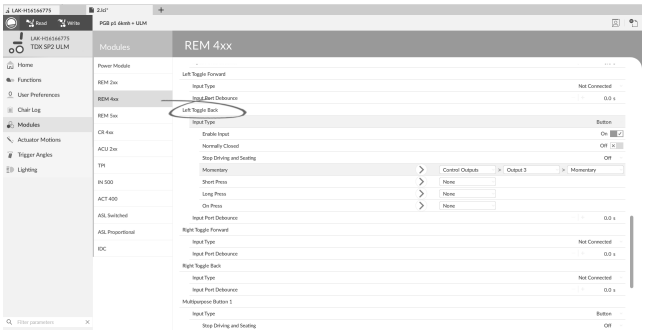


Fig. 9-145

3. Choose **Input Type**.
   Options are:
   - **Not Connected**
   - **Button**
   - **Power Button**
4. Click on **Button** to reveal control IO slots.

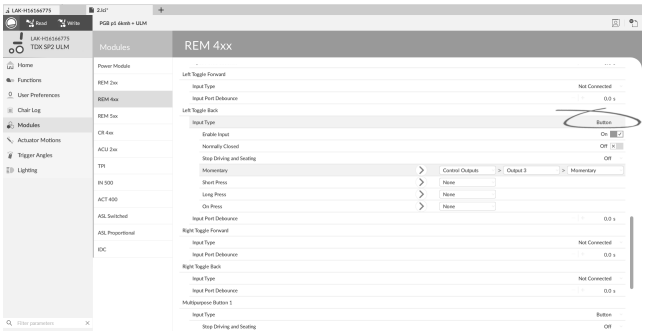


Fig. 9-146

5. Choose **Momentary** slot.

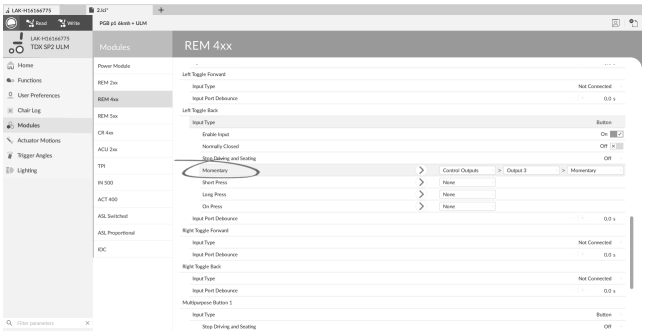


Fig. 9-147

6. Set displayed drop-down menus to **Control Outputs** → **Output 3** → **Momentary**.

For more information about the other parameters such as **Input Port Debounce**, refer to or *9.15.2 Configuring Control IO (PC Tool), page 165*

9.15.6 Configuring External Switches

Left Jack Socket (J1) Tip is set with a default configuration that can be changed.

In this example, a 10–way switch connected to the jack socket of the DLX-REM400 is configured.

1. Open **Modules** –> **REM 4xx**.
2. Scroll down to **Input Type** of **Left Jack Socket (J1) Ring**.
3. Choose **Input Type**.
   Options are:
   - **Not Connected**
   - **Button**
   - **10–Way Switch**

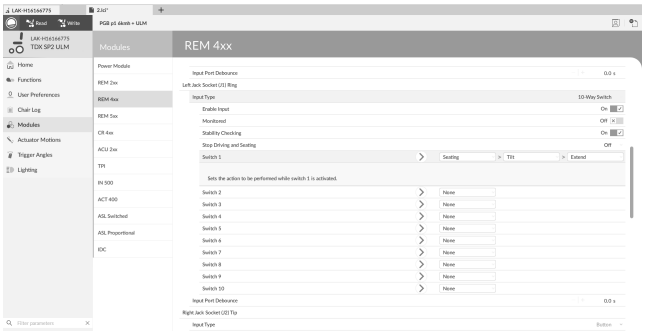


Fig. 9-148

4. Click on **10–Way Switch** to reveal control IO slots **Switch 1** to **Switch 10**.
   Choose desired slot.

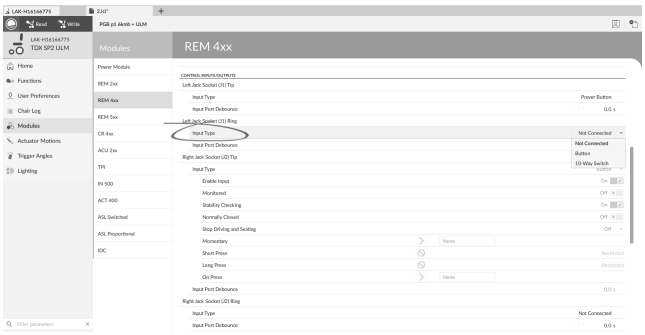


Fig. 9-149

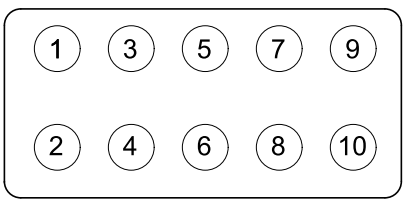


Fig. 9-150 Bands on 10–Way Switch

5. Click on first (left-most) drop-down menu to reveal available outputs.
   The options are:
   - **Seating**
   - **Drive**
   - **Control Outputs**
   - **Functions**
   - **Navigation**
   - **Lighting**
   - **Horn**
   - **Connectivity**

   For more information about available outputs, refer to *5.2.4 Overview Control Input / Output (Control IO), page 84*.

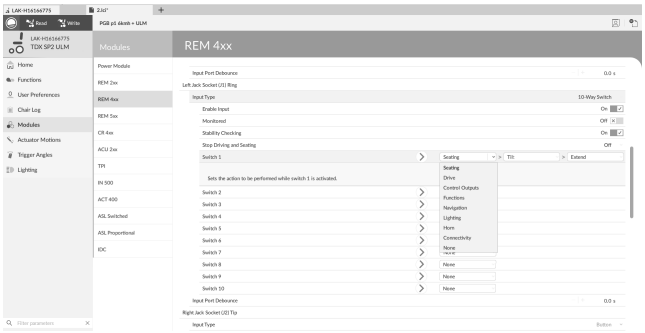


Fig. 9-151

6. After selecting output, further one or two drop-down menus are revealed. Moving left to right open each menu and select appropriate action for output.

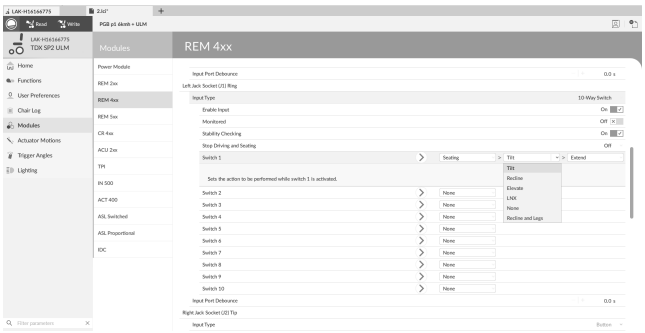


Fig. 9-152

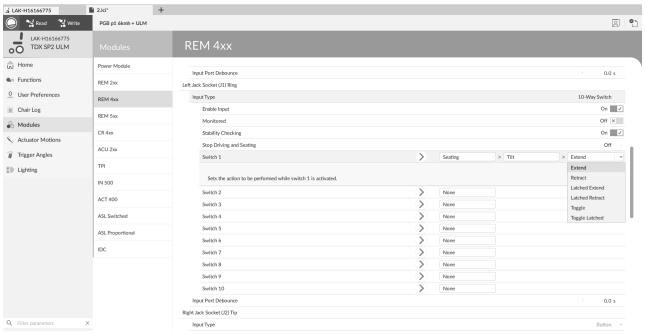


Fig. 9-153

Other Parameters

For more information about the other parameters such as **Input Port Debounce**, refer to *9.15.2 Configuring Control IO (PC Tool), page 165*

9.15.7 Programming Multipurpose Buttons

In this example, the Multipurpose Button 1 is configured to turn on the position lights.

1. Open **Modules** → **REM 4xx**.
2. Scroll down to **Input Type** of **Multipurpose Button 1**.

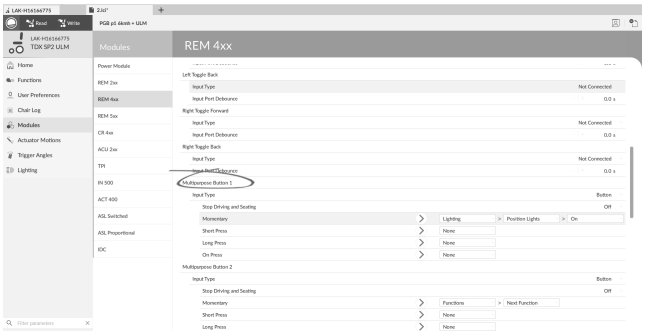


Fig. 9-154

3. Choose **Momentary** slot.

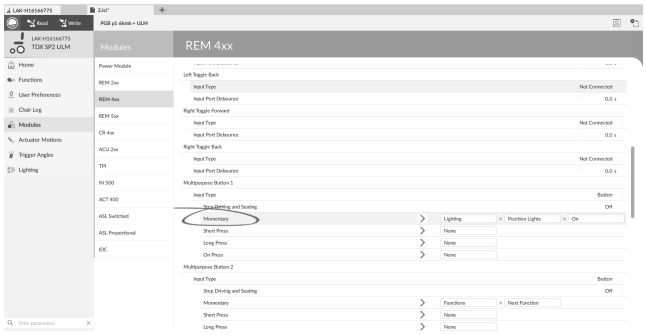


Fig. 9-155

4. Set displayed drop-down menus to **Lighting** → **Position Lights** → **On**.

For more information about the other parameters such as **Stop Driving and Seating**, refer to *9.15.2 Configuring Control IO (PC Tool), page 165*

9.16 Conditional Control IO

The LiNX system now supports conditional control IO, extending the current always rule-based model, where a single output action is always activated in response to a single input action. With the introduction of conditional control IO, now the following rules can be created:

- multiple always rules — one or more outputs are always activated from a single input,
- conditional rules — one or more outputs are activated from a single input if the specified conditions are true,
- conditional/else rules — an output is activated from a single input if a specified condition is true, else (otherwise) an alternative output is activated if the same specified condition is false.

The benefit of conditional IO is two-fold. Firstly, a single input can now activate multiple outputs. Secondly, control inputs can be overloaded. Overloading is where a single input can have multiple uses, each of which depends on specified conditions. This means that an input can be used to activate one output if the system is in one state or function, and then activate a different output when the system is in another state or function. For example, a buddy button that is used to stop a wheelchair when driving can also be used to extend a seating motion when in a seating function.

Creating Rules

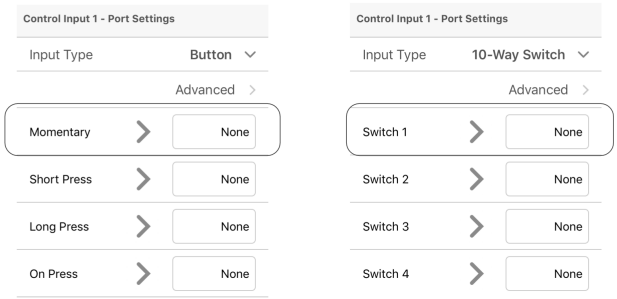


Fig. 9-156

All rules are defined from a control input's control IO slot, such as the Momentary control IO slot for when the input type is set to button, or Switch 1 control IO slot for when the input type is set to 10–way switch.

First of all a control input must be set up, see *9.15 Configuring Control Input/Output (Control IO), page 163*

To create any rule for an input, assign conditions and outputs or just outputs.

Assigning Condition and Output with iOS Tool

1. Select desired control IO slot to reveal **Add Rule** button.

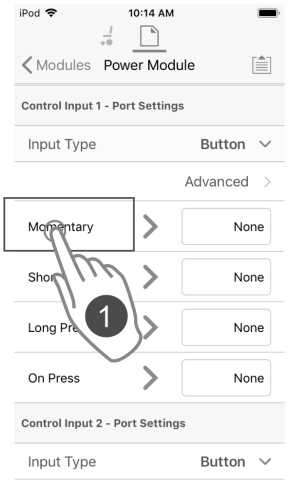


Fig. 9-157

2. To assign condition to rule, select **Add Rule** button.
   Condition list is displayed.

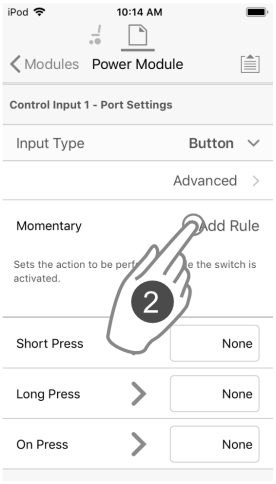


Fig. 9-158

3. Select desired condition.
   Condition button Ⓐ displays choice.
4. To assign output to rule, select output button Ⓑ.
   Output list is displayed.

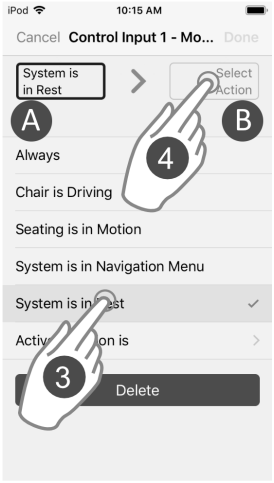


Fig. 9-159

5. Select desired output.

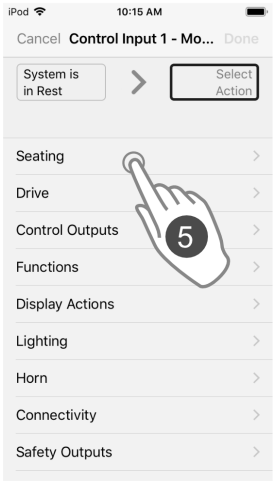


Fig. 9-160

6. If more output lists are displayed, drill down through options as presented.

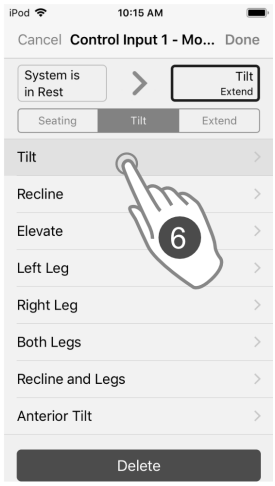


Fig. 9-161

7. Select desired outputs.
8. Select **Done**.
   Summary of rule is displayed in control IO slot

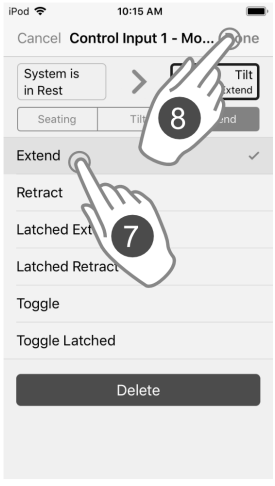


Fig. 9-162

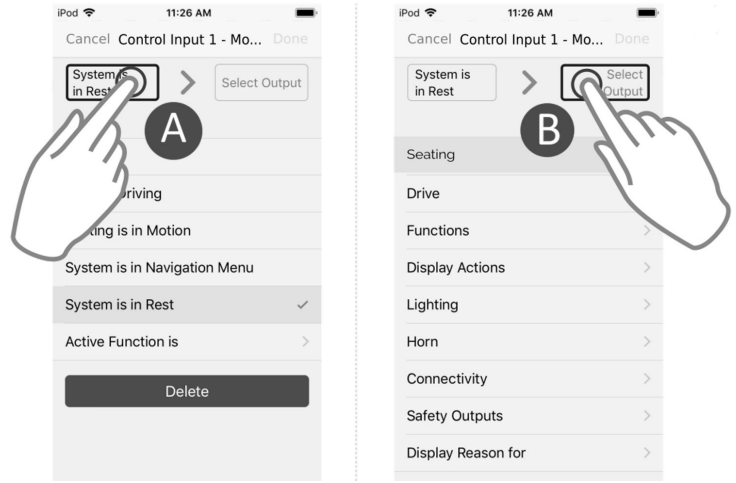


Fig. 9-163

It can be switched between viewing conditions list and output list easily, by using condition button Ⓐ and output button Ⓑ.

Directly Assigning Output Only with iOS Tool

Outputs are selected from the output list. If no rules have yet been defined, the output list can be opened immediately by selecting the box on the right-hand side of the control IO slot.

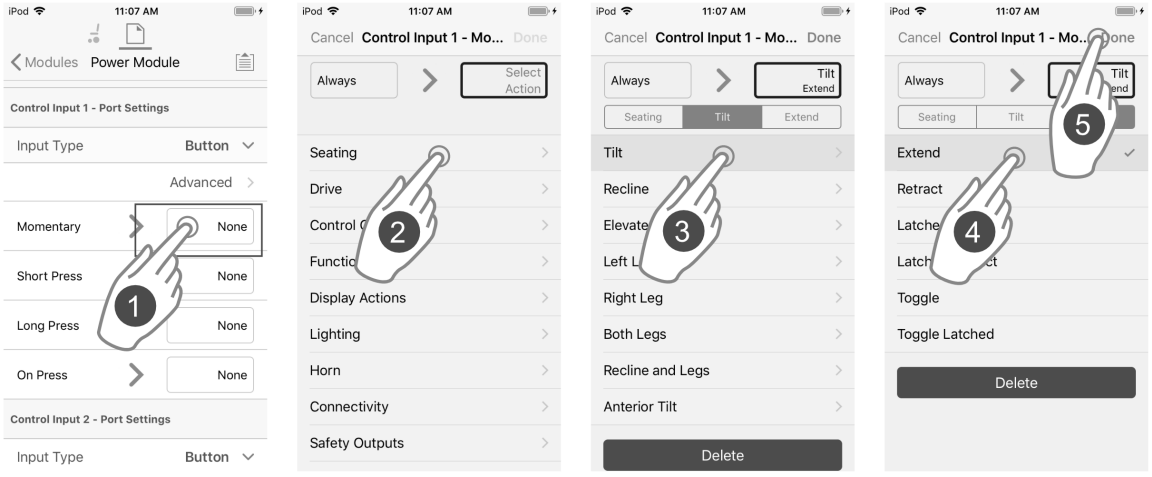


Fig. 9-164

1. Select box on right-hand side of desired control IO slot.
2. Make sure **Select Output** button is highlighted and select desired output.
3. If more output lists are displayed, drill down through options as presented.
4. Select desired outputs.
5. Select **Done**.
   Summary of rule is displayed in control IO slot

Indirectly Assigning Output Only with iOS Tool

If a rule already exists, further outputs can be added.

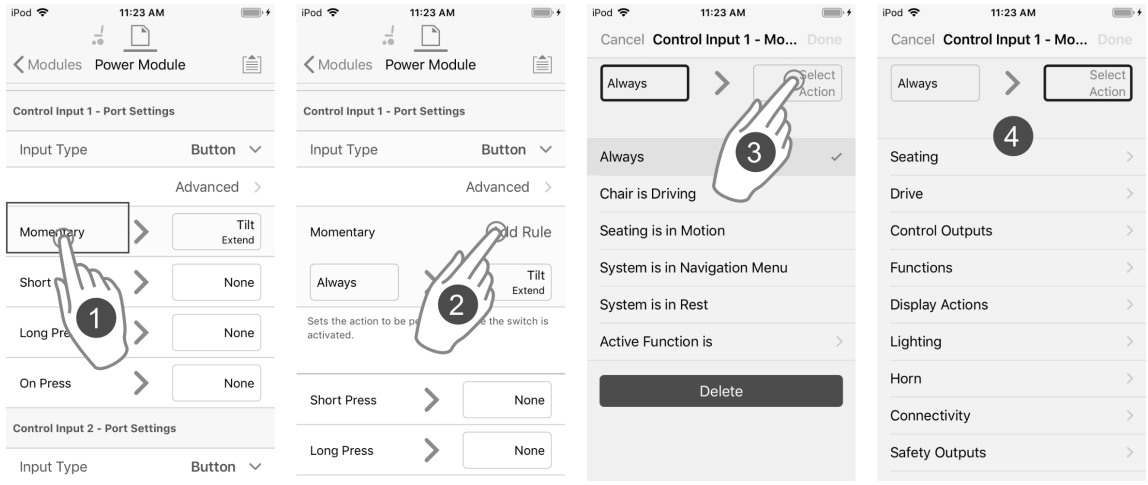


Fig. 9-165

1. Select desired control IO slot to reveal **Add Rule** button.
2. Select **Add Rule** button.
3. Select output button.
4. Select desired output.
5. If more output lists are displayed, drill down through options as presented.
6. Select desired outputs.
7. Select **Done**.
   Summary of rule is displayed in control IO slot

Assigning Condition and Output with PC Tool

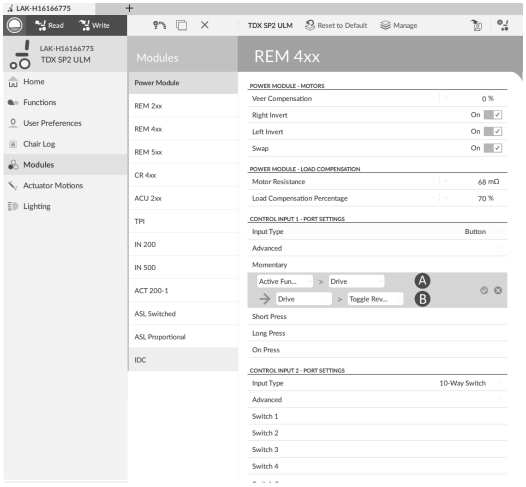


Fig. 9-166

Ⓐ Condition slot: to assign desired condition to rule

Ⓑ Output slot: to assign desired output to rule

1.

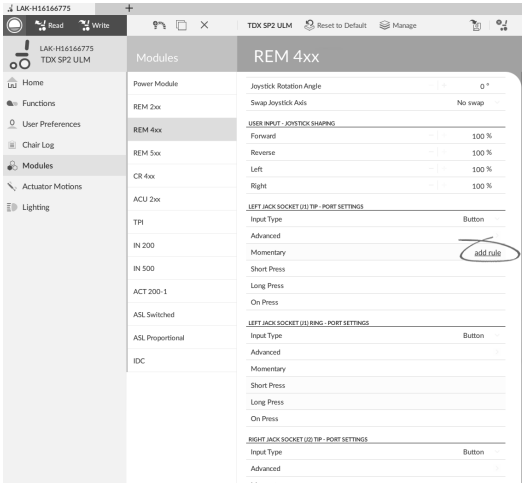


Fig. 9-167

Select desired Control IO slot to reveal **Add Rule** button.

2.

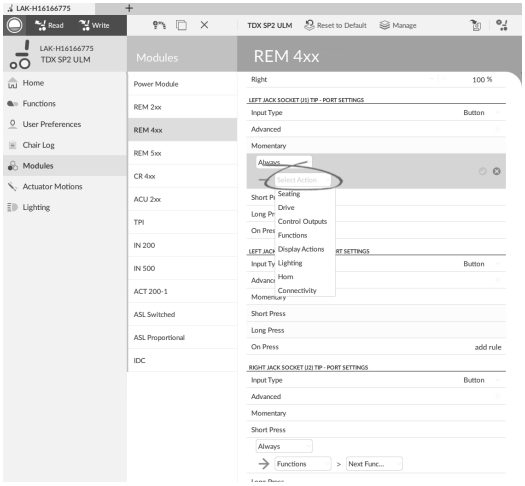


Fig. 9-168

To assign condition to rule, select desired condition from drop-down menu in condition slot.

3.

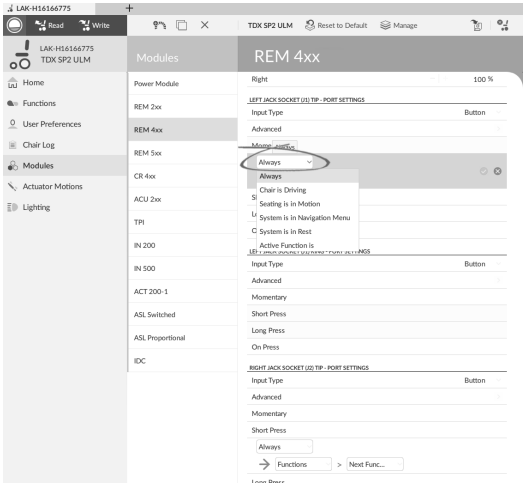


Fig. 9-169

To assign output to rule, select desired output from drop-down menu in output slot.

4.

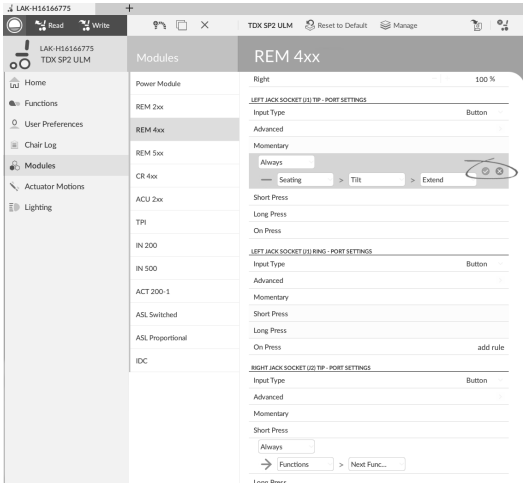


Fig. 9-170

To save rule, choose green check mark.
To delete rule, choose red cross.

9.16.1 Always Rule

An always rule can be used to assign one or more outputs to an input with no conditions. To create an always rule, simply specify an input and assign one or more outputs to it. Since there are no conditions, an always rule can be written as:

```
on [input]
   activate [output]
```

This states whenever the [input] is triggered, the [output] assigned to the [input] is always activated. It does not depend on any condition such as the state of the system or which function the user is currently operating in — if the input is triggered, the output is activated.

An always rule can have multiple outputs, which can be written as:

```
on [input]
   activate [output-1]
   activate [output-2]
   ...
   ...
   activate [output-n]
```

This states whenever the [input] is triggered, activate all [outputs] assigned to the [input] simultaneously.

Adding Multiple Always Rule

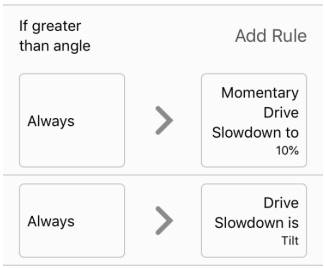


Fig. 9-171

In this example a multiple always rule is added to determine the output from a single momentary action on a button, connected to the CI-1 pin on a power module:
Whenever the button is pressed [input] the wheelchair always stops driving [output-1], and the navigation menu is always entered [output-2].

The rule looks like this:

on	[momentary action to button]
	activate [Drive Stop]
	activate [Enter Navigation Menu]

- Rule output 1: wheelchair stops driving
- Rule output 2: Navigation menu is entered

Adding Rule with iOS Tool

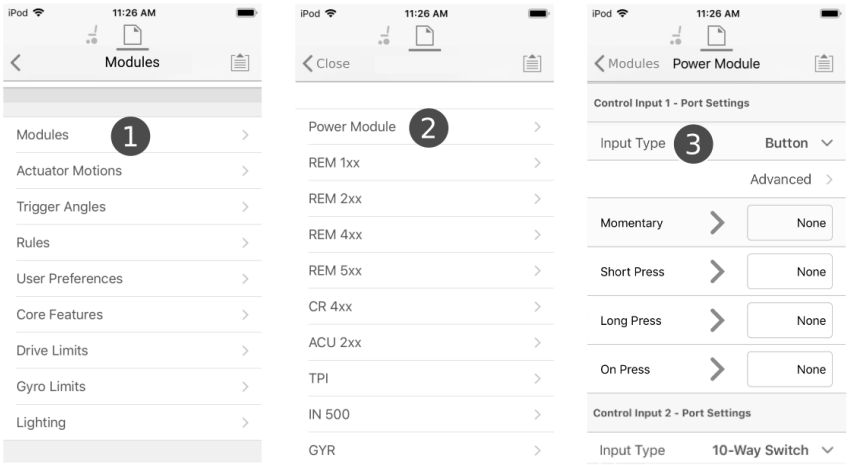


Fig. 9-172

1. Open **Modules** –> **Power Module**.
2. Go to **Control Input 1 – Port Settings**.
3. Set **Input Type** to **Button**.

Assign Rule Output 1

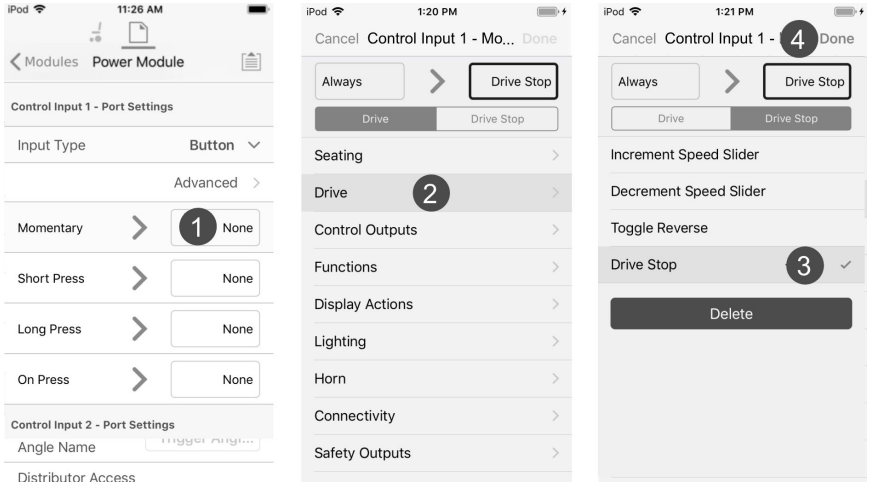


Fig. 9-173

1. Select box on right-hand side of **Momentary** slot.
2. Make sure output button is highlighted and select **Drive**.
3. Select **Drive Stop**.
4. Select **Done**.

Assign Rule Output 2

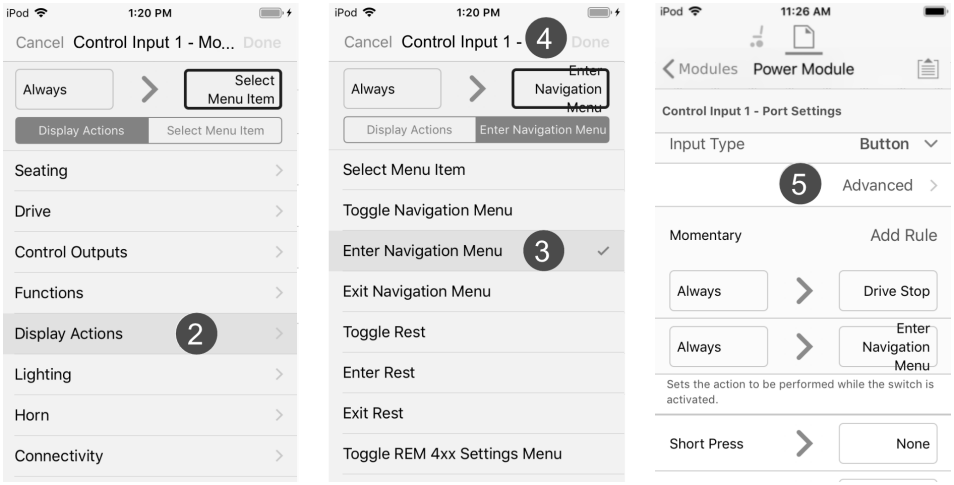


Fig. 9-174

1. Select **Add Rule** button.
2. Select **Display Actions**.
3. Select **Enter Navigation Menu**.
4. Select **Done**.
5. Multiple always rule summary is displayed.

Adding Rule with PC Tool

1.

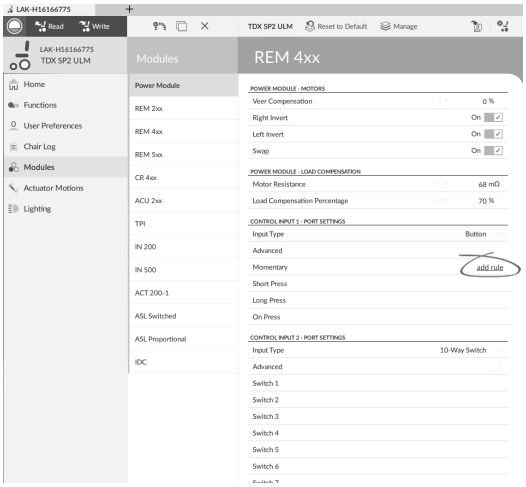


Fig. 9-175

Select desired Control IO slot to reveal **Add Rule** button.

Assign Rule Output 1

2.

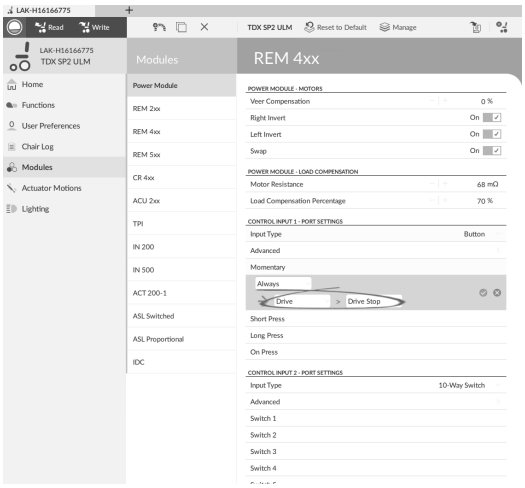


Fig. 9-176

Assign condition **Always** to condition slot.
Assign output **Drive** –> **Drive Stop** to output slot.

3.

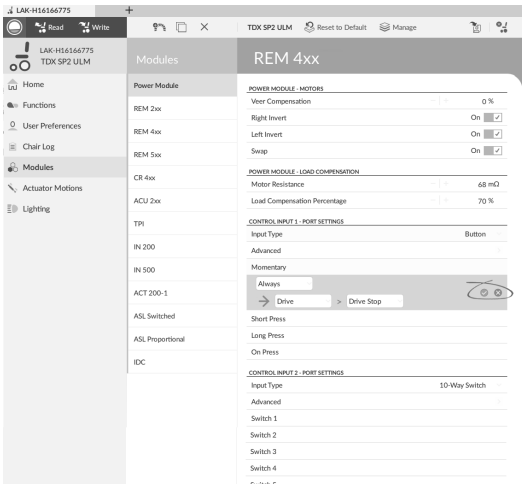


Fig. 9-177

Save rule.

Assign Output Rule 2

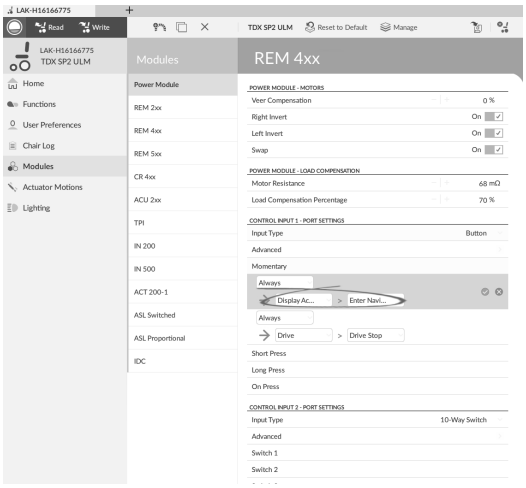
4. Select **Add Rule** button.
5. 

Fig. 9-178

Assign condition **Always** to condition slot.
Assign output **Display Action –> Enter Navigation Menu** to output slot.

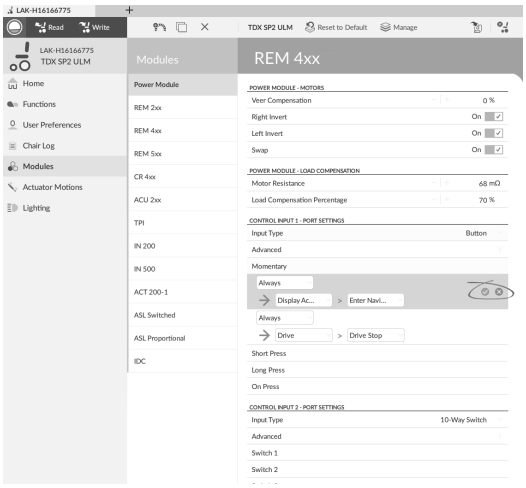
6. 

Fig. 9-179

Save rule.

9.16.2 Conditional Rule

A conditional rule can be used to activate an output from an input, subject to a condition. That is, whenever the input is triggered, only an output whose condition is true is activated. To create a conditional rule, you need to select an [input] and specify one [condition] and one [output]. The conditional rule can be written as:

```
on   [input]
     if [condition] is true, activate [output]
```

This rule states whenever the [input] is triggered, activate the [output] if the [condition] is true. If the [condition] is false, the [output] is not activated.

An input can be assigned multiple conditional rules which can be written as:

```
on   [input]
     if [condition-1] is true, activate [output-1]
     if [condition-2] is true, activate [output-2]
     ...
     ...
     if [condition-n] is true, activate [output-n]
```

This rule states whenever the [input] is triggered:

- activate [output-1] if [condition-1] is true,
- activate [output-2] if [condition-2] is true,
- and so on, up to number (n) of conditional rules defined.
- If any of the conditions are false, the respective output is not activated.

When assigned multiple rules, each condition is evaluated individually and so it's possible that multiple outputs are activated at the same time if more than one of those conditions is true. This may or may not be the intention.

A conditional rule can also be assigned multiple outputs, which can be written as:

```
on  [input]
    if [condition] is true,
        activate [output-1]
        activate [output-2]
        activate [output-3]
```

This rule states whenever the [input] is triggered, activate [output-1], [output-2] and [output-3] simultaneously if the [condition] is true.

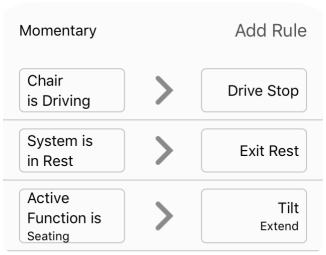


Fig. 9-180

Three conditional rules assigned to the momentary input of the button connected to the power module. When the button is pressed:

- if the wheelchair is driving [condition-1], the wheelchair stops driving [output-1],
- if the wheelchair is in rest state [condition-2], the system exits rest state [output-2],
- if the active function is a seating function [condition-3], the wheelchair activates a tilt [output-3].

Adding Conditional Rule

In this example, two conditional rules are added to determine the output from a single momentary action on a button, connected to the CI-1 pin on the power module:
If the wheelchair is driving [condition-1] when the button is pressed [input], the wheelchair starts to toggle reverse [output-1]. If the Mouse Mover function is activated [condition-2] when the button is pressed [input], a single left click [output-2] is performed.

The rule looks like this:

```
on  [momentary action to button]
    if [in Drive function] is true,
        activate [toggle reverse]
    if [in Mouse Mover function] is true,
        activate [single left click]
```

- Rule output 1: if the wheelchair is driving, toggle reverse.
- Rule output 2: if in Mouse Mover function, activate a single left click.

Adding Rule With iOS Tool

Select Input Type

1. Open **Modules** –> **Power Module** –> **Control Input 1 – Port Settings**.
   Set **Input Type** to **Button**.

Assign Rule Output 1

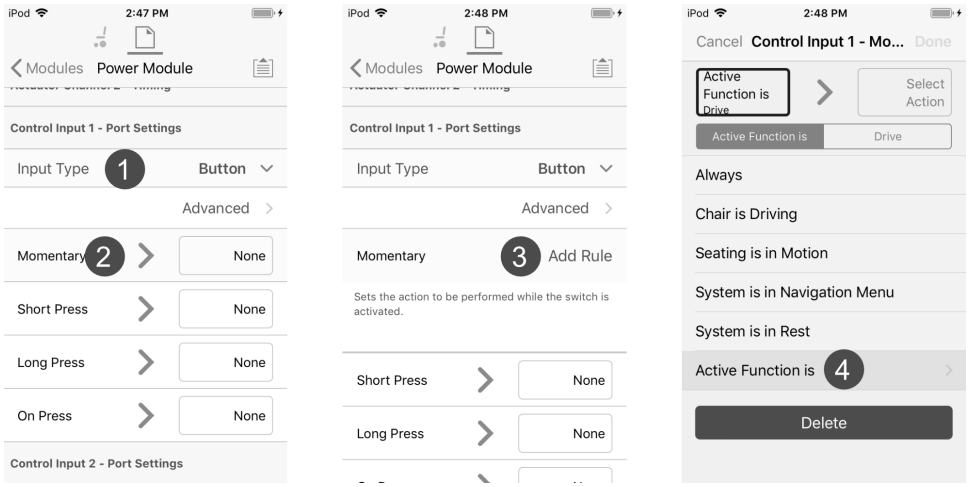


Fig. 9-181

2. Select **Momentary** input item.
3. Select **Add Rule** button.
4. Select **Active Function is**.
5.

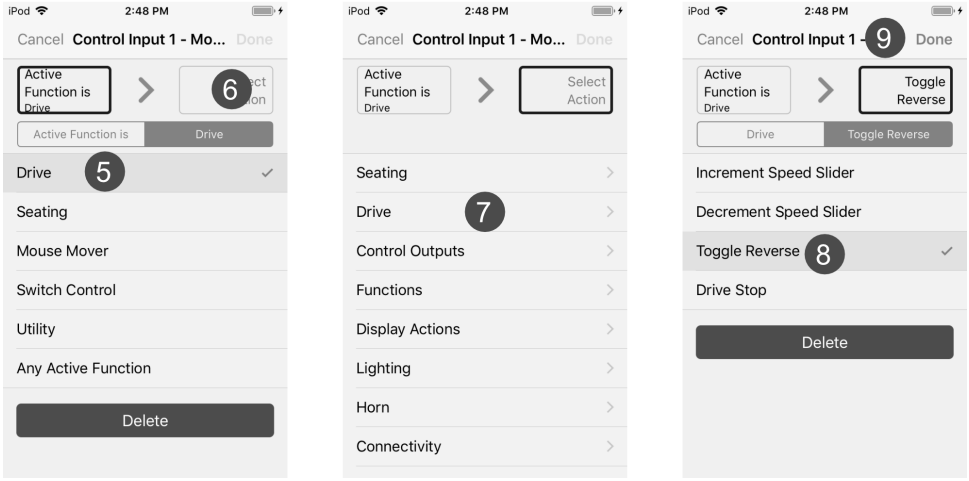


Fig. 9-182

   Select **Drive**.
6. Select output button.
7. Select **Drive**.
8. Select **Toggle Reverse**.
9. Select **Done**.

Assign Rule Output 2

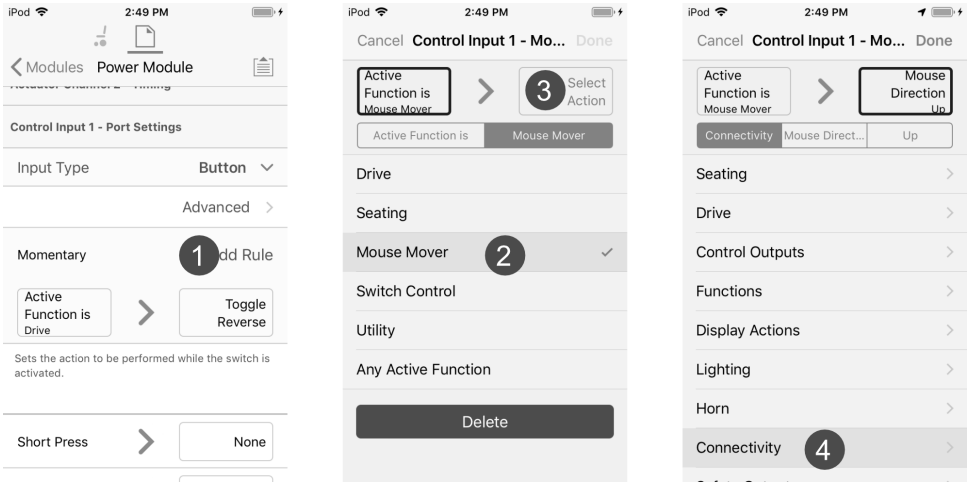


Fig. 9-183

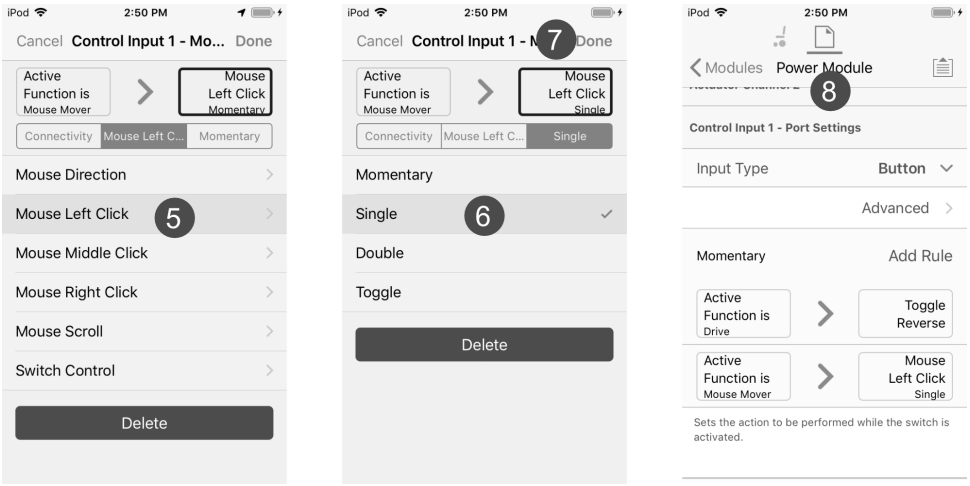
1. Select **Add Rule** button.
2. Select **Mouse Mover**.
3. Select output button.
4. Select **Connectivity**.
5. 

Fig. 9-184

   Select **Mouse Left Click**.
6. Select **Single**.
7. Select **Done**.
8. Conditional rule summary is displayed.

Adding Rule with PC Tool

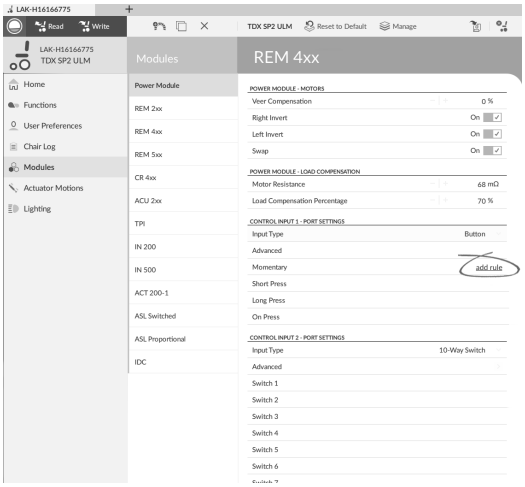
1. 

Fig. 9-185

   Select desired Control IO slot to reveal **Add Rule** button.

Assign Rule Output 1

2.

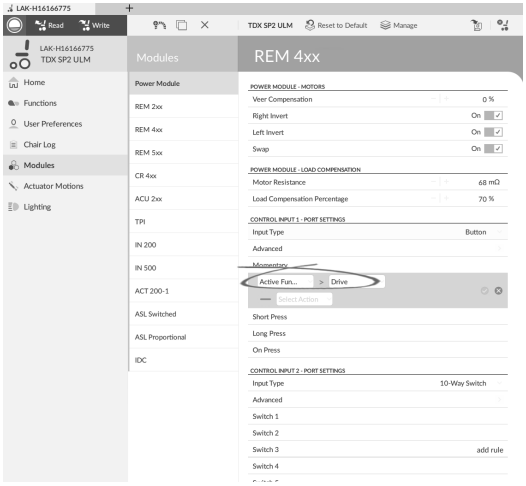


Fig. 9-186

Assign condition **Active Function is –> Drive** to condition slot.

3.

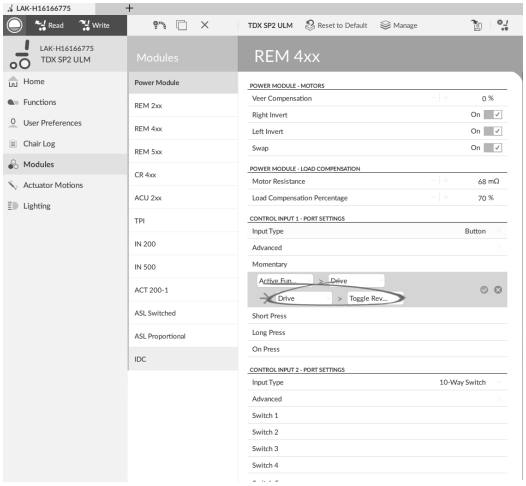


Fig. 9-187

Assign output **Drive –> Toggle Reverse** to output slot.

4.

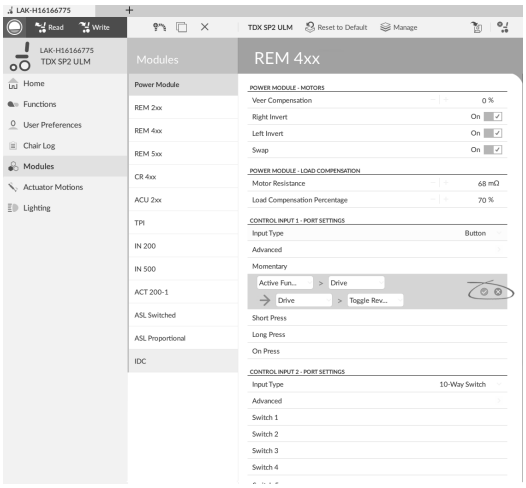


Fig. 9-188

Save rule.

Assign Output Rule 2

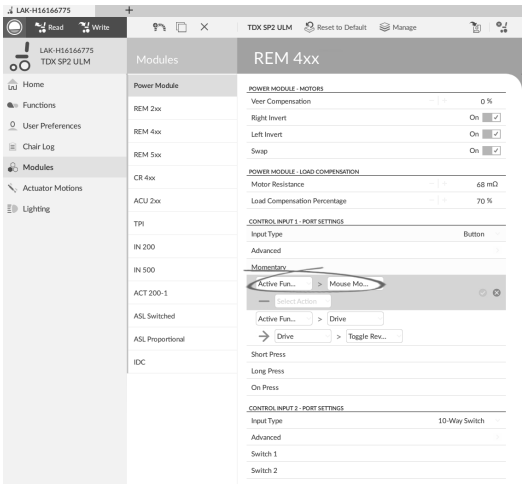
5. Select **Add Rule** button.
6. 

Fig. 9-189

Assign condition **Active Function is** –> **Mouse Mover** to condition slot.

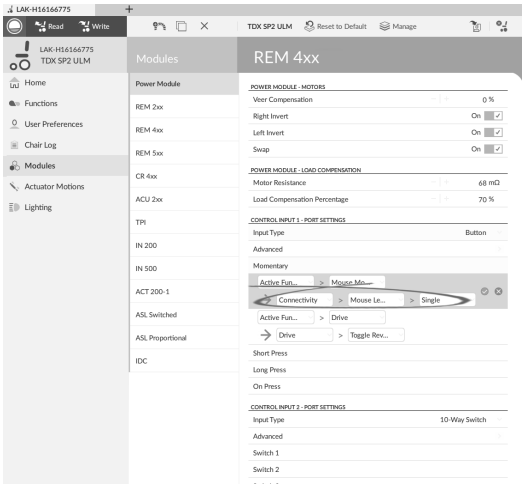
7. 

Fig. 9-190

Assign output **Connectivity** –> **Mouse Left Click** –> **Single** to output slot.

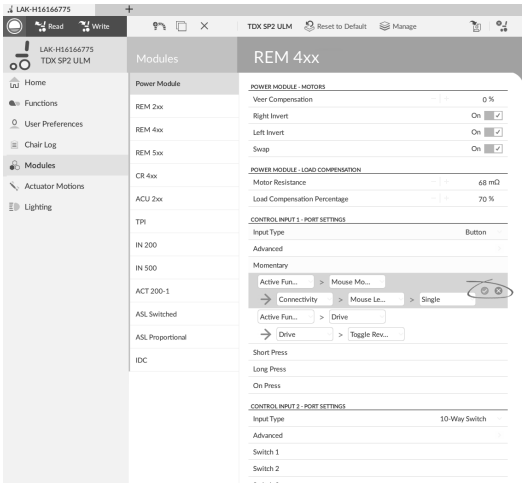
8. 

Fig. 9-191

Save rule.

9.16.3 Conditional/Else Rule

A conditional/else rule allows you to activate an output from a single input if a specified condition is true. Else an alternative output is activated if the condition is false. To create a conditional/else rule, you need to select an [input], a

[condition] and two outputs [output-1] and [output-2]. The first output you specify activates if the [condition] is true. Else the second output activates if the [condition] is false. The conditional/else rule can be written as:

```
on  [input]
    if [condition] is true, activate [output-1]
    else activate [output-2]
```

Adding Conditional/Else Rule

Fig. 9-192

In this example a conditional/else rule is added to determine the output from a single momentary action on a button, connected to the CI-1 pin of the power module:
If the system is in rest [condition] when the button is pressed [input], the system exits rest [output-1]. Else the system enters rest [output-2], if the system is not in rest, when the button is pressed.

The rule looks like this:

```
on  [momentary action to button]
    if [system is in Rest] is true, activate [Exit Rest]
    else activate [Enter Rest]
```

- Rule output 1: Exit Rest (if in Rest state).
- Rule output 2: Enter Rest (else).

Adding Rule With iOS Tool

Select Input Type

1. Open **Modules** –> **Power Module** –> **Control Input 1 – Port Settings**.
   Set **Input Type** to **Button**.

Assign Rule Output 1

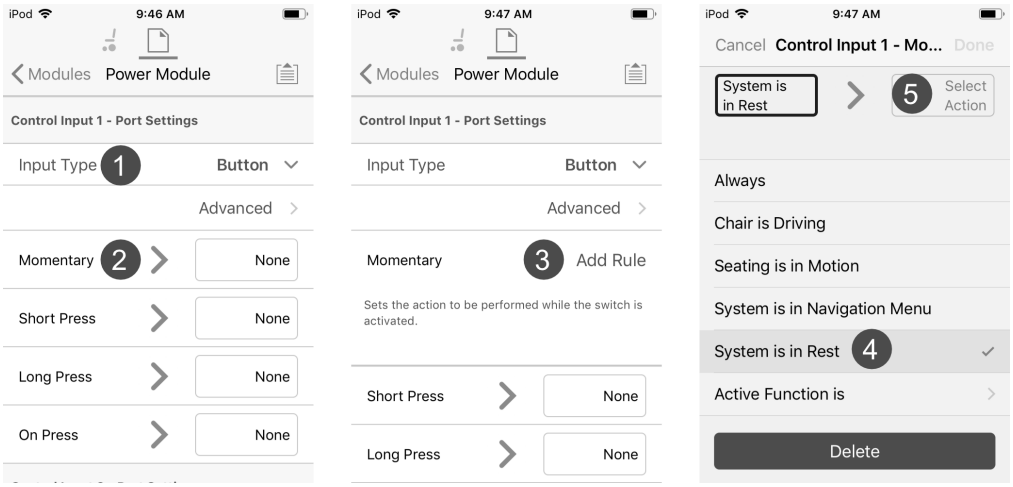


Fig. 9-193

2. Select **Momentary** input item.
3. Select **Add Rule** button.
4. Select **System is in Rest**.
5. Select output button.
6. Select **Display Actions**.
7. Select **Exit Rest**.
8. Select **Done**.

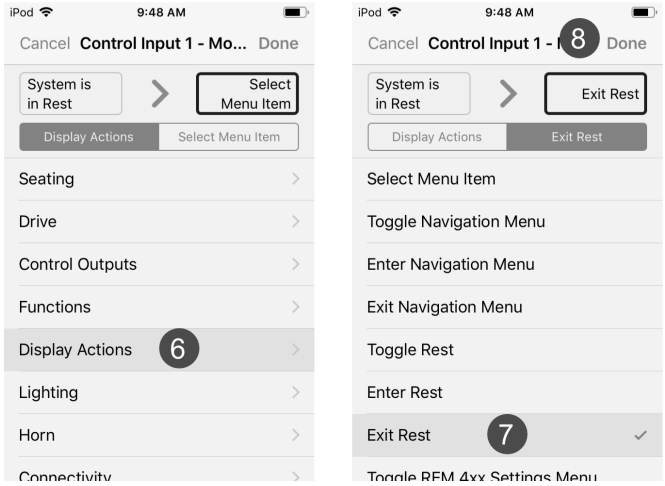


Fig. 9-194

Assign Rule Output 2

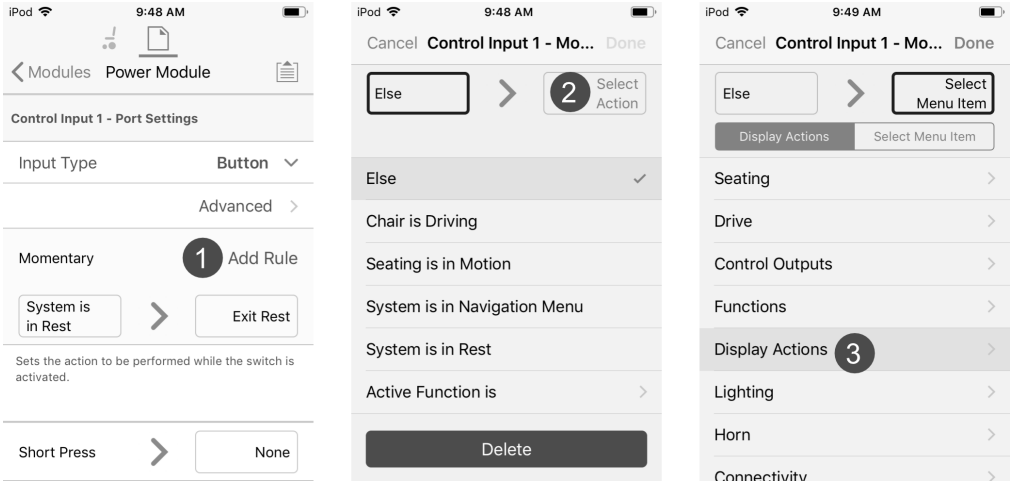


Fig. 9-195

1. Select **Add Rule** button.
2. Select output button.

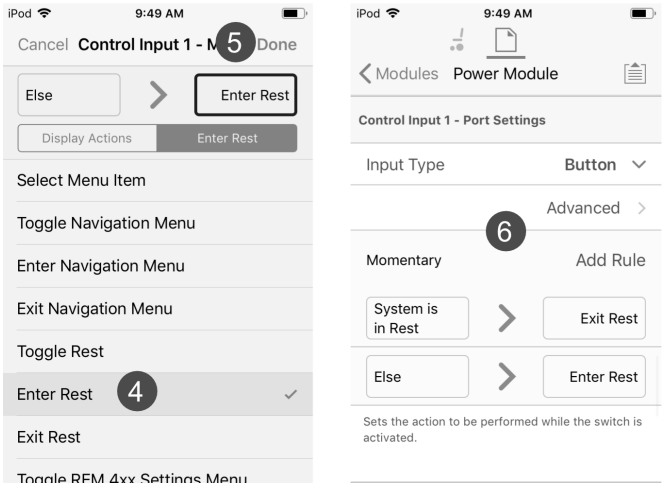
3. Select **Display Actions**.
4. 

Fig. 9-196

   Select **Enter Rest**.
5. Select **Done**.
6. Conditional/else rule summary is displayed.

Adding Rule with PC Tool

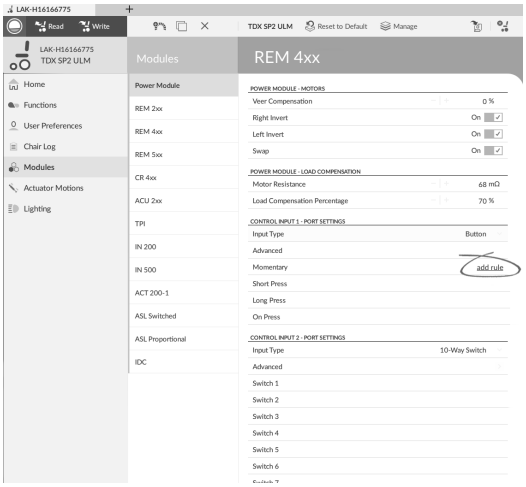
1. 

Fig. 9-197

   Select desired Control IO slot to reveal **Add Rule** button.

Assign Rule Output 1

2.

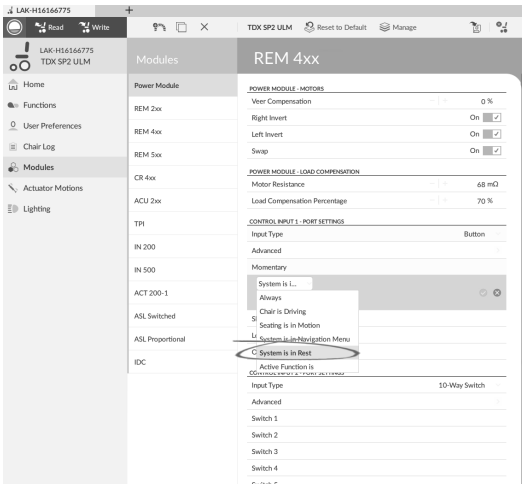


Fig. 9-198

Assign condition **System is in Rest** to condition slot.

3.

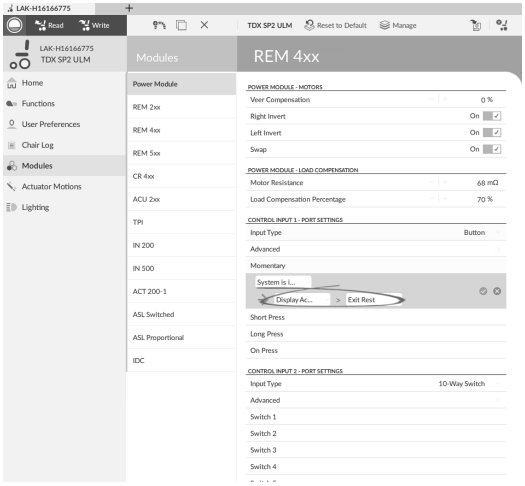


Fig. 9-199

Assign output **Display Actions** –> **Exit Rest** to output slot.

4.

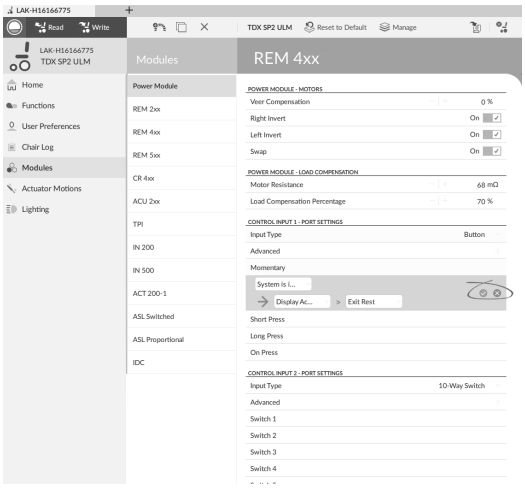


Fig. 9-200

Save rule.

Assign Output Rule 2

5.

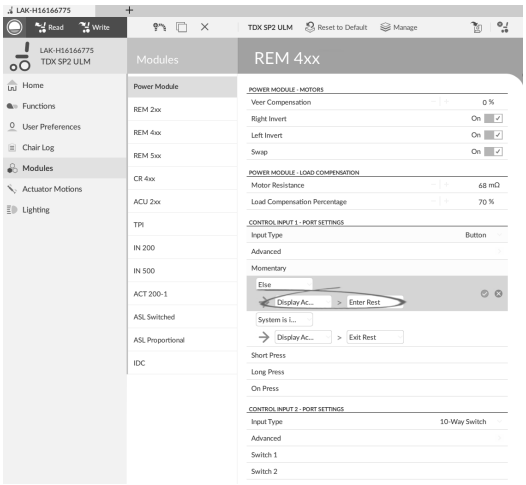


Fig. 9-201

Assign condition **Else** to condition slot.
Assign output **Display Actions** –> **Enter Rest** to output slot.

6.

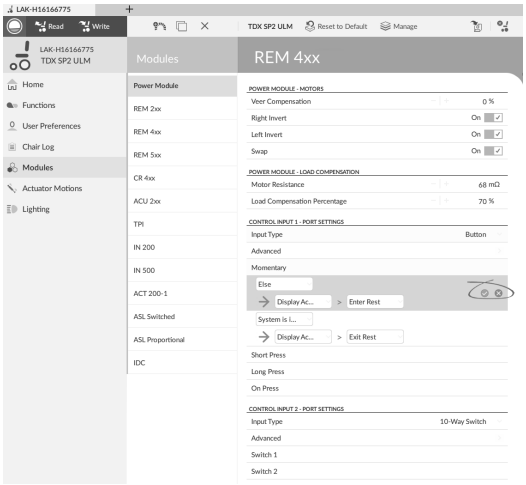


Fig. 9-202

Save rule.

9.17 Installing/Setting up Alternative Switches

There are different types of alternative switches, that interface differently to the system. For components and their particular connections, see table below.

Component	Connection
Sip and Puff breath tube kit	Input Module IN5xx
Sip and Puff Head Array	Input Module IN5xx
Pediatric Compact Joystick	Input Module IN5xx
Head Array	Bus port (TPI)
Chin control	Bus port (TPI)
Compact Single Switch Joystick	Bus port (TPI)
Four Switch Proximity Array	Bus port (TPI)
Remote Stop Switch	Auxiliary port (Power Module)

For more information about installing a Sip and Puff, refer to *9.18 Sip and Puff installation, page 199*

To install a Remote Stop Switch, just connect to the Power Module using the interface cable and to the 4–way connector using the Bus cable, see wiring diagram *3.8 Wiring Diagrams, page 23*. Programming is not necessary.

Programming with iOS Tool

1. Add new profile or add user function to existing profile. For more information about adding profiles and functions, refer to *9.1 Profile and Function Actions, page 128*
2. Set **User Input** to **TPI** or to **IN 5xx**, depending on component input.

   Same procedure for drive, seating and connectivity functions.
3. From **Home** screen open **Modules** –> **IN 5xx** or **TPI**, depending on component input.

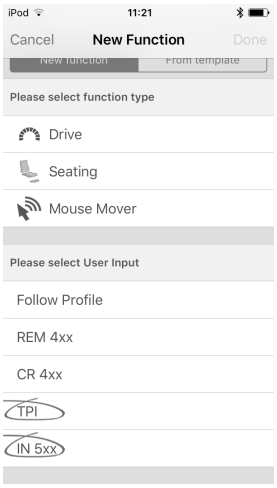


Fig. 9-203

4. Set **User Input Configuration** to desired component. Options are:
   - Proportional Joystick: Pediatric Compact Joystick, Chin Control, Compact Single Switch Joystick
   - Discrete Proportional Joystick: not used
   - Switches: Four Switch Proximity Array, Sip and Puff Head Array
   - Switched Head Array: Head Array
   - Switched Joystick: not used
   - Sip and Puff: Sip and Puff
5. Depending on component, modify other parameters. For switched inputs, such as Sip and Puff, parameters are found under **User Preferences**, refer to *5.2.2 Overview User Preferences, page 80*.

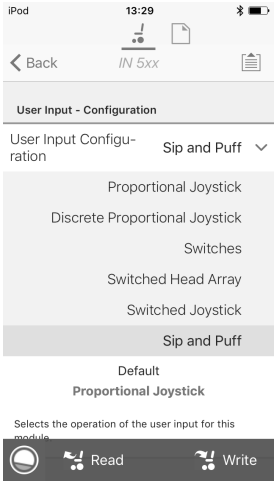


Fig. 9-204

Programming with PC Tool

1. Open **Functions**.
2. Add new profile or add user function to existing profile. For more information about adding profiles and functions, refer to *9.1 Profile and Function Actions, page 128*
3. Set **Function User Input** to **Input Module** or to **Third Party**, depending on component input.

   Same procedure for drive, seating and connectivity functions.
4. Open **Modules** –> **IN 5xx** or **TPI**, depending on component input.

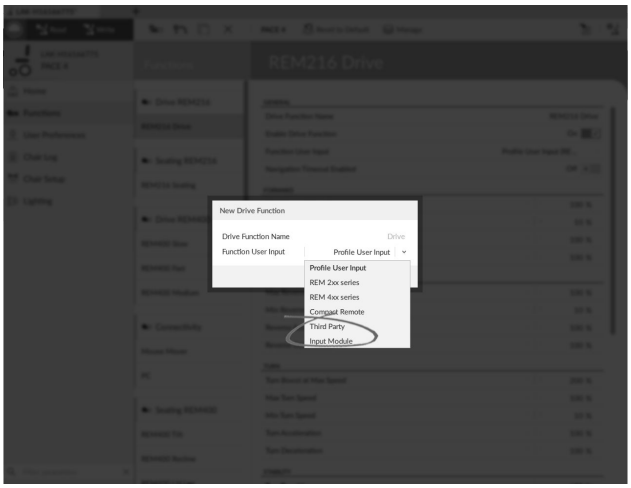


Fig. 9-205

5. Set **User Input Configuration** to desired component. Options are:
   - Proportional Joystick: Pediatric Compact Joystick, Chin Control, Compact Single Switch Joystick
   - Discrete Proportional Joystick: not used
   - Switches: Four Switch Proximity Array , Sip and Puff Head Array
   - Switched Head Array: Head Array
   - Switched Joystick: not used
   - Sip and Puff: Sip and Puff
6. Depending on component, modify other parameters. For switched inputs, such as Sip and Puff, parameters are found under **User Preferences**, refer to *5.2.2 Overview User Preferences, page 80*.

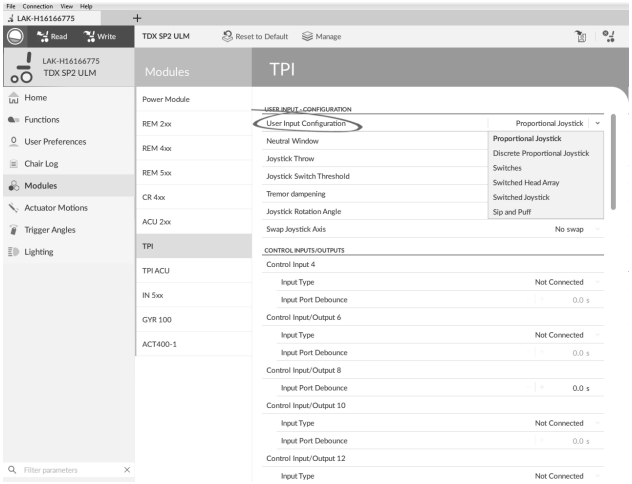


Fig. 9-206

9.18 Sip and Puff installation

A Sip and Puff module is included in the input module.

A Sip and Puff module provides the user with the ability to activate four digital inputs with their breath via a tube depending on pressure level, hard or soft, and direction, sip or puff. These inputs can be used to control driving or seating actions.

iOS Tool

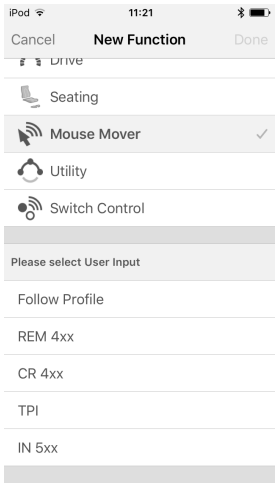


Fig. 9-207

PC Tool

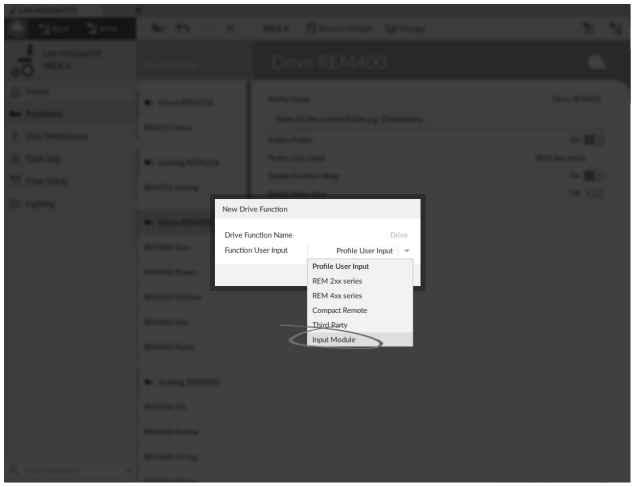


Fig. 9-208

1. Open **Functions**.
2. Add user function for Sip and Puff module. For more information about adding profiles and functions, refer to *9.1 Profile and Function Actions, page 128*
3. Set **Function User Input** to **Input Module**.

   Same procedure for drive, seating and connectivity functions.

4. Open **Modules –> IN 5xx**.
5.

iOS Tool

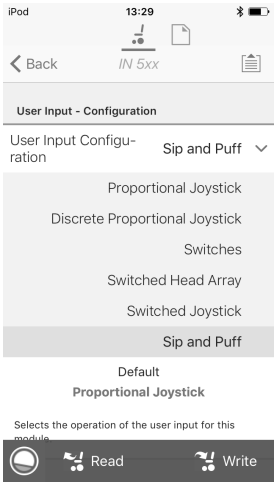


Fig. 9-209

PC Tool

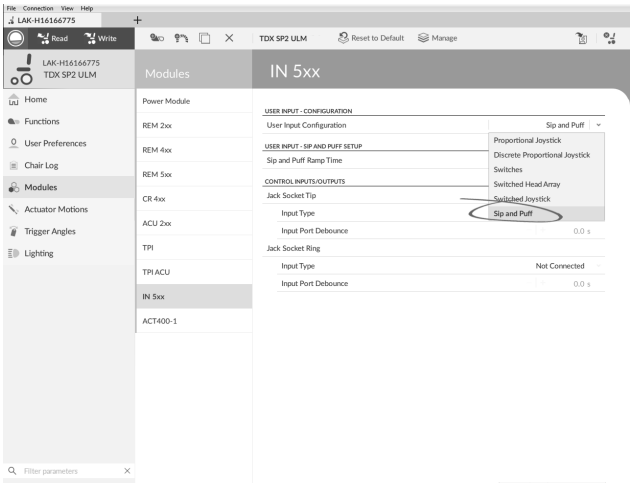


Fig. 9-210

   Set **User Input Configuration** to **Sip and Puff**.
6. Calibrate Sip and Puff module, refer to *9.18.1 Sip and Puff Calibration, page 200*
7. Open **User Preferences** to adjust veer behaviour for switched inputs. For more information refer to *5.2.2 Overview User Preferences, page 80*.

9.18.1 Sip and Puff Calibration

Primary input operations, such as driving, are disabled when using the calibration tool. This is for safety reasons to prevent unintended operation when calibrating.

There are three pressure zones for each pressure direction (sip and puff):

- Neutral zone,
- soft zone and
- hard zone.

The Sip and Puff module's response to a sip or puff input, depends on which zone the pressure falls within: hard or soft. Pressures within the neutral zone are ignored.

Since all users have different capabilities, the Sip and Puff module can be calibrated to change the size and position of these zones. The zones need to be set so that a user can control the wheelchair comfortably and consistently. A Sip and Puff calibration tool is used to determine the pressure thresholds that define the zones. These thresholds are:

- Minimum limit for soft puff,
- minimum limit for hard puff,
- minimum limit for soft sip and
- minimum limit for hard sip.

To calibrate the Sip and Puff module, you have to record pressure measurements from a series of pressure samples performed by the user and adjust the four pressure thresholds accordingly.

Calibration with iOS Tool

1. From **Home** screen open **Modules –> IN 5xx**.
2. Tap on **Go to Sip And Puff Calibration**.

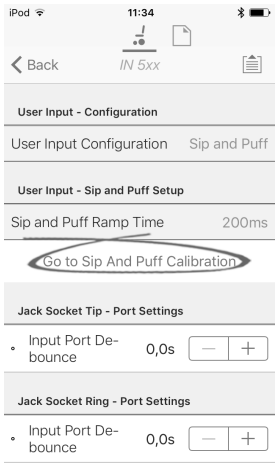


Fig. 9-211

Ⓐ Neutral zone for sip input

Ⓑ Pressure level

Ⓒ Threshold slider to adjust minimum limit for soft sip

Ⓓ Soft zone for sip input

Ⓔ Threshold slider to adjust minimum limit for hard sip

Ⓕ Hard zone for sip input

Ⓖ Hard zone for puff input

Ⓗ Threshold slider to adjust minimum limit for hard puff

Ⓘ Soft zone for puff input

Ⓙ Threshold slider to adjust minimum limit for soft puff

Ⓚ Neutral zone for puff input

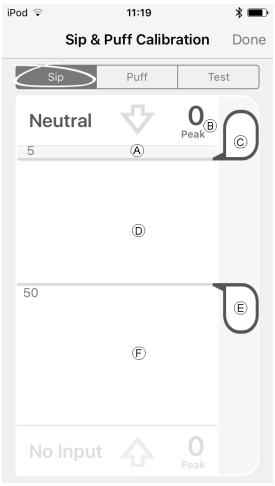


Fig. 9-212

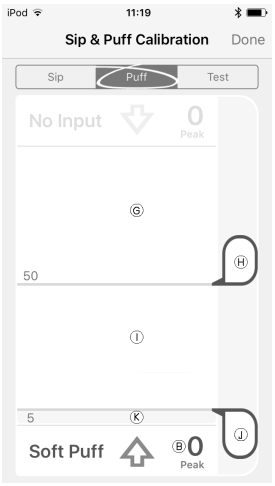


Fig. 9-213

3. If **Sip** tab is open, user performs hard sip and soft sip in no specific order.
   If **Puff** tap is open, user performs hard puffs and soft puffs in no specific order.
   For each sip and puff, a pressure level Ⓑ is recorded on calibration tool. Based on these recorded levels, you determine best level at which to set each pressure threshold.
4. Drag corresponding Threshold sliders.
   - For soft sip, drag threshold slider Ⓒ to position just above user's soft sip. Any subsequent pressure above threshold slider Ⓒ is in neutral zone Ⓐ and is ignored. Pressure below threshold slider Ⓒ and threshold slider Ⓔ is in soft zone Ⓓ and determined as soft sip.
   - For hard sip, drag threshold slider Ⓔ to position just above user's hard sip. Pressure above threshold slider Ⓔ is not considered as hard sip. Pressure below threshold slider Ⓔ is in hard zone Ⓕ and determined as hard sip.
   - For soft puff, drag threshold slider Ⓙ to position just below user's soft puff. Any subsequent pressure below threshold slider Ⓙ is in neutral zone Ⓚ and is ignored. Pressure above threshold slider Ⓙ and below threshold slider Ⓗ is in soft zone Ⓘ and determined a soft puff.
   - For hard puff, drag threshold slider Ⓗ to position just below user's hard puff. Pressure below threshold slider Ⓗ is not considered as hard puff. Pressure above threshold slider Ⓗ is in hard zone Ⓖ and determined as hard puff.

Calibration with PC Tool

1. Open **Connection** in menu bar.
2. Select **Sip and Puff Calibration**.

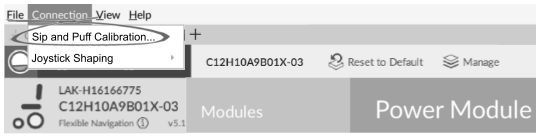


Fig. 9-214

Ⓐ Hard zone for puff input

Ⓑ Threshold slider to adjust minimum limit for hard puff

Ⓒ Soft zone for puff input

Ⓓ Threshold slider to adjust minimum limit for soft puff

Ⓔ Neutral zone for puff input

Ⓕ Neutral zone for sip input

Ⓖ Threshold slider to adjust minimum limit for soft sip

Ⓗ Soft zone for sip input

Ⓘ Threshold slider to adjust minimum limit for hard sip

Ⓙ Hard zone for sip input

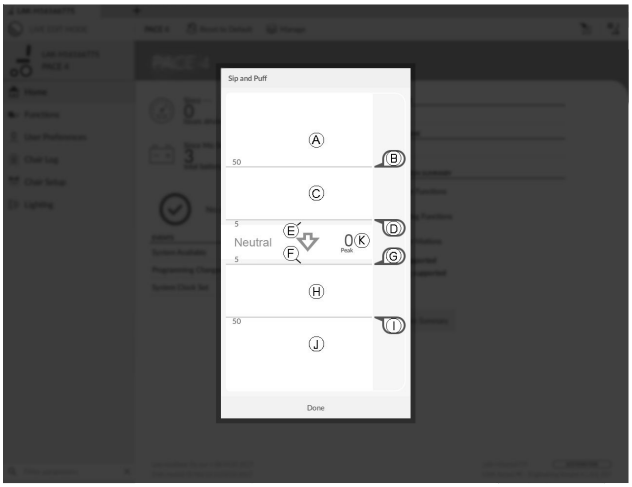


Fig. 9-215

3. User performs hard puff, soft puff, hard sip and soft sip in no specific order. For each sip and puff, a pressure level Ⓚ is recorded on calibration tool. Based on these recorded levels, you determine best level at which to set each pressure threshold.
4. Drag corresponding Threshold sliders.
   - For soft puff, drag threshold slider Ⓓ to position just below user's soft puff. Any subsequent pressure below threshold slider Ⓓ is in neutral zone Ⓔ and is ignored. Pressure above threshold slider Ⓓ and below threshold slider Ⓑ is in soft zone Ⓒ and determined a soft puff.
   - For hard puff, drag threshold slider Ⓑ to position just below user's hard puff. Pressure below threshold slider Ⓑ is not considered as hard puff. Pressure above threshold slider Ⓑ is in hard zone Ⓐ and determined as hard puff.
   - For soft sip, drag threshold slider Ⓖ to position just above user's soft sip. Any subsequent pressure above threshold slider Ⓖ is in neutral zone Ⓕ and is ignored. Pressure below threshold slider Ⓖ and threshold slider Ⓘ is in soft zone Ⓗ and determined as soft sip.
   - For hard sip, drag threshold slider Ⓘ to position just above user's hard sip. Pressure above threshold slider Ⓘ is not considered as hard sip. Pressure below threshold slider Ⓘ is in hard zone Ⓙ and determined as hard sip.

Sip and Puff Ramp Time

The **Sip and Puff Ramp Time** defines the amount of time that a pressure input must remain in the soft zone before it is registered as a soft sip or puff. Consequently, it also provides:

- Time for a user to cross from the neutral zone to the hard zone and
- a filter for any noise (unintentionally pressures) at the zone boundaries.

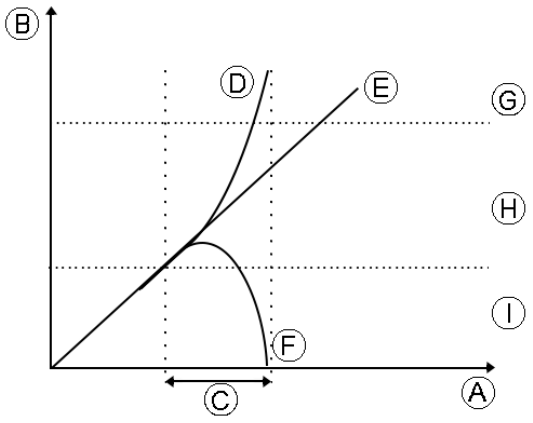


Fig. 9-216

The ramp time Ⓒ begins at the point where the pressure input Ⓓ, Ⓔ or Ⓕ crosses into soft zone Ⓗ — either from neutral zone Ⓘ, when pressure is increasing, or from hard zone Ⓖ, when pressure decreases. A pressure input Ⓓ that reaches the hard zone before ramp time expires, is registered as a hard sip or puff. A pressure input Ⓔ within soft zone at the

end of ramp time is registered as a soft sip or puff. Pressure inputs Ⓕ that fall away into neutral zone before ramp time expires are not registered as an input.

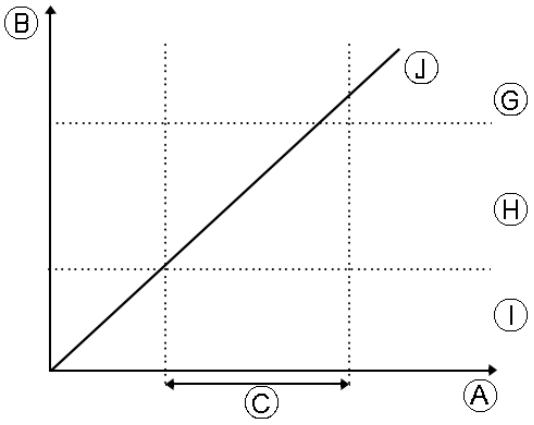


Fig. 9-217

When setting **Sip and Puff Ramp Time**, consideration should be given to users, who cannot produce a hard sip or puff within the ramp time. If ramp time is set too low, a user may not be able to reach the hard zone Ⓖ in time and a soft sip or puff is registered instead of the intended hard sip or puff. For users who need more time to reach hard zone, the ramp time Ⓒ needs to be extended, so the pressure input Ⓙ is registered as a hard sip or puff.

iOS Tool

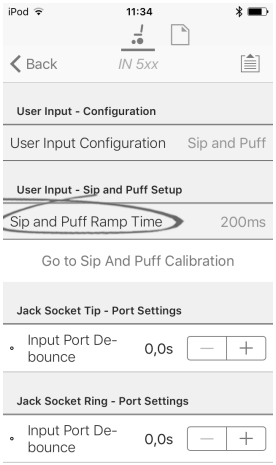


Fig. 9-218

PC Tool

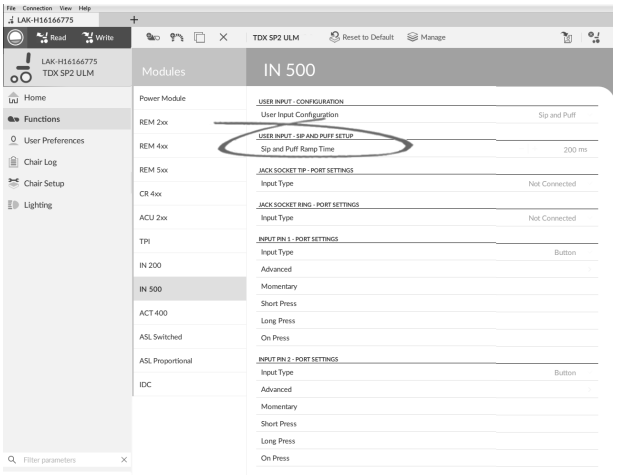


Fig. 9-219

1. Open **Modules** –> **IN 5xx**.
2. Adjust **Sip and Puff Ramp Time**.

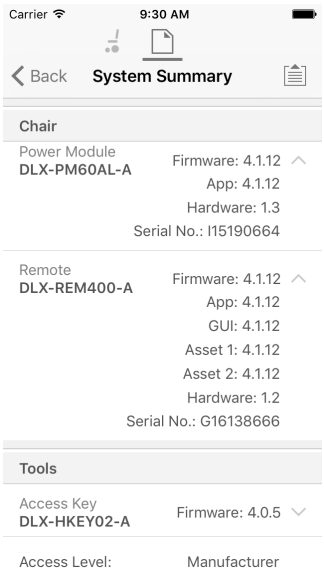
10 Diagnostics

Diagnostic options:

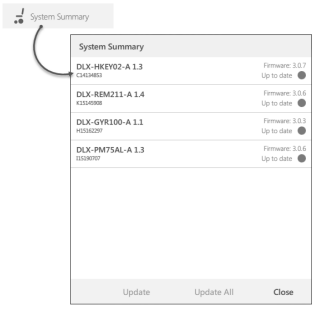
- System Summary
- Active Errors
- Event Log
- Chair Statistics
- Real-time diagnostics

10.1 Viewing System Summary

iOS tool



PC tool



Click on the **System Summary** button to view the **System Summary** screen.

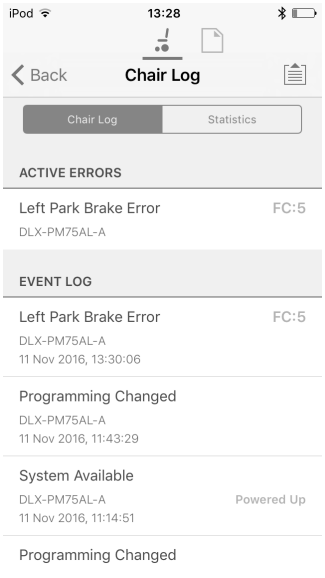
The **System Summary** screen displays details of the system's connected modules, such as:

- Connected modules
- Module software version
- Module serial number
- Access Level of LiNX Access Key

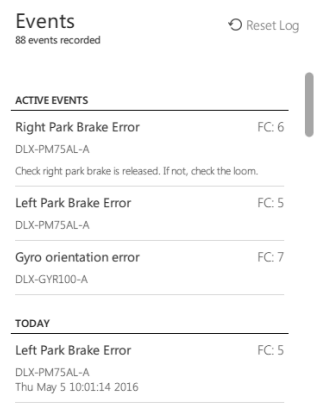
Click on **Back** or **Close** button, to exit the **System Summary**.

10.2 Viewing Active Errors

iOS tool



PC tool



Click on the **Active Errors** button to view which errors, if any, are current. Each entry in this log displays the error, its flash code (e.g. FC5) and the component where the error is. Click on the error entry to reveal an error description with more helpful information about the error.

Click on **Back** or **Close** button to exit **Active Errors**.

10.3 Viewing Chair Statistics

Go to **Chair Log** to view a comprehensive list of current system statistics. The chair statistics are divided into the following sections:

- Battery usage
- Drive statistics

iOS tool

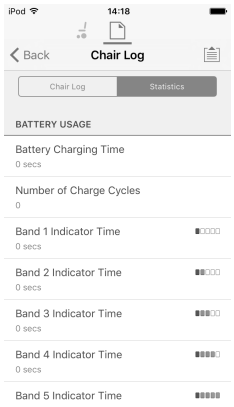


Fig. 10-1

PC tool

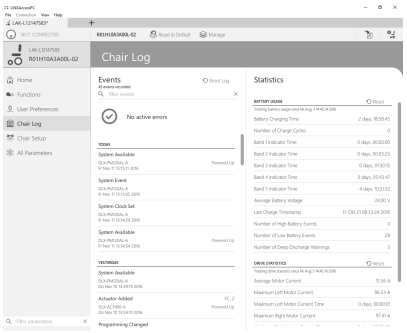


Fig. 10-2

Reading Battery Usage

To view more information about a battery statistic, click on a statistic and a helpful description is displayed in the local help panel.

The available statistics are detailed in the following table.

Battery Usage Statistics	Details
Battery Charging Time	The time that the batteries have been charged for.
Number of Charge Cycles	The number of times the batteries have been charged.
Band 1 Indicator Time	The total time the LiNX system is operated with the state of charge between 0 and 20%.
Band 2 Indicator Time	The total time the LiNX system is operated with a state of charge between 20 and 40%.
Band 3 Indicator Time	The total time the LiNX system is operated with a state of charge between 40 and 60%.
Band 4 Indicator Time	The total time the LiNX system is operated with a state of charge between 60 and 80%.
Band 5 Indicator Time	The total time the LiNX system is operated with a state of charge between 80 and 100%.
Average Battery Voltage	The average battery voltage over the last 31 days.
Last Charge Timestamp	The date and time when the batteries were last put on charge.
Number of High Battery Events	The number of high battery warnings.
Number of Low Battery Events	The number of low battery warnings.
Number of Deep Discharge Warnings	The number of deep discharge warnings.
Battery Usage Last Reset	Date when these statistics were last reset.

Resetting Battery Usage

1.

iOS tool

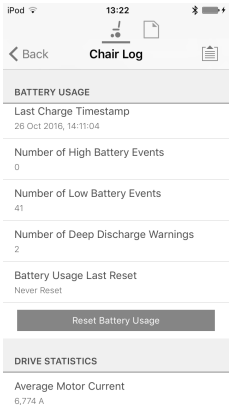


Fig. 10-3

PC tool

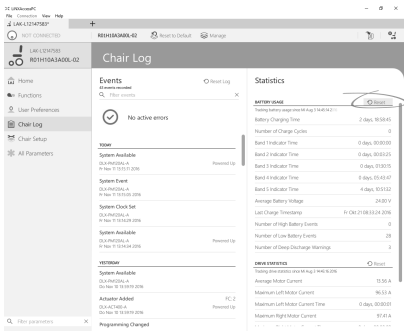


Fig. 10-4

Click on **Reset Battery Usage** button.

2.

iOS tool

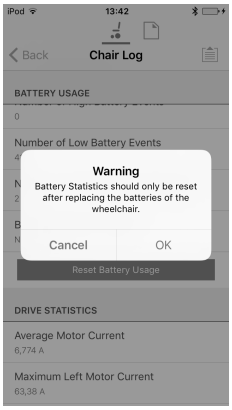


Fig. 10-5

PC tool

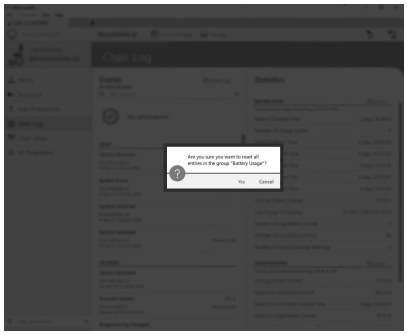


Fig. 10-6

Click on **OK** or **Yes** to continue.

Reading Drive Statistics

To view more information about a drive statistic, click on the statistic and a description is displayed in the local help panel. The available statistics are detailed in the following table.

Drive statistic	Details
Average Motor Current	The average current drawn across all motors while driving.
Maximum Left Motor Current	The peak measured motor current.
Maximum Left Motor Current Time	Time spent drawing the “Maximum Drive Current Draw”.
Maximum Right Motor Current	The peak measured motor current.
Maximum Right Motor Current Time	Time spent drawing the Maximum Drive Current Draw”.
Powered Up Time	The total time that the wheelchair controller is powered up.
Drive Time	The total time that the wheelchair has been driven.
Average Drive Time	Average drive time.
Time Near Maximum Current	The duration the current was within 20% of maximum threshold.
Trip Distance	The total distance travelled by this wheelchair in meters since being reset by the user.

Drive statistic	Details
Total Distance Travelled	The total distance travelled by this wheelchair since being reset by a provider.
Drive Statistics Last Reset	Date when these statistics were last reset.

Resetting Drive Statistics

1.

iOS tool

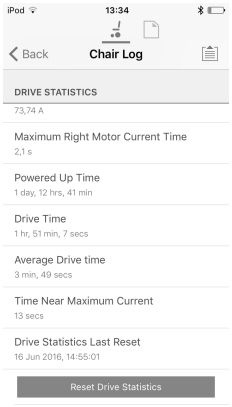


Fig. 10-7

PC tool

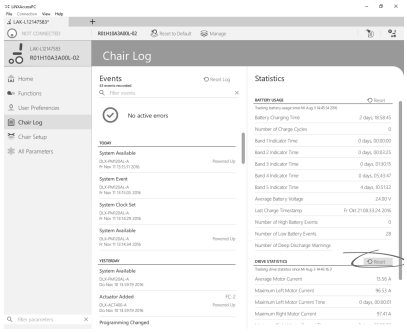


Fig. 10-8

Click on **Reset Drive Statistics** button.

2.

iOS tool

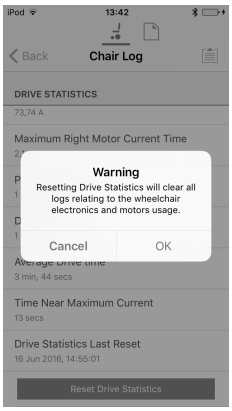


Fig. 10-9

PC tool

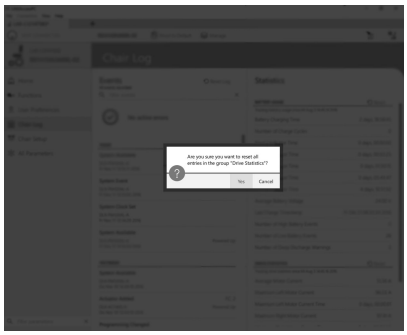


Fig. 10-10

Click on **OK** or **Yes** to continue.

Click on **Back** or **Close** button to exit the **Chair Statistics**

10.4 Viewing Live Diagnostics

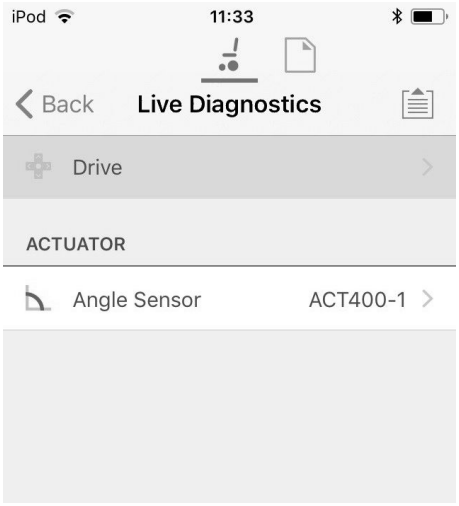


Fig. 10-11

The Live Diagnostics are only available when the LiNX Access iOS tool is connected to a wheelchair. The parameters (see *Parameter list, page 208*) on the Live Diagnostics screen are split into two categories:

- Drive, and
- Actuators.

Parameter list

Drive

Speed Demand (%)

Turn Demand (%)

Left Motor

- Voltage (V)
- Current (A)
- Resistance (mΩ)

Right Motor

- Voltage (V)
- Current (A)
- Resistance (mΩ)

Battery Voltage (V)

Speed Dial (%)

Actuators

Sensor Angle (°)

1. Click Live Diagnostics button.
2. Click desired category to view real-time graphs and data.
3. Click Back button twice to exit Live Diagnostics.

10.5 Clearing the event log

This feature is only available when a wheelchair is in **Connection context** mode.

PC tool

To clear the event log, click on the **Reset Log** button at the top of the logs.

11 Structure of Program Names

By default, the file name, program name and system name are composed of the wheelchair configuration. The program name can be changed to a more familiar name.

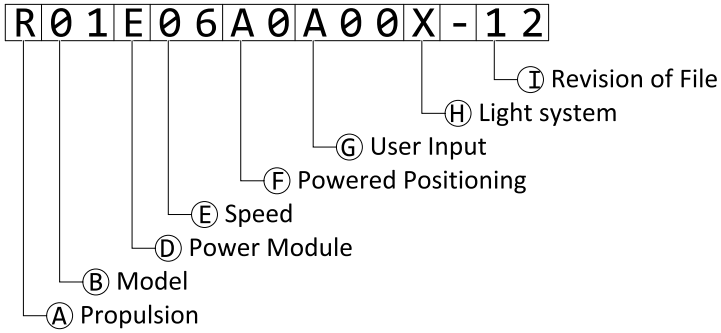


Fig. 11-1 Example of a Kite program name (2 pole motor, drive only) using naming format up to July 2018

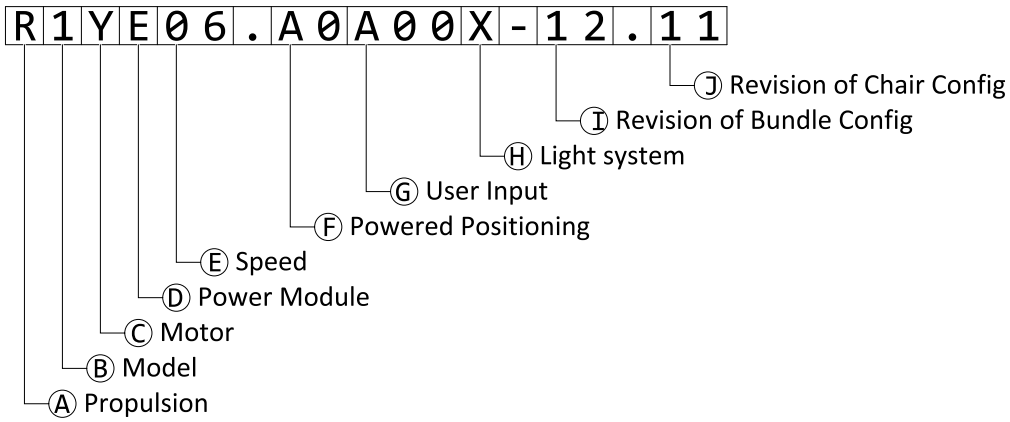


Fig. 11-2 Example of a Kite program name (2 pole motor, drive only) using naming format as of August 2018

Ⓐ	Propulsion
Ⓑ	Model
Ⓒ	Motor
Ⓓ	Power Module
Ⓔ	Speed
Ⓕ	Powered Positioning
Ⓖ	User Input
Ⓗ	Light System
Ⓘ	Revision of Bundle Configuration or File
Ⓙ	Revision of Chair Configuration

11.1 Naming Format

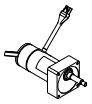
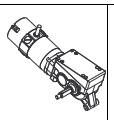
	Up to July 2018	As of August 2018
Ⓐ	R = Rear wheel drive C = Centre wheel drive F = Front wheel drive	
Ⓑ	01 = Kite 02 = TDX SP2 - legacy motors 12 = TDX SP2 - DuraWatt motors 03 = Bora/Spectra XTR 04 = Fox 05 = Storm^4, Storm^4 X-plore 06 = Storm^4 Max	1 = Kite 2 = TDX SP2 3 = Bora/Spectra XTR 4 = Fox 5 = Storm^4, Storm^4 X-plore, Storm^4 Max 6 = not used 7 = Stream 8 = Pronto M41 9 = AVIVA
Ⓒ	Not used. Included in Ⓑ.	Z = Inline motor Y = 2 pole (low speed) X = 2 pole (high speed) W = 4 pole legacy (low speed) V = 4 pole legacy (high speed) U = 4 pole legacy (HD) T = DuraWatt (low speed) S = DuraWatt (high speed) R = DuraWatt (ultra high speed) Q = OPS Drive (low speed) P = OPS Drive (high speed) O = OPS Drive (ultra high speed)
Ⓓ	A = not used B = not used C = DLX-PM60 D = not used E = DLX-PM75 F = DLX-PM75AL G = DLX-PM120 H = DLX-PM120AL	
Ⓔ	03 06 08 10 12	
Ⓕ	A1 = Powered “fixed pivot” tilt (20°) A2 = Powered tilt (30°), CoG shift A3 = Seat lifter & powered tilt (300 mm, 30°), CoG shift A4 = Powered tilt (12°) A5 = Seat lifter & powered tilt (300 mm, 28°), CoG shift A6 = Column lifter & “fixed pivot” tilt (250 mm, 25°) A7 = Recaro with “fixed pivot” tilt (25°) A8 = Recaro with column lifter & “fixed pivot” tilt (250 mm, 25°) A9 = Ultra Low Maxx with tilt (50°), CoG shift B0 = Ultra Low Maxx with lifter & tilt (300 mm, 45°), CoG shift	**Drive only** A0 = w/o actuators[3] **Standard seat / Modulite seat** A1 = Powered “fixed pivot” tilt (20°) A2 = Powered tilt (30°), CoG shift A3 = Lifter & tilt (300 mm, 30°), CoG shift A4 = Column lifter & “fixed pivot” tilt (250 mm, 25°) **Max seat** B1 = Powered “fixed pivot” tilt 25° B2 = Lifter & tilt (300 mm, 28°), CoG shift **Recaro seat** C1 = Powered “fixed pivot” tilt (25°) C2 = Column lifter & “fixed pivot” tilt (250 mm, 25°) **Ultra Low Maxx seat** D1 = Powered tilt (50°), CoG shift + LNX D2 = Lifter & tilt (300 mm, 45°), CoG shift + LNX D3 = Powered tilt (50°), CoG shift + ADP D4 = Lifter & tilt (300 mm, 45°), CoG shift + ADP D5 = Powered tilt (50°), CoG shift + Pivot Plus D6 = Lifter & tilt (300 mm, 45°), CoG shift + Pivot Plus

3. If light system is equipped: use profile A1, B1 or C1 (according to seat)

	Up to July 2018	As of August 2018
Ⓖ	A00 = DLX-REM1XX/DLX-REM2XX + DLX-REM050 A01 = DLX-REM2XX + LNX A02 = DLX-REM2XX + ADP A02 = DLX-REM2XX + ADP A03 = DLX-REM2XX + Pivot Plus A04 = DLX-REM2XX/400 + ACU200 B01 = DLX-REM400 + 4Q-P + LNX B02 = DLX-REM400 + 4Q-P + ADP B03 = DLX-REM400 + 4Q-P + Pivot Plus C01 = DLX-REM400 + 3Q-D + LNX C02 = DLX-REM400 + 3Q-D + ADP C03 = DLX-REM400 + 3Q-D + Pivot Plus C04 = DLX-REM400 + 4Q-D + LNX C05 = DLX-REM400 + 4Q-D + ADP C06 = DLX-REM400 + 4Q-D + Pivot Plus	A00 = DLX-REM1XX/DLX-REM2XX + DLX-REM050[4] A04 = DLX-REM2XX/400 + ACU200 B02 = DLX-REM400 + 4Q-P C01 = DLX-REM400 + 3Q-D C04 = DLX-REM400 + 4Q-D
Ⓗ	T = Traditional L = LED X = w/o light[5,6]	
Ⓘ	Revision of file	Revision of bundle configuration
Ⓙ	Not used. Included in Ⓘ.	Revision of chair configuration

4. Use only if DLX-REM1XX or DLX-REM050 are equipped to the wheelchair. Otherwise use profile A04.
5. If only programs with activated light system are available: use profile LED instead.
6. By default, Ultra Low Maxx programs are with deactivated light system. See *9.7 Modifying Lighting Parameters, page 143* to activate light system.

11.2 Where-Used Matrices

Model	Motor											
	 Inline	2 pole		4 pole		 4 pole	DuraWatt			OPS Drive		
	(Z)	LS (Y)	HS (X)	LS (W)	HS (V)	HD (U)	LS (T)	HS (S)	UHS (R)	LS (Q)	HS (P)	UHS (O)
AVIVA FX	-	-	-	-	-	-	x	x	x	-	-	-
AVIVA RX	-	-	-	-	-	-	x	x	x	x	x	x
Bora/ Spectra XTR	-	x	x	x	x	-	-	-	-	-	-	-
Fox	x	-	-	-	-	-	-	-	-	-	-	-
Kite	-	x	x	x	x	-	-	-	x	-	-	-
Storm4, Storm4 X-plore	-	-	-	x	x	-	-	-	x	-	-	-
Storm4 Max	-	-	-	-	-	x	-	-	-	-	-	-
TDX SP2	-	-	-	x	x	-	x	x	x	x	x	x

Motor		Type of LiNX power module	Speed				
			03	06	08	10	12
Z	Inline motor	DLX–PM60	x	x	x	-	-
Y	2 pole (low speed)	DLX–PM75 / DLX–PM75AL	x	x	-	-	-
X	2 pole (high speed)		-	-	x	x	-
W	4 pole legacy (low speed)	DLX–PM120 / DLX-PM120AL	x	x	-	-	-
V	4 pole legacy (high speed)		-	-	x	x	-
U	4 pole legacy (HD)		-	x	-	-	-
T	DuraWatt (low speed)		-	x	-	-	-
S	DuraWatt (high speed)		-	-	x	x	-
R	DuraWatt (Ultra high speed)		-	-	-	x[7]	x
Q	OPS Drive (low speed)		x	x	-	-	-
P	OPS Drive (high speed)		-	-	-	x	-
O	OPS Drive (Ultra high speed)		-	-	-	-	x

Model	Powered Positioning			
	Standard / Modulite seat	Max seat	Recaro seat	Ultra Low Maxx seat
AVIVA FX	x	-	-	x
AVIVA RX	x	-	-	x
Bora/Spectra XTR	x	x	-	-
Fox	x	-	-	-
Kite	x	x	-	-
Storm4, Storm4 X-plore	x	-	x	-
Storm4 Max	x	x	-	-
TDX SP2	x	x	-	x

7. France only

Notes

Notes

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