PG DRIVES TECHNOLOGY

R-NET OMNI

TECHNICAL MANUAL

SK78813/3

TABLE OF CONTENTS

About this manual

The Technical Manual gives a general introduction to the R-net Omni. For more detailed and/or current information refer to the Electronic Manual.

Throughout the manual icons are used to draw the reader's attention.

The icons used are:

Note - A general point for best practice.

Caution - A point of safety which if ignored could result in damage to the control system or the vehicle.

Warning - A point of safety which if ignored could cause injury to the individual.

PG Drives Technology accept no liability for any losses of any kind if the points are not followed.

Definition of Terms Used and Abbreviations

PM:	Power Module
JSM:	Joystick Module
ISM:	Intelligent/seating Lighting Module. The R-net equivalent to the Pilot+ ALM.
ID:	Any system Input Device, e.g. a JSM or the Omni.
SID:	Specialty Input Device. Any specialty type of Input Device for connection to the Omni, e.g. head array, TASH switch panel or mini-Joysticks.

User Switch:	The switch for the User that initiates Profile/Mode changes and emergency stopping. This was previously referred to as the Mode/Stop Switch.
IOM:	Input/Output Module. A universal Module that can be used as a simple TRACE Input Module, or as an Output Module equivalent to the Pilot+ ACM.
OBP:	On-Board Programming. A method of programming the R-net system via the buttons on the Omni's front panel.
TRACE:	The industry standard pin-out for 9-way D-type input and output connectors.

How to Use This Manual

The Manual has two main sections – Standard and Advanced. The Standard section covers the more common types of specialty control installations, i.e. the Omni is the only Input Device in the system; whereas, the Advanced section covers how to use the Omni in conjunction with another Input Device or with two Specialty Input Devices.

To get the most out of this manual it is recommended that you concentrate on the Standard section and only refer to the Advanced section if you are working with two IDs, two SIDs or wish to set up the Omni so the functions can be navigated audibly.

CHAPTER 1 - INSTALLATION

If you are using the Omni with no other R-net Input Modules and just one Specialty Input Device (SID), you need only read this section.

1 Introduction

The Omni is a universal specialty controls interface that accepts signals from many different types of SIDs and translates them into commands compatible with the PG Drives Technology R-net control system.

The following diagrams show the Omni controls and connections. Full electrical specifications are given in the Specifications Chapter.

This document must be read and understood by the healthcare professional who is installing and configuring the Omni. If you are in any doubt contact PG Drives Technology. The R-net Operating and Installation guide and the relevant Input Device installation instructions should also be read.

It is possible to set up a control system so that it is unsuitable for some users or even some vehicles. For all of the above reasons it is important that you contact PG Drives Technology if you have the slightest doubts or if you need any advice on programming.

Programming and diagnostics should only be conducted by healthcare professionals with in-depth knowledge of PG Drives Technology electronic control systems. Incorrect programming could result in an unsafe setup of a vehicle for a user. PG Drives Technology accept no liability for any losses of any kind if the programming of the control system is altered from the factory preset values.

2   Controls and Connections

LCD Screen

Profile
Mode
On/Off

+ / -
Navigation

Charger Socket

Communication Cable

User Jack 2
Port 2 - D-Type

OMNI

User Jack 1
Port 1 - D-Type

On/Off Input

Sip and Puff Port
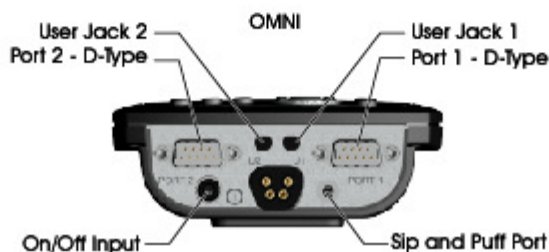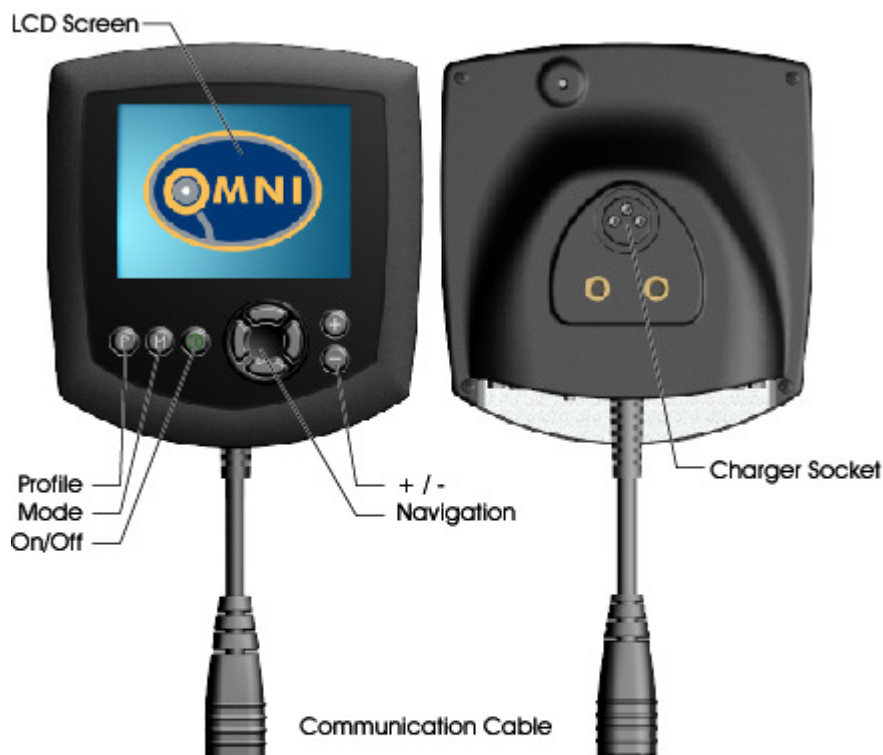
2.1   LCD Screen

A full color, backlit LCD screen that can show Omni configuration details and operating information to the installer and user. More details of actual displays are given in the LCD Screen Details Section and throughout this manual.

2.2   On/Off Button

The On/Off button provides a complete power down of the control system electronics. In addition to the button mounted on the front panel of the Omni Module, there is facility for an optional, externally mounted switch which can be operated by the user, see section External On/Off Switch Input.

2.3   Mode Button

The Mode button allows the installer to change between the available Modes.

2.4   Profile Button

The Profile button allows the installer to change between the available Drive Profiles.

2.5   Navigation Buttons

The array of 4 Navigation buttons allows the OBP screens to be navigated.

2.6   - / + Buttons

These buttons make adjustments to the highlighted OBP parameter.

Holding both buttons down at the same time launches the Omni into the Settings menu screen.

2.7   Charger Socket

This 3pin socket can be used to charge the wheelchair batteries and, dependent on system programming, to lock the wheelchair. For details of battery charging, refer to the R-net Operating and Installation guide.

2.8   Communications Connector

This connector links the Omni to the R-net system.

2.9   9-way D-type Specialty Input Device (SID) Connectors

These provide connections to analogue or digital SIDs. There is a facility to detect if a mating connector is in place; and provision of a low current 12V supply. Refer to the Specifications Chapter for full details of the electrical specifications.

2.10   User Switch Jacks

There are two 3.5mm/1/8" jack sockets which provide connection to the User Switches. Full details of User Switches are given in the section Connection of SIDs.

There is also facility to detect if the mating User Switch jack plug is in place. Refer to the Specifications Chapter for full details of the electrical specifications.

2.11   External On/Off Switch Input

This is a 3.5mm/1/8" jack socket which provides connection to a user operated On/Off button. This connection is optional and the Omni will function normally without it.

2.12   Sip and Puff Input

This input will accept a 3.5mm/1/8" pipe connected to a Sip and Puff mouthpiece. For full specification refer to the Specifications Chapter.

3   Installation and Set-up of the Omni

The Omni can be used with many different types of SIDs and then in various modes of operation, e.g. driving, latched driving, seat adjustment etc. The Omni Module must be configured to meet the individual requirements of the powerchair user. Below is a suggested installation and set-up sequence:

1. Assess user's needs and select relevant SID.

2. Install the Omni onto the powerchair.

3. Install the SID onto the powerchair.

4. Program the Omni to match the SID.

5. Program the Omni to suit the user.

6. Program the R-net driving characteristics to suit the user.

This chapter is laid out as above and it is recommended that the sequence is adhered to.

4   Assessing the User's Needs

This should only be conducted by a healthcare professional. PG Drives Technology accept no liability for losses of any kind resulting in an incorrect assessment of a user's abilities.

4.1   Selecting the SID

Selection of the SID for the user is not covered in this document. It is the responsibility of a healthcare professional to assess the needs of the powerchair user and to select a suitable SID. It is the responsibility of the individual who is installing the SID and the Omni to make sure the two are compatible with each other and the powerchair on which they will be used. If you are in any doubt contact the SID manufacturer, the powerchair manufacturer and/or PGDT. Your powerchair manufacturer or mobility dealer will be able to advise of the available SIDs for a particular powerchair model. It may also be useful to refer to the section Installing the SID onto the Powerchair.

5   Installing the Omni onto a Powerchair

The Omni should be fitted to the powerchair using the bracket supplied by the powerchair manufacturer. If a suitable bracket is not available, the diagram below can be used to design your own.
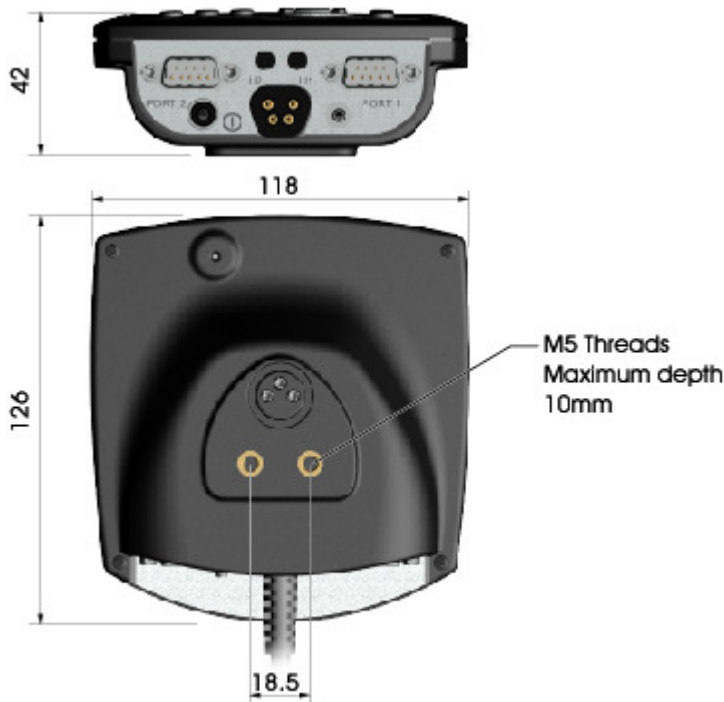
All dimensions in millimeters

Take care not to over-tighten the fixing screws.

The Omni should be fitted in a position that is suitable for the powerchair user. It is particularly important to ensure the Omni's screen is clearly visible.

6   Installing the SID onto a Powerchair

The SID should be fitted to the powerchair in accordance with the instructions of both the SID and powerchair manufacturers. PG Drives Technology accept no liability for losses of any kind resulting from an incorrect installation of a SID.

Because of the wide variety of SIDs available and the constantly changing specifications, it is not practical to provide a definitive list of SID classifications in this manual. Instead, the healthcare professional may have to contact the SID manufacturer, the powerchair manufacturer and/or PG Drives Technology to determine the exact classification of the chosen type of SID. Further details on each SID type are given in the following sections.

In addition to the SID for controlling the powerchair functions, the Omni has facility for the connection of an optional, user operated On/Off switch. The function of this switch is identical to the On/Off button on the Omni's front panel.

Refer to the Specifications Chapter for full electrical specifications for the SIDs and On/Off switch.

6.1   Connection of SID

For single SID operation, always connect the SID to Port 1.
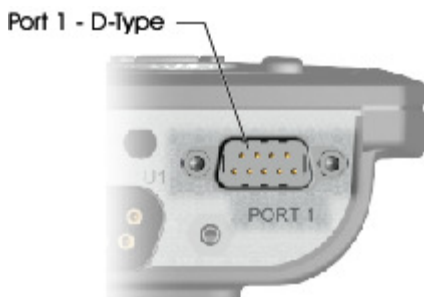
Port 1 comprises:

> A 3.5mm / 1/8" jack for the User Switch.

> A 9-way input connector with a TRACE standard pin-out.

> A Sip and Puff input.

Make sure that all SID connections to the Omni are securely mated.

Route and secure all cables and tubes in such a way as to prevent damage by crushing, cutting or snagging.

6.2   User Switch

For a truly fail-safe system a normally closed User Switch is recommended. This ensures that if the switch becomes accidentally disconnected the powerchair will default to a stop condition. It is possible to configure the Omni to function with normally open switch types, see section User Switch in the Programming chapter for details. PG Drives Technology recommend that, whenever possible, a normally closed switch should be used. If a normally open switch is used the responsibility for that decision lies with the healthcare professional.

As a further level of safety, the Omni can also detect if the User Switch jack is not properly located. If it is detected that the jack is not secure, then drive will be prevented. Alternatively, the Omni can be programmed to allow slower drive in this situation, i.e. a limp home facility, or to allow full drive. See Switch Detect in the Programming chapter for more details.

For a truly fail-safe system a normally closed User Switch is recommended. This ensures that, if the switch becomes accidentally disconnected the powerchair will default to a stopped condition. It is possible to configure the Omni to function with normally open switch types, see section User Switch in the Programming chapter for details. PG Drives Technology recommend that, whenever possible, a normally closed switch should be used. If a normally open switch is used the responsibility for that decision lies with the healthcare professional. PG Drives Technology accept no liability for any losses resulting from the use of a non-normally closed User Switch.

Because a disconnected User Switch means there is no emergency stop function, PG Drives Technology recommend that Switch Detect is always set to On. PG Drives Technology will accept no liability for any losses resulting from any other setting of this parameter.

6.3   D-type Connector

Ensure the connector is correctly inserted and if there are locking screws ensure they are fully tightened.

Some SIDs will have a "detect link" fitted. This link enables the Omni to detect if the D-type connector has become disconnected. The Omni will need to be programmed to look for a "detect link", see section 9-way Detect in the Programming chapter. To enhance the system safety and to ease diagnostics, it is recommended that this feature be used if the SID has such a link. If this feature is used and the Omni detects the SID is disconnected, a screen as below will appear.

14:35

OMNI   0905
SID Detached
Fast Drive
3
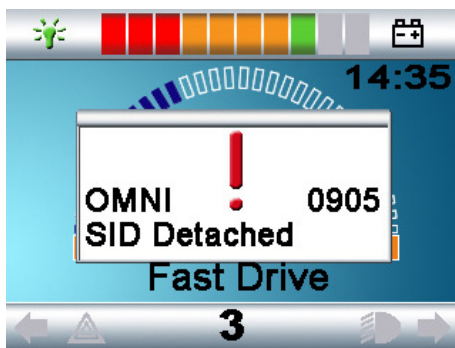
Some SID/User Switch installations require a permanent 12V power supply, even while the Omni is asleep; whereas, to save power, some installations would want to switch off this supply while the Omni is asleep. Consequently, there is a programmable parameter, Sleep 12V, which sets this operation. Refer to the section Sleep 12V in the Programming chapter.

The SID's D-type connector should always be fitted with gold contacts and a suitable backshell with locking screws. The locking screws should be used to mechanically hold the connector in place. PG Drives Technology accept no liability for losses of any kind if these conditions are not met.

6.4   Sip and Puff Input

Ensure the tube from the Sip and Puff Device is of the correct diameter and that it is securely routed. For pneumatic details of this input, refer to the Specifications Chapter.

7   How to set up the Omni

There are three methods of programming the Omni. Details of the actual programmable parameters are given in the Programming chapter.

7.1   On-Board Programming (OBP)

This is performed using the Omni's own display and front panel buttons. For details of these buttons, refer to section Controls and Connections. From the Omni, all system OBP parameters can be adjusted: for example, Speeds and Accelerations.

OBP can be entered in one of two ways, depending on the factory programming of the control system.

7.1.1   To enter OBP using a keypad sequence:

• Hold down the Profile button and then hold down the On/Off button until there is a short beep. Note, the normal power-up sound will occur prior to this beep.

• Release the Profile button, but continue to hold down the On/Off Button until there are two further short beeps.

• Release the On/Off button, there will be a longer beep and OBP Mode will be entered.

After the sequence has been performed and while the system remains switched on, the Mode button can be used to sequence through all system Modes and to return to OBP Mode. If the system is powered-down or there is no OBP activity for 5 minutes, then the keypad sequence will need to be performed again.

7.1.2   To enter OBP using the R-net Dongle:

• Turn off the control system.

• Connect the Dongle either between any of the system modules or into any spare communications connector.

• Turn on the control system.

• Use the mode button to step to OBP mode.

While the Dongle remains connected, the Mode button can be used to sequence through all system Modes and to return to OBP Mode.

7.2   Handheld Programming

From 2008, the Omni will be programmable via the R-net Handheld Programmer.

7.3   PC Programming

The Omni can be programmed using the R-net PC Programmer. Refer to the Programming chapter for more details.

8   Program the Omni to Match the SID

Fuller details on programming the Omni can be found in the Programming chapter.

The Omni is compatible with six types of SID.

1. Joystick and User Switch

2. Five switch and User Switch

3. Three axis proportional and User Switch

> 4. Three axis switch and User Switch
>
> 5. Sip and Puff device and User Switch
>
> 6. Single switch scanner

The User Switch provides a means of changing Profiles and Modes, an emergency stop function and a means of putting the Omni to sleep. It is also possible to use most of the SID types without a User Switch. Refer to section Using the Omni without a User Switch for more details.

The Omni parameter that sets the SID compatibility is SID. This can be set to one of the following options that correspond to each SID type as shown in the table.

SID Setting	SID Type
Proportional	Joystick and User Switch
Switch	Five switch and User Switch
3-Axis Proportional	Three axis proportional and User Switch
3-Axis Switch	Three axis switch and User Switch
Sip Puff	Sip and Puff device and User Switch
Scanner	Single switch scanner

8.1   Joystick and User Switch

Typical applications are chin control, foot control or heavy/light operating force joysticks.

The device comprises of a PG Drives Technology or Flightlink type inductive joystick connected to the Omni via the 9-way D-type connector. In addition, a User Switch is required and connects to the Omni via the 3.5mm/1/8" jack socket.

8.1.1   Joystick Calibration

If a new joystick type SID is fitted, then the following calibration procedure must be performed. If it is not, the wheelchair may not drive in a straight line or reach maximum speed.

To begin the procedure you must first enter OBP mode and go to the System branch. Select the Joystick Calibration option.

The procedure is automatic, simply follow the on-screen instructions. Values for both the forward/reverse and left/right SID axes will be displayed. Alongside each value will be a X or a √ symbol.

X –   indicates the axis value is outside of the permitted calibration range for the particular SID direction.

√ –   indicates the axis value is within the permitted calibration value for the particular SID direction.

Simply deflect the SID in the instructed direction until both values are within the permitted ranges. Repeat for all four directions.

A large tick will be displayed on screen, for a short period of time, when the calibration has been completed successfully. The screen will then return to the System Menu.

8.2 Five switch and User Switch

Typical applications are Tash Penta switches or Buddy Buttons, or products from ASL and Switch-it.

The device comprises of 4 direction switches and one User switch connected to the Omni via the 9-way D-type connector. In addition, a normally closed User Switch should be connected to the Omni via the 3.5mm/1/8" jack socket. This switch, although functionally identical to the fifth switch input on the 9-way D-type connector, is required to provide a fail-safe emergency stop system.

8.3 Three axis proportional and User Switch

Typical applications are head control mechanisms fitted with a joystick.

The device comprises of a PG Drives Technology or Flightlink type inductive joystick connected to the Omni via the 9-way D-type connector. In addition, a User Switch is required and connects to the Omni via the 3.5mm/1/8" jack socket.

8.4 Three axis switch and User Switch

Typical applications are head control systems.

The device comprises of three or four direction switches and a User Switch connected to the Omni via the 9-way D-type connector. In addition, a normally closed User Switch should be connected to the Omni via the 3.5mm/1/8" jack

socket. This switch, although functionally identical to the switch input on the 9-way D-type connector, is required to provide a fail-safe emergency stop system.

8.5   Sip and Puff Device and User Switch

A sip and puff mouthpiece is connected to the Omni via the pneumatic input. In addition, a User Switch should be connected to the Omni via the 3.5mm/1/8" jack socket. This switch is required to provide a fail-safe emergency stop system.

8.5.1   Sip and Puff Calibration

If a new Sip and Puff SID is fitted, then the following calibration procedure must be performed to match the Omni to the user's operating capabilities.

To begin the procedure you must first enter OBP mode. From there, follow the path detailed below, using the right navigation button on the front of the Omni:

Omni – Global – Sip and Puff – Calibrate

A screen like the one shown below should appear.
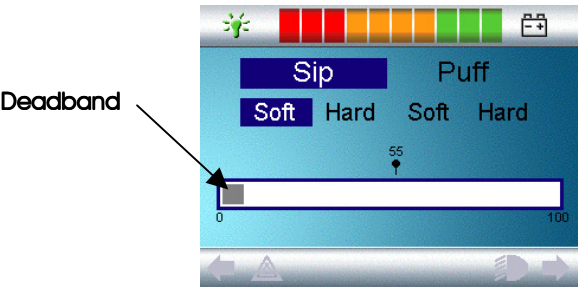
Soft Sip will be highlighted first. The user must now make a series of soft sips. After each sip, a live readout of the current pressure will be displayed on the screen in the form of a line within the 0 - 100 scale. Repeated soft sips will produce a 'band' of values. During this process it may be beneficial for the user to look away from the screen. This prevents 'false' values where the user may be trying to attain earlier levels. Once you are satisfied that the user can produce a

soft sip consistently within this band, use the right navigate button on the front of the Omni to highlight Hard Sip.

The user must now make a series of hard sips to produce a new Hard Sip band. Ideally there should be as much difference as possible between the Soft Sip and Hard Sip values. To aid the Omni's differentiation between these pressures, the installer should move the Threshold Marker, (shown in the diagram below), to the middle of the gap between the hardest soft command and the softest hard command. This is done via the + / - buttons on the front of the Omni. Once a suitable threshold is set, use the right navigate button on the front of the Omni to highlight Soft Puff.
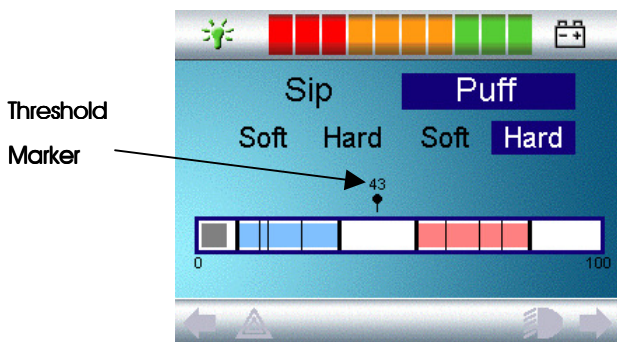
Now repeat the sequence of instructions as above for both soft and hard puffs including the Threshold setting. Once calibration has been performed, use the right navigate button on the front of the Omni to return to the Calibrate option in the Sip and Puff branch of OBP.

Please note that all values must be greater than the Deadband setting, for calibration to be performed successfully. For more details of the parameter Deadband, refer to the Programming Chapter.

8.6   Single Switch Scanner

A single User Switch is connected to the Omni via one of the 3.5mm/1/8" jack sockets.

For a truly fail-safe system a normally closed User Switch is recommended. This ensures that, if the switch becomes accidentally disconnected the powerchair will default to a stopped condition. It is possible to configure the Omni to function with normally open switch types, see section User Switch in the Programming chapter for details. PG Drives Technology recommend that, whenever possible, a normally closed switch should be used. If a normally open switch is used the responsibility for that decision lies with the healthcare professional. PG Drives Technology accept no liability for any losses resulting from the use of a non-normally closed User Switch.

If the Omni is configured to operate with a Single Switch Scanner Type SID, the scan rate can be programmed to suit the user. Refer to the Programming Chapter for more details.

8.7   Using the Omni without a User Switch

With the exception of scanner operation it is possible to use the Omni without a User Switch. This can be achieved by setting the Omni parameter, Timeout to Menu. This function will mean that the User Menu will automatically be entered after a period of SID inactivity. Once in the User Menu, the SID's direction commands can be used to select the menu options. See the Timeout to Menu section in the Programming chapter for more details.

In this scenario, the Omni can be put to sleep by selecting that option in the User Menu. To awake the Omni, the following SID sequence is required: Left, Right, Left, Right. Note, this waking method only works if the Omni has been put to sleep via the User Menu.

Because the User Switch provides a method of emergency stopping, then a method of emergency stopping will not exist. The decision not to utilize the User Switch lies with the healthcare professional who is commissioning the wheelchair.

PG Drives Technology accept no liability for losses arising from the non-use of a User Switch.

9   Programming the Omni to Suit the User

Ensure the R-net Control System's Drive, Acceleration and Deceleration settings are at a comfortable and safe level prior to attempting to program the Omni to suit the user. Refer to the R-net Technical Manual SK77981 or the On-Board Programming Manual SK78571 for details of how to program the R-net Control System.

Programming should only be conducted by healthcare professionals with in-depth knowledge of PG Drives Technology electronic control systems. Incorrect programming could result in an unsafe set-up of a wheelchair for a user. PG Drives Technology accept no liability for losses of any kind if these conditions are not met.

For more details of all the programmable parameters mentioned in this section, refer to the Programming chapter.

9.1   User Switch

With the exception of scanner operation the User Switch provides the following functionality.

A short operation while not driving will select the different wheelchair functions. See section Accessing Wheelchair Functions for more details.

A short operation while driving or making a seating adjustment will stop all movement, i.e. an emergency stop function.

A long operation while not driving will put the Omni to sleep. To wake the Omni, a short operation of the User Switch is required.

The time of a long operation is preset to 1 Second, but it is programmable from 0.5 to 5.0 Seconds via the parameter Switch Long. See section Switch Long in the Programming chapter for more details.

There is a further programmable parameter associated with the operation of the User Switch, Switch Medium. This parameter is only applicable with 3-axis

type SIDs, i.e. 3 switch head controls. Refer to the Programming Chapter for full details of this function.

9.2   Accessing Wheelchair Functions

The Omni can be programmed to access all the available wheelchair functions in two ways – by Menu or by Sequence. The programmable parameter that sets the access method is User Control.

The Menu method is whereby an activation of the User Switch while in Drive Mode will bring up an on-screen User Menu as shown below. SID direction commands are then used to navigate the menu and select functions.
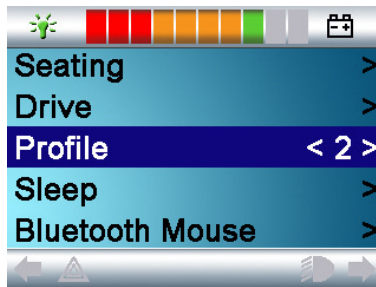
The Sequence method is whereby successive activations of the User Switch will sequentially access all the wheelchair functions.

It is not advisable to program the menu options, 'speed adjust' or 'profile select', if the Sequence method is being used with scanning operation. Refer to the Programming Chapter for further details.

9.3   Order of User Menu or Sequence

Using the programmable parameter, Position 1 to Position 16, it is possible to change the order of the options on the User Menu. The User Menu can have a maximum of 16 lines and the content of each of the lines is set by these parameters. If the Sequence method is being employed, then these parameters set the order of the sequence.

A further programmable option for the Menu method of operation is Return To. This parameter sets whether an operation of the User Switch while in a non-Drive Mode takes the user back to drive or back to the User Menu.

The function of some of the options in the User Menu is also programmable. Refer to section Position 1 Type to Position 16 Type in the Programming chapter for full details.

9.4   Display Background

The color of the Omni screen background can be altered via the programmable parameter Background. There are currently two options, Blue or White.

> Blue is the standard Omni graphical display.

> White is the High Contrast display, ideal for use outside or in brightly lit environments.

It is also possible for the user to choose the color of the screen background via the Settings Menu.

> If set to Blue, the background will always be blue regardless of the setting shown in the parameter Background.

> If set to White, the background will always be white regardless of the setting shown in the parameter Background.

> If set to Auto, the colour of the background in each profile will be as shown in the parameter Background.

10   Program the R-net Driving Characteristics to Suit the User

Now that the Omni has been programmed to suit the SID, the powerchair's drive performance must be programmed to suit the individual user. By using one of the methods explained in the section How to set up the Omni, the powerchair's speeds, acceleration rates and braking rates can be adjusted to meet exact requirements. Refer to the user guide for the programming method you are using for further details of the available adjustments. While conducting

this programming you may also need to refer to the previous section Programming the Omni to Suit the User. It is recommended you read that section before undertaking any programming.

Before test driving the system ensure there is sufficient space in which to drive the wheelchair, and that you and the user understand how to stop the wheelchair quickly.

Firstly, refer to the operating instructions for the type of SID in use. Ensure that the user fully understands each SID command. It is advisable to initially select the lowest speed setting and allow the user to become familiar with the controls before increasing the setting.

The Omni also contains a training function, whereby any of the SID's directional commands can be disabled. For example, the left and right commands could be disabled, in order to allow the user to become familiar with driving forwards. Refer to the Programming Chapter for more details.

Select values that are comfortable and safe for the powerchair user. It is the responsibility of the healthcare professional to ensure these values are comfortable and safe. PGDT accept no liability for any losses resulting from unsuitable values.

CHAPTER 2 - OPERATION

I   General Operating Principles

When the Omni is powered-up or awoken, then a screen such as below will appear. Power-up can be via the On/Off button on the front panel or via a switch connected into the External On/Off Switch Jack; while wake-up can be via the User Switch or a particular SID sequence if a User Switch is not fitted. See section Using the Omni without a User Switch for details of this sequence.
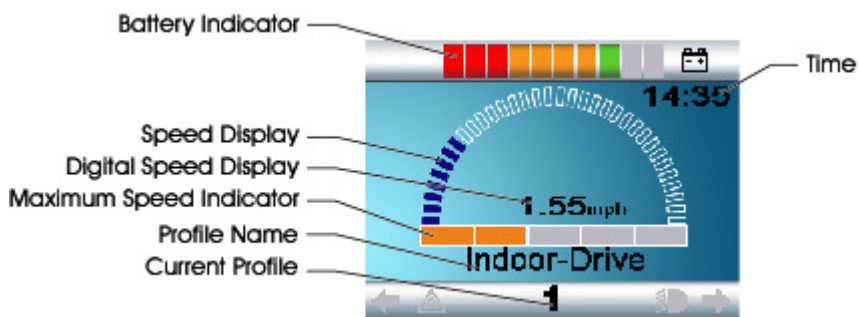
> This is a typical screen. Depending on SID type, programming or system configuration and status, there may be additional icons. Refer to section LCD Screen Details for further information.

The wheelchair can now be driven with the SID. While driving, the speed of the wheelchair will be indicated by the numeric display and the graphical display.

2   User Menu

If the Menu method of control is being used, then an operation of the User Switch will initiate the User Menu. A typical User Menu is shown below.
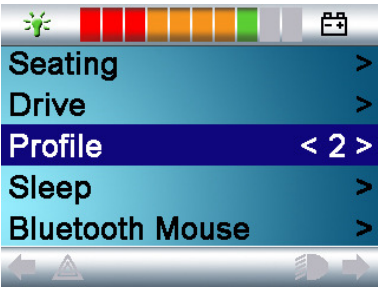
Forward and Reverse SID commands will change the highlighted line on the menu. It is also possible to program an automatic scanning sequence, which will highlight each line in turn. Refer to the Programming Chapter for further details.

At the right hand end of each line, there will be either a > or a number surrounded by < >, i.e. < 3 >

A > symbol indicates that a Right SID command, (or a User Switch operation when using a Single Switch Scanner Type SID), will enter that function.

A <3> display indicates that Left and Right SID commands, (or a User Switch operation when using a Single Switch Scanner Type SID), will change the selection for that function.

The User Menu can provide the following functions.

Drive*   >   Will enter Drive Mode in the presently selected Profile.

x: Profile x**   >   Will enter Drive Mode in the indicated Profile.

Profile   <x>   Sets the Profile that is used the next time Drive Mode is entered.

Seating*	>	Will enter Seating Mode.
Seating* 2	>	Will enter a second Seating Profile. E.g. if non-latched and latched operation is required.
Seating*	<x>	Sets the Seating Profile that is used the next time Seating Mode is entered.
Speed Adjust	<x>	Adjusts the maximum speed setting.
Mode x*		
To	>	All other available system Modes, e.g. PC Mouse, Environmental etc.
Mode y*		
Sleep	>	Will put the Omni to sleep.
Lights	>	Will enter Lighting Control Mode.
Exit	>	Will exit the menu and enter Drive Mode in the presently selected Profile.
Settings	>	Allows access to user settings such as backlight, background color and clock adjustment.

* The text will reflect the setting of the standard R-net parameter Mode Name.

** The text will reflect the setting of the standard R-net parameter Profile Name.

For full details of how to set up and customize the User Menu, refer to sections Position 1 to Position 16 and Position 1 Type to Position 16 Type in the Programming chapter.

For more details of operation for each SID type, refer to the following sections. Refer also to sections Speed Adjust Mode and Lighting Control Mode for information on how to use each SID type to control these Modes.

3   Operation with Joystick Type SIDs

Driving is via the SID's joystick and the User Switch is used to enter the User Menu or to sequence through the other functions of the wheelchair.

There are several standard R-net programming features that may be useful when using this SID type. These include joystick throw, joystick orientation and joystick deadband. Refer to the user guide for the programming method you are using for further details of the available adjustments.

Standard control of seating movement is via Forward and Reverse commands, and Left and Right commands will select a different seat axis for movement.

If required, it is possible to re-program the Omni to control the seating movement in alternative ways. Refer to sections Actuator Selection and Actuator Axes in the Programming chapter.

For latched operation using this SID type, refer to section Latched Operation.

4   Operation with Switch Type SIDs

Driving is via the SID's Forward, Reverse, Left and Right switches, and the fifth switch or User Switch is used to enter the User Menu or to sequence through the other functions of the wheelchair.

There are several standard R-net programming features that may be useful when using this SID type. These include joystick orientation. Refer to the user guide for the programming method you are using for further details of the available adjustments.

Standard control of seating movement is via Forward and Reverse commands, and Left and Right commands will select a different seat axis for movement.

If required, it is possible to re-program the Omni to control the seating movement in alternative ways. Refer to sections Actuator Selection and Actuator Axes in the Programming chapter.

For latched operation using this SID type, refer to section Latched Operation.

5   Operation with 3-axis Proportional and Switch Type SIDs (Head Arrays)

These types of SID contain a Forward/Reverse command, and Left and Right commands, as well as a User Switch(es)*. Driving is via the Forward/Reverse, Left and Right commands

* Depending on the installation, as well as a normally closed User Switch, there may be a user switch integrated into the head array. This switch would connect to the Omni via the fifth switch pin on the D-type connector.

User switch commands are then used to change drive direction and to enter the User Menu or to sequence through the other functions on the wheelchair. There are 3 ways to program the Omni to provide this functionality.

5.1   Double Click Change

A single User Switch operation toggles the direction, while a double operation of the User Switch will enter the User Menu or sequence the other functions.

This method is selected by setting parameter, Fwd/Rev Auto Toggle to Off.

There is programmability associated with the timing of the double operations. Refer to section Double Click in the Programming chapter.

5.2   Auto Toggle Change

A direction change will occur if a Forward/Reverse command is operated and released. A further operation of the Forward/Reverse command will result in drive in the newly selected direction.

This sequence must be completed within a given time period, typically 2 seconds. However, the parameter, Fwd/Rev Auto Toggle Time, can be adjusted to give a different time period.

If the sequence is not completed within the time period, the selected direction will automatically revert to its previous state.

The User Switch is used to enter the User Menu or sequence through the other functions on the wheelchair.

This method is selected by setting parameter, Fwd/Rev Auto Toggle to On.

For more details, refer to sections Fwd/Rev Auto Toggle and Fwd/Rev Auto Toggle Time in the Programming chapter.

5.3   Switch Medium Change

A direction change occurs at the instant the User Switch is operated, provided the parameter Double Click has been set to 0. If the User Switch is released and

a Forward/Reverse command is entered, then drive will commence in the newly selected direction.

If the User Switch is not released and is held for time period set by the programmable parameter, Switch Medium, then this is interpreted as a conventional User Switch operation, i.e. the User Menu will be entered or the other wheelchair functions would be sequenced. There will be no direction toggle in this instance.

As with the other two methods, if the User Switch is operated for a period greater than the time set by the programmable parameter, Switch Long, then the Omni will go to sleep.

5.4   Seating Control

Standard control of seating movement is via the Forward/Reverse command, and Left and Right commands will select a different seat axis for movement. The direction of movement is selected in the same way as that for changing drive direction.

As is often required in head array situations, it is possible to re-program the Omni to control the seating movement in alternative ways. Refer to sections Actuator Selection and Actuator Axes in the Programming chapter.

5.5   Associated Programming

There are several standard R-net programming features that may be useful when using this SID type. These include joystick throw, joystick orientation and joystick deadband. Refer to the user guide for the programming method you are using for further details of the available adjustments.

For latched operation using this SID type, refer to section Latched Operation.

It is possible to set up the Omni so that the functions can be navigated audibly. This can be useful if the user cannot easily always see the Omni's screen. Refer to section Using the Omni by Sound in the Advanced Section of this manual.

6   Operation with Sip and Puff Type SIDs

Driving is via a tube connected to the Omni's pneumatic input and the User Switch is used to enter the User Menu or to sequence through the other functions of the wheelchair. For this type of SID, you may want to consider using a pneumatic user switch.

There are four sip and puff commands, each of which relates to a drive direction. The table below shows the relationships.

Sip & Puff Command	Direction
Hard Puff	Forward
Hard Sip	Reverse
Soft Sip	Left
Soft Puff	Right

In addition, the Omni can be programmed so that two pneumatic operations, made within the period set by the parameter Double Click Time, will mimic a short operation of the User Switch in Standby.

The standard R-net programming parameter Joystick Orientation may also be useful when using this type of SID. Refer to the user guide for the programming method you are using for further details.

Standard control of seating movements is via a Hard Puff or Sip and a Soft Puff or Sip will select a different seat axis for movement.

If required, it is possible to re-program the Omni to control the seating movement in alternative ways. Refer to sections Actuator Selection and Actuator Axes in the Programming Chapter.

For latched operation using this SID type, refer to Latched Operation.

7   Operation with Single Switch Scanner Type SIDs

All functions, including drive, can be accessed via a single switch connected to one of the Omni's 'User Switch' jack sockets. For details of installation and connections, please refer to the 'Single Switch Scanner' section of Chapter 1.

7.1   Drive

The scanning rate in drive mode can be programmed to suit the user. Refer to the Programming Chapter for more details.

When the Omni is switched on, a screen like the one shown below will appear:
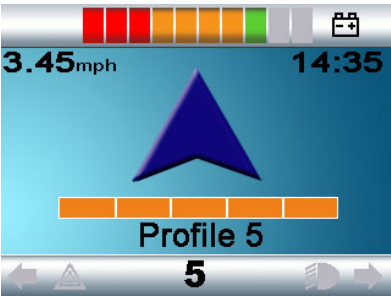
The Omni will scan through the following icons:

The method of driving is dependent on whether the R-net system is configured for 'momentary' or 'latched' operation.

In momentary operation, continuously depressing the User Switch whilst one of the 'arrow' icons is shown will cause the powerchair to drive in that direction until the switch is released. If the User Switch is depressed when the 'M' icon is shown, the Omni will enter the User Menu.

In latched operation, a single depression of the User Switch whilst one of the 'arrow' icons is shown will cause the powerchair to drive in that direction for a period of time set by the R-net power module parameter, 'Latched Timeout'. (Please refer to the user guide for the programming method you are using for further details of these parameters and latched operation).

To ease control of the chair while driving forwards, the scan sequence will change to:

>Forward, Right, Reverse, Left, Reverse, Right, Reverse, Left, Reverse, Right, Forward.

If the R-net system is configured for latched operation in reverse as well as forwards, the scan sequence will change when driving in reverse to:

>Reverse, Right, Forward, Left, Forward, Right, Forward, Left, Forward, Right, Reverse.

7.2   Seating Control

Seating mode can be entered from the User Menu via an operation of the User Switch. The Omni will sequentially scan though each available actuator 'axis' and then finish with an 'Exit' option to return to Drive, the User Menu or the next sequential function. If the User Switch is operated when one of the actuator axes are shown, a new scanning sequence will begin. The Omni will step through, 'up', 'down' and 'exit' choices. Each option can then be selected with an operation of the User Switch.

The scanning rate of the actuator axes is set to approximately 1 second and cannot be altered through programming.

7.3   Associated Programming

It is possible to set up the Omni so that the functions can be navigated audibly. This can be useful if the user cannot easily always see the Omni's screen. Refer to the section, Using the Omni by Sound in the Advanced Section of this manual.

It is not advisable to program the Switch to Standby parameter in the R-net power module when using Single Switch Scanner Type SIDs.

8   Speed Adjust Mode

A Speed Adjust Mode screen as shown below will appear if the User Control parameter has been set to Sequence. Left and Right SID commands will adjust the maximum speed setting.
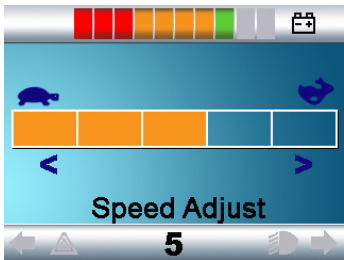
The User Switch exits to the next available menu entry.

> **It is not advisable to program the menu option, 'speed adjust' if the Sequence method is being used with a Single Switch Scanner Type SID. Refer to the Programming Chapter for further details.**

9   Lighting Control Mode

While in Lighting Control Mode, a screen as below will appear. Forward and Reverse SID commands will select each lighting function. A Left or Right SID command will switch on the function. Another Left or Right SID command will switch the function off.
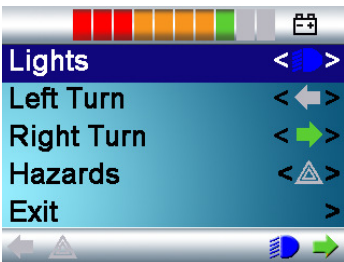
An operation of the User Switch or a Right SID command while Exit is highlighted exits to the point set by the parameter, Return To. For more details of this parameter, refer to the section Return To in the Programming chapter.

If User Control is set to Sequence, then selecting the Exit option will sequence to the next available menu entry.

10   Latched Operation

The programming for latched operation is now contained within the standard R-net programming, with the Omni and or a standard JSM.

Within the standard R-net Programming, the relevant parameters are: Latched Drive, Latched Actuators, Latched Timeout and Latched Timeout Beep. Refer to the user guide for the programming method you are using for further details of these parameters and latched operation.

11   LCD Screen Details

Some of the information in this section will have been covered earlier, however, the following provides a complete description of all the LCD screen graphics.

The LCD screen is split into 3 areas of information. The Top Bar, the Base Bar and the Main Screen Area.
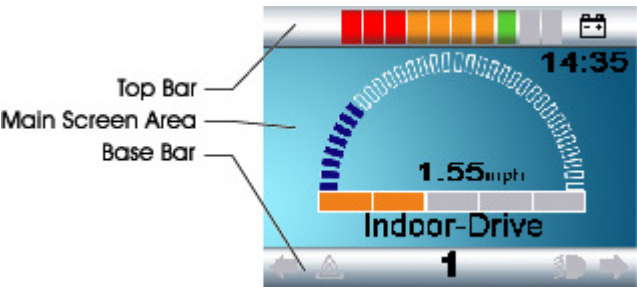
Each area is covered separately within this section.

II.I Top Bar

II.I.I   Battery Indicator

This displays the charge available in the battery and can be used to alert the user to the status of the battery.

Steady

This indicates that all is well.

Flashing Slowly

The control system is functioning correctly, but you should charge the battery as soon as possible.

Stepping Up

The wheelchair batteries are being charged. You will not be able to drive the wheelchair until the charger is disconnected and you have switched the control system off and on again.

II.I.2   Focus

When the control system contains more than one method of direct control, such as a secondary Joystick Module or a Dual Attendant Module, then the Module that has control of the wheelchair will display the In Focus symbol.

II.I.3   Port Identifier

If the Omni has been configured to accept 2 input devices the input device in command will be identified by either:

1 – Port 1   2 – Port 2

II.2   Base Bar

II.2.I   Current Profile

The current profile is shown in numeric form.

II.2.2   Motor Temperature

This symbol is displayed when the control system has intentionally reduced the power to the motors, in order to protect them against heat damage.

II.2.3   Control System Temperature

This symbol is displayed when the control system has intentionally reduced its own power, in order to protect itself against heat damage.

II.2.4   Indicator Icons

Off   On

The Indicator icons will flash when the respective indicators are active.

The Indicator icons will only be visible when an Intelligent Lighting/Seating Module is connected within the system.

II.2.5   Hazards Icon

Off   On

The Hazards icon and indicator icons will flash when the Hazard Warning lights have been activated.

The Hazards icon will only be visible when an Intelligent Lighting/Seating Module is connected within the system.

II.2.6 Lights Icon

 Off   On

The Lights icon will be switched on when the lights have been activated.

The Lights icon will only be visible when an Intelligent Lighting/Seating Module is connected within the system.

II.3   Main Screen Area

:: Drive Screen ::
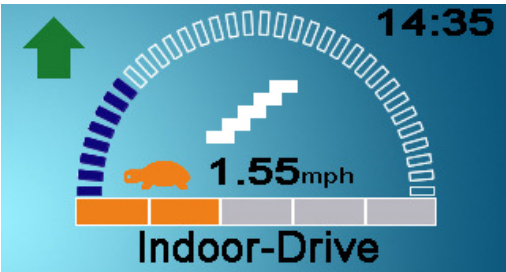
II.3.1   Profile Name

Indoor-Drive

This is a text string that displays the name of the currently selected Profile. The name is programmable, Refer to R-net Technical Manual SK77981 for details.

II.3.2   Clock

14:35

This displays the current time in a Numeric format.

The clock is user adjustable. Adjustable options are:

• **Visibility, whether the clock is displayed on screen.**

• **The display format, 12 or 24 hour.**

• **The time, the user can adjust the time.**

These adjustments are made within User Menu/Settings.

II.3.3   Selected Direction Indicator

Forwards   Reverse
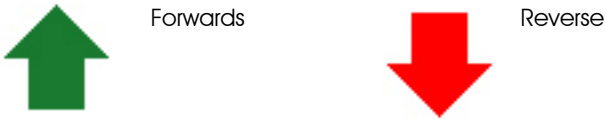
These are only displayed if the Omni has been configured to use a 3 axis proportional SID. Refer to the Operation with 3-axis Proportional and Switch type SIDs (Head Arrays).

II.3.4   Speed Display

This gives a proportional display of the wheelchairs speed. The Arc begins at 0% and has a programmable maximum. The programmable parameter is Max Displayed Speed. Refer to the Programming Chapter.

II.3.5   Digital Speed Display

1.55mph   This displays the actual speed of the wheelchair derived from the motors. The display can be set to mph of km/h.

These adjustments can be made in the OBP Menu.

II.3.6 Maximum Speed Indicator

This displays the current speed setting.

II.3.7 Latched

When the control system is operating in a latched condition this symbol will be displayed.

II.3.8 Inhibit

If the speed of the wheelchair is being limited; for example, by a raised seat, then this orange symbol will be displayed.

If the wheelchair is being inhibited from driving, then this red symbol will be flashing.

II.3.9 Scanner Drive Symbols

If the Omni is programmed to operate with a Single Switch Scanner Type SID these symbols will be displayed to indicate:

Forward drive.

Reverse drive.

Right drive.

Left drive.

Mode Select

II.3.IO Scanner Actuator Symbols

If the Omni is programmed to operate with a Single Switch Scanner Type SID these symbols will be displayed to indicate:

Up.

Down.

Exit Actuators

:: Mode Screens ::

II.3.II   Actuator Mode

Backrest
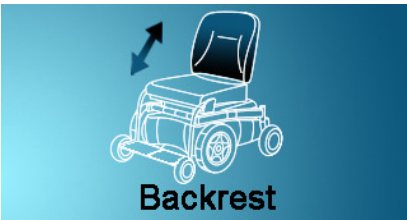
Displays the sections of the chair currently selected for movement, the name given to the selection and a direction arrow showing what sort of movement is available.

II.3.I2 Environment Mode

When Environmental Mode is entered the following screen will be displayed.

II.3.I3 PC

When PC Mode is entered the following screen will be displayed.
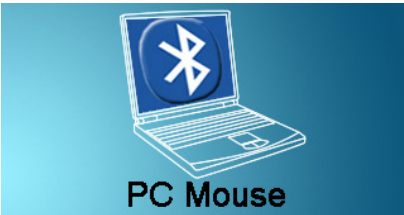
II.3.I4 Speed Adjust

When Speed Adjust Mode is entered the following screen will be displayed.
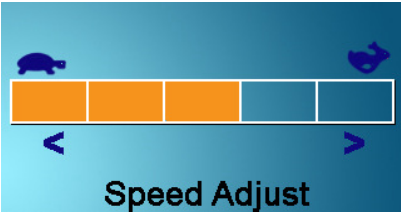
II.4   Message Window

The Omni displays warning icons and informational messages, in a dedicated message window, as seen below.

II.4.1   Restart

 When the control system requires a reboot; for example, after a module re-configuration, this symbol will be flashed.

II.4.2   Timer

 This symbol is displayed when the control system is changing between different states. An example would be entering into Programming Mode. The symbol is animated to show the sands falling.

II.4.3   Sleep

 This symbol is displayed when the Omni has gone into sleep mode.

II.4.4   Cross & Tick

These symbols will be displayed during configuration procedures.

 Process completed correctly.

Process not completed correctly.

II.4.5 Limp

This message is displayed if a user switch has become disconnected and the Omni is programmed to still allow drive, at a reduced rate.

Limp

II.4.6 E-stop

E-Stop

If the user switch is activated during drive, or actuator operation, this symbol will be displayed.

II.4.7 SID Displaced

If you operate the SID before or just after you switch the control system on, the screen will flash the joystick displaced screen.

You must release and center the SID to resume normal operation. If you do not release the SID within five seconds the wheelchair will not be able to move, even if you release the SID and operate it again. The screen will display a

diagnostic screen at this time. You can reset this condition by switching the control system off and on again.

II.4.8 Control System Locked

The Control System can be locked in one of two ways. Either using a sequence of deflections and presses with a SID or with a physical Key. How the Control System is locked depends on how the wheelchair manufacturer has programmed the system.

II.4.8.1   Keypad Locking

To lock the wheelchair using the keypad:

* While the control system is switched on, depress On/Off input.

* After 1 second the control system will beep. Now release the On/Off input

* Deflect the SID forwards until the control system beeps.

* Deflect the SID in reverse until the control system beeps.

* Release the SID, there will be a long beep.

* The wheelchair is now locked.

The padlock will be displayed if the Omni is switched back on.

To unlock the wheelchair:

* If the control system has switched off, press the On/Off input.

* Deflect the SID forwards until the control system beeps.

* Deflect the SID in reverse until the control system beeps.

* Release the SID, there will be a long beep.

* The wheelchair is now unlocked.

It is not possible to lock the control system using the sequence method if a Single Switch Scanner Type SID is being used.

II.4.8.2   Key Locking

To lock the wheelchair with a key lock:

•   Insert a PGDT supplied key into the Charger Socket until there is an audible short beep.

•   Remove the key, there will now be a long beep.

•   The wheelchair is now locked.

The padlock will be displayed if the Omni is switched back on.

To unlock the wheelchair:

•   Insert a PGDT supplied key into the Charger Socket until there is an audible short beep.

•   Remove the key, there will now be a long beep.

•   The wheelchair is now unlocked.

II.4.9 Diagnostic Screen

When the control system safety circuits have operated and the control system has been prevented from moving the wheelchair a diagnostics screen will be displayed.

This indicates a system trip, i.e. the R-net has detected a problem somewhere in the wheelchair's electrical system.
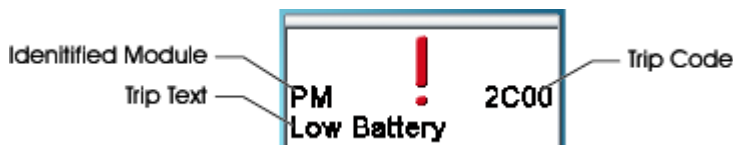
If the error is in a non-active module, for example in the ISM but with a drive Profile selected, then drive will still be possible, however, the diagnostic screen will appear intermittently.

II.4.9.I   Identified Module

This identifies which module of the control system has registered the problem.

PM   Power Module

JSM   Joystick Module

ISM   Intelligent Seating/lighting Module

OMNI   Omni

II.4.9.2   Trip Text

The Trip Text gives a brief description of the trip type.

II.4.9.3   Trip Code

The 4 digit code displayed gives the exact trip that has been recorded.

II.4.9.4   Diagnostic Procedure

Please follow this procedure:

•   Read and note the Trip Text displayed, the identified Module and the Trip Code.

•   Switch off the control system.

•   Make sure that all connectors on the listed Module and the wheelchair are mated securely.

•   Check the condition of the battery.

•   Find the definition of the Trip Code in the Service Guide, and take the required action.

- Switch on the control system again and try to drive the wheelchair. If the safety circuits operate again, switch off and do not try to use the wheelchair. Contact your service agent.

Example:
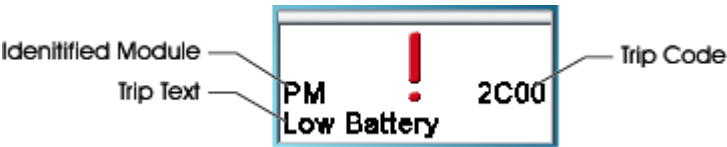
Identified Module	Power Module Trip.
Trip Text	Low Battery
Trip Code	2C00

This means the battery needs charging or there is a bad connection to the battery.

- Check the connections to the battery. If the connections are good, try charging the battery.

CHAPTER 3 – PROGRAMMING STANDARD

1   Introduction

This chapter gives an overview of the R-net programmable parameters that are associated with the Omni. The Omni can be programmed in 3 ways, each is described below.

Programming should only be conducted by healthcare professionals with in-depth knowledge of PGDT control systems. Incorrect programming could result in an unsafe set-up of a wheelchair for a user. PGDT accept no liability for losses of any kind if the programming is inappropriate for the SID type or user.

1.1   On-Board Programming (OBP)

This is performed using the Omni's own display and front panel buttons. For details of these buttons, refer to section Controls and Connections. From the Omni, all system OBP parameters can be adjusted: for example, Speeds and Accelerations.

OBP can be entered in one of two ways, depending on the factory programming of the control system.

To enter OBP using a keypad sequence:

- Hold down the Profile button and then hold down the On/Off button until there is a short beep. Note, the normal power-up sound will occur prior to this beep.

- Release the Profile button, but continue to hold down the On/Off Button until there are two further short beeps.

- Release the On/Off button, there will be a longer beep and OBP Mode will be entered.

After the sequence has been performed and while the system remains switched on, the Mode button can be used to sequence through all system Modes and to return to OBP Mode. If the system is powered-down or there is no OBP activity for 5 minutes, then the keypad sequence will need to be performed again.

To enter OBP using the R-net Dongle:

•   **Turn off the control system.**

•   **Connect the Dongle either between any of the system modules or into any spare communications connector.**

•   **Turn on the control system.**

•   **Use the Mode button to step to the OBP mode.**

While the Dongle remains connected, the Mode button can be used to sequence through all system Modes and to return to OBP Mode.

The following parameters are available for adjustment within OBP. Within the OBP parameter tree, there is a branch called Omni. This branch contains the parameters shown below. The default settings for all these parameters are also shown below. Refer to the R-net OBP user guide for details of how to program using this method. Those marked with * are relevant to advanced use and you should read the Advanced Section of this document before making adjustments.

1.1.1   OBP Parameter List

Global

    Sip and Puff

	Calibrate	*Test Function*
	Puff Threshold	*50%*
	Sip Threshold	*50%*
	Deadband	*10%*
	Puff Ramp Up	*0.30s*
	Puff Ramp Down	*0.30s*
	Sip Ramp Up	*0.30s*
	Sip Ramp Down	*0.30s*
	Double Click	*2xSoft*
	Double Click Time	*1.0s*
	Active Double Click	*Test Function*
Scan Speed		*1.0s*
Sleep 12V		*On*

Profiled

    Port   *1*

Port 1 / 2

SID	*Proportional*
Switches	
User Switch	*Normally Closed*
Switch Detect	*On*
9-way Detect	*Off*
Switch Long	*1.00s*
Switch Medium	*1.00s*
Switch Debounce	*100ms*
Double Click	*0.30s*
Active Double Click	*Test Function*
Controls	
User Control	*Menu*
Return to	*Drive*
Timeout to Menu	*0s*
Menu Nav	*Normal*
Menu Scan Rate	*0s*
Auto-Repeat	*Off*
F/R Auto Toggle	*Off*
F/R Auto Tog Time	*2.00s*
Actuator Select	*SID*
Actuator Axes	*Normal*
User Menu	
Position	
Position 1	*Md 2*
Position 2	*Md 1*
Position 3	*Md 1*
Position 4	*SAdj*
Position 5	*Md 3*
Position 6	*Md 4*
Position 7	*Md 5*
Position 8	*Md 6*
Position 9	*Md 7*
Position 10	*Blank*
/	
Position 16	*Blank*
Position Type	
Position 1	*Entry*
Position 2	*Entry*

Position 3	*Select*
Position 4	*Select*
Position 5	*Entry*
/	
Position 16	*Entry*

Beeps

Profile Change*	*Short*
Mode Change*	*Short*
User Menu Entry*	*Short*
Menu Scroll*	*Short*
Profile Id#*	*Off*
Axis Id# *	*Off*
Position 1*	*0*
Position 16*	*0*

Port 2   **All Parameters as per Port 1**

Settings

Set Time	*Current Time*	
Display Time	*24Hr*	
Backlight	*100%*	
Background	*Auto*	(Available mid-2007)

Training Mode

Fwd Inhibit	*No*
Rev Inhibit	*No*
Left Inhibit	*No*
Right Inhibit	*No*

1.2   Handheld Programming

From 2008, the Omni will be programmable via the R-net Handheld Programmer. Refer to the R-net Handheld Programmer user guide for further details of how to program using this method.

1.3   PC Programming

The Omni can be programmed using the R-net PC Programmer. Within the PC Programmer parameter tree, there is a branch called Omni. This branch

contains the parameters shown below. The default settings for all these parameters are also shown below. Refer to the R-net PC Programmer user guide for further details of how to program using this method.

1.3.1   PCP Parameters

	Profile 1 / Port 1	Profile 2 / Port 2	Profile 3	Profile 4	Profile 5	Profile 6	Profile 7	Attendant
Omni								
Global								
Sip and Puff								
Puff Threshold	55 %							
Sip Threshold	55 %							
Deadband	10 %							
Puff Ramp Up	0.50 s							
Puff Ramp Down	0.50 s							
Sip Ramp Up	0.50 s							
Sip Ramp Down	0.50 s							
Double Click	2xHard							
Double Click Time	0.3 s							
Scan Speed	0.3 s							
Sleep 12V	On							
Profiled	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Profile 6	Profile 7	Attendant
Port	1	1	1	1	1	1	1	1
Ports								
SID	Port 1	Port 2						
SID	Proportional	Proportional						
Switches	Port 1	Port 2						
User Switch	Normally Closed	Normally Closed						
Switch Detect	On	On						
9-Way Detect	Off	Off						
Switch Long	1.00 s	1.00 s						
Switch Medium	1.00 s	1.00 s						
Switch Debounce	50 ms	50 ms						
Double Click	0.3 s	0.3 s						
Controls	Port 1	Port 2						
User Control	Menu	Menu						
Return To	Drive	Drive						
Timeout to Menu	0 s	0 s						
Menu Navigation	Normal	Normal						
Menu Scan Rate	0.50 s	0.50 s						
Auto-repeat	Off	Off						
Fwd / Rev Auto Toggle	Off	Off						
Fwd / Rev Auto Toggle Time	2.00 s	2.00 s						
Actuator Selection	SID	SID						
Actuator Axes	Normal	Normal						
User Menu	Port 1	Port 2						
Position 1	Seating	Seating						
Position 1 Type	Entry	Entry						
Position 2	Drive	Drive						
Position 2 Type	Entry	Entry						
Position 3	Drive	Drive						
Position 3 Type	Select	Select						
Position 4	Speed Adjust	Speed Adjust						
Position 4 Type	Select	Select						
Position 5	Bluetooth	Bluetooth						
Position 5 Type	Entry	Entry						
Position 6	Environmental	Environmental						
Position 6 Type	Entry	Entry						
Position 7	Mode 5	Mode 5						
Position 7 Type	Entry	Entry						
Position 8	Mode 6	Mode 6						
Position 8 Type	Entry	Entry						
Position 9	Mode 7	Mode 7						
Position 9 Type	Entry	Entry						
Position 10	Blank	Blank						
Position 10 Type	Entry	Entry						
Position 16	Blank	Blank						
Position 16 Type	Entry	Entry						
Beeps	Port 1	Port 2						
Profile Change	Short	Short						
Mode Change	Short	Short						
User Menu Entry	Short	Short						
User Menu Scroll	Short	Short						
Profile Identifier #	Off	Off						
Axis Identifier #	Off	Off						
Position 1 #	0	0						
Position 16 #	0	0						
Training Mode								
Forward Inhibit	No							
Reverse Inhibit	No							
Right Inhibit	No							
Left Inhibit	No							

2   Details of all Omni Programmable Parameters

The following sections explain the effect of all the Omni programmable parameters.

2.1   Global – Sip and Puff

2.1.1   Puff Threshold

This sets the threshold point between soft and hard puffs.

The programmable range is between the value of Deadband and 100 in steps of 1.

2.1.2   Sip Threshold

This sets the threshold point between soft and hard sips.

The programmable range is between the value of Deadband and 100 in steps of 1.

2.1.3   Deadband

This sets the size of the sip / puff's neutral area. In other words, how much pressure the user must apply with either a sip or a puff before the brakes of the powerchair are released and drive commences.

The programmable range is between 5 and 50 in steps of 1.

2.1.4   Puff Ramp Up

This sets the time allowed to ramp up to a hard puff from zero pressure.

Whenever a hard puff is attempted, there is a period of time when the pneumatic pressure is below the Puff Threshold. This could be falsely interpreted by the Omni as a soft puff command. Different users will have differing abilities in terms of how quickly they can generate sufficient pressure to pass this threshold. Puff Ramp Up allows the user more time to reach the Puff Threshold. If this threshold is not reached within the Puff Ramp Up time, a soft puff will be interpreted, provided the pressure is above the value set for Deadband.

The programmable range is between 0ms and 2000ms in steps of 50ms.

2.1.5   Puff Ramp Down

This sets the time allowed to ramp down to zero pressure from a hard puff.

When a hard puff has finished, there is a period of time when the pneumatic pressure is below the Puff Threshold but still above the value for Deadband. This could be falsely interpreted by the Omni as a soft puff command. Puff Ramp Down allows the user sufficient time to reach the Deadband without unintentionally providing a soft puff. If this Deadband is not reached within the Puff Ramp Down time, a soft puff will be interpreted, provided the pressure is below the Puff Threshold.

The programmable range is between 0ms and 2000ms in steps of 50ms.

2.1.6   Sip Ramp Up

This sets the time allowed to ramp up to a hard sip from zero pressure.

Whenever a hard sip is attempted, there is a period of time when the pneumatic pressure is below the Sip Threshold. This could be falsely interpreted by the Omni as a soft sip command. Different users will have differing abilities in terms of how quickly they can generate sufficient pressure to pass this threshold. Sip Ramp Up allows the user more time to reach the Sip Threshold. If this threshold is not reached within the Sip Ramp Up time, a soft sip will be interpreted, provided the pressure is above the value set for Deadband.

The programmable range is between 0ms and 2000ms in steps of 50ms.

2.1.7   Sip Ramp Down

This sets the time allowed to ramp down to zero pressure from a hard sip.

When a hard Sip has finished, there is a period of time when the pneumatic pressure is below the Sip Threshold but still above the value for Deadband. This could be falsely interpreted by the Omni as a soft sip command. Sip Ramp Down allows the user sufficient time to reach the Deadband without unintentionally providing a soft sip. If this Deadband is not reached within the Sip Ramp Down time, a soft sip will be interpreted, provided the pressure is below the Sip Threshold.

2.1.8   Double Click

Two pneumatic operations made within the period set by the parameter Double Click Time, mimic a short operation of the User Switch in Standby. This parameter sets whether a double Soft or a double Hard command are required.

The parameter can be set to either 2x Soft commands or 2x Hard commands

2.1.9   Double Click Time

This sets the period of time during which two pneumatic commands must be detected, in order to be interpreted as a 'double-click'.

The programmable range is between 0s and 2.5s in steps of 0.1s. (If set to 0s no double-click facility will be supported).

2.1.10   Active Double Click

This parameter allows the user to test whether they can reproduce a pneumatic double-click operation within the period set by Double Click Time.

2.2   Global – Scan Speed

This sets the scanning rate of the drive screen when using a Single Switch Scanner Type SID.

2.3   Global - Sleep

2.3.1   Sleep 12V

This sets whether the 12V supply to the D-type connectors is present while the Omni is asleep*.

There are two programmable options, On and Off.

> If set to On, then the 12V supply will be present when the Omni is asleep.

> If set to Off, then the 12V supply will not be present when the Omni is asleep.

*Asleep is the Sleep state entered via a long operation of the User Switch or from the User Menu.

2.4   Profiled

2.4.1   Port

This sets which Omni Port is active in a particular Profile.

The programmable options are 1 or 2.

2.4.2 Background

This sets which Screen display will be shown when each Profile is entered.

There are two programmable options, Blue and White.

> Blue is the standard Omni graphical display

> White is the High Contrast display, ideal for operations outside or in brightly lit environments.

For this parameter to work effectively, the Background setting in the User Menu must be set to Auto.

2.5   Ports 1 / 2 - SID

2.5.1   SID

This sets the type of Specialty Input Device, SID, that the Omni will be compatible with.

The programmable options are: Proportional, Switch, 3-Axis Proportional, 3-Axis Switch, Sip Puff and Scanner.

2.6   Ports I / 2 - Switches

2.6.1   User Switch

This sets whether the Omni is expecting a normally-open or normally-closed User Switch.

The programmable options are Normally Open or Normally Closed.

If the setting does not match the switch type, then the Omni will not operate correctly.

PGDT recommend the use of a normally-closed User Switch. PGDT accept no liability for losses of any kind arising from the use of any other type of switch.

2.6.2 Switch Detect

This sets how the Omni will behave if the User Switch becomes disconnected.

The programmable options are On, Off and Limp.

> If set to On and the User Switch becomes disconnected, then the Omni will trip.

> If set to Off and the User Switch becomes disconnected, then the Omni will try to operate normally, even though the User Switch is disconnected.

> If set to Limp and the User Switch becomes disconnected, then the Omni will allow drive, but at a reduced speed, and will issue visual and audible warnings.

PGDT recommend this parameter is always set to On. PGDT accept no liability for losses of any kind arising from any other setting.

2.6.3 9-way Detect

This sets whether the Omni will expect a "detect link" in a SID connected to the 9-way D-type.

There are two settings, On and Off.

> If set to On, the Omni will expect a "detect-link" and if one is not present will trip.

> If set to Off, no "detect-link" is required.

2.6.4 Switch Long

This sets the period of time the User Switch must be operated in order to put the Omni into Sleep Mode.

The programmable range is 0.5s to 5.0s in steps of 0.25s.

When using Single Switch Scanner Type SIDs the Omni can be put to sleep via the User Menu or Sequence.

2.6.5 Switch Medium

This parameter is intended for 3-axis Proportional and Switch Type SIDs only

A direction change occurs at the instant the User Switch is operated, provided the parameter Double Click has been set to 0. If the User Switch is released and a Forward/Reverse command is entered, then drive will commence in the newly selected direction.

If the User Switch is not released and is held for time period set by the programmable parameter, Switch Medium, then this is interpreted as a conventional User Switch operation, i.e. the User Menu will be entered or the other wheelchair functions would be sequenced. There will be no direction toggle in this instance.

As with the other two methods, if the User Switch is operated for a period greater than the time set by the programmable parameter, Switch Long, then the Omni will go to sleep.

The programmable range is 0.5s to 5.0s in steps of 0.25s.

2.6.6 Switch Debounce

This sets the debounce time for the User Switch. Debounce is the period of time the switch is operated continuously before a new condition is registered.

The programmable range is 30ms to 500ms in steps of 10ms.

2.6.7 Double Click

This sets the period of time during which two User Switch operations must be detected, in order to be interpreted as a double-click.

The programmable range is 0s to 2.5s in steps of 0.1s

> If set to 0s, then no double-click facility will be supported. This setting should be used if accidental double-clicks are a problem.

> If set to any other value, then this is the period that two User Switch operations must be made, in order to be interpreted as a double-click.

2.6.8 Active Double Click

This parameter allows the user to set and test the Double Click speed.

This parameter is only available in OBP.

2.7   Omni – Controls

2.7.1   User Control

This sets how the SID and/or User Switch are used to select the available Profiles and Modes.

There are two programmable options, Sequence and Menu.

- If set to Sequence, then operations of the User Switch will move to the next available Profile or Mode. The order of the sequence is programmable, refer to the section Omni - User Menu.

> **It is not advisable to program the menu options, 'speed adjust' or 'profile select', if the Sequence method is being used with Single Switch Scanner Type SIDs.**

- If set to Menu, then an operation of the User Switch in Drive Mode will bring up a User Menu that presents all available Profiles and Modes. The SID is then used to navigate the menu. Forward and Reverse commands will change the highlighted menu options; and Left and Right commands are used to change settings, or to enter the highlighted Profile or Mode.

The order of the menu is programmable, as is the way in which some of the options are presented, refer to the section Omni User Menu.

When using a Single Switch Scanner Type SID, it is advisable to program an appropriate scanning rate for the User Menu. This is achieved using the programmable parameter, Menu Scan Rate. Operations of the User Switch whilst scanning through the User Menu will change settings or enter the highlighted Profile or Mode.

2.7.2 Return To

This sets the effect of a short operation of the User Switch in a non-Drive Mode when the User Control is set to Menu.

There are two programmable options, Drive and Menu.

> If set to Drive, then a short operation of the User Switch in any non-Drive Mode will return to the Drive Mode.

> If set to Menu, then a short operation of the User Switch will bring up the User Menu.

When using Single Switch Scanner Type SIDs this parameter will set the return destination from a non-Drive Mode when the Exit option is highlighted and the User Switch is operated.

2.7.3 Timeout to Menu

This sets the period of SID inactivity before the User Menu will appear.

The programmable range is 0s to 60s in steps of 1s.

> If set to 0, then the User Menu cannot be entered using this method.

2.7.4 Menu Navigation

This parameter allows the user to invert the navigation direction of the User Menu with their SID. This parameter is not adjustable with 3-axis type SIDs.

The programmable options are Normal and Invert.

If set to Normal, operations of the SID in the forwards direction will navigate UP.

If set to Invert, operations of the SID in the forwards direction will navigate DOWN.

2.7.5 Menu Scan Rate

This sets the scanning rate for the User Menu, Lights Menu and Settings Menu. If User Control is set to Sequence, the scan rate will only be applicable in the Lights and Settings menus.

The programmable range is between 0s and 10s in steps of 0.25s. (If set to 0s no scanning is possible within menus).

2.7.6 Auto-repeat

This sets whether there is an auto-repeat function on the direction commands for various SIDs. Auto-repeat means that successive commands will be applied if the switch is continuously operated, which is useful when navigating the user menu.

This is usually not desirable in head control applications.

There are two programmable options, On and Off.

If set to On, there will be an auto-repeat function.

If set to Off, there will be no auto-repeat function.

2.7.7 Fwd/Rev Auto Toggle

This sets the method of changing direction with 3-axis SIDs. This parameter has no effect with any other type of SID, i.e. it is intended for use primarily in head control applications.

There are two programmable options, On and Off.

If set to On, then an operation of the SID's Fwd/Rev command can be used to change the selected drive direction. This is achieved by operating and releasing the Fwd/Rev command within a 2 second period. This will change the previously selected drive direction. To drive in the newly selected drive direction, then the Fwd/Rev command must be operated again within a further 2 seconds. If this 2 second period

passes without a Fwd/Rev command, then the selected drive direction will revert to the original setting.

If set to Off, then a short operation of the User Switch selects a new drive direction and double-clicks of the same switch change Profile or Modes.

> **It is not possible to use the Fwd/Rev Auto Toggle function if latched driving is required, as there is a conflict in user command logic. If Fwd/Rev Auto Toggle is set to On and latched drive is enabled in programming, then an error message Bad Settings will appear.**

2.7.8 Fwd/Rev Auto Toggle Time

This sets the time the user has to operate the Fwd/Rev command to be effective.

Adjustable between 0.5 and 5 seconds in steps of 0.25s.

2.7.9 Actuator Selection

This sets whether actuator axes are selected via SID commands or via the User Switch.

There are two programmable options, SID and Switch.

If set to SID, then operation of the SID's direction commands will select each of the available actuator axes. The actual SID commands required to do this will be dependent on the setting of the parameter, Actuator Axes.

If set to Switch, then operations of the User Switch will select each of the available actuator axes. In this instance, there will be an additional pseudo axis, Exit, and when this is selected, the SID commands normally used to move an axis can be used to exit Seating Mode.

2.7.10 Actuator Axes

This sets which SID direction commands are used to select the available axes. This parameter is not applicable when using Single Switch Scanner Type SIDs.

The programmable options are: Normal, Swap, Left/Right and Right/Left.

> If set to Normal, then left and right SID commands will select the available actuator axes, and forward and reverse commands will move the selected axis.

> If set to Swap, then forward and reverse SID commands will select the available actuator axes, and left and right commands will move the selected axis.

> If set to Left/Right, then a left SID command will select the available actuator axes and a right SID command will move the selected axis. The direction of movement is changed via a short operation by a right SID command.

> If set to Right/Left, then a right SID command will select the available actuator axes and a left SID command will move the selected axis. The direction of movement is changed via a short operation by a left SID command.

2.8   Omni – User Menu

2.8.1   Position 1 to Position 16

This sets the position of menu items within the User Menu. The User Menu can have up to 16 lines. If any of the values are edited, the following additional window will appear.

Omni User Menu Edit

Port 1 | Port 2

User Menu Position

	Mode	Type
1	Seating	Entry
2	Drive	Entry
3	Drive	Select
4	Speed Adjust	-
5	Bluetooth	Entry
6	Environmental	Entry
7	Mode 5	Entry
8	Mode 6	Entry
9	Mode 7	Entry
10	Blank	Entry
11	Blank	Entry
12	Blank	Entry
13	Blank	Entry
14	Blank	Entry
15	Blank	Entry
16	Blank	Entry

Actual User Menu Display

Seating	>
Drive	>
Drive	<1>
Speed Adjust	<1>
Bluetooth	>
Environmental	>
Mode 5	>
Mode 6	>
Mode 7	>

OK | Cancel | Apply | Help

The programmable options are: Blank, each of the standard R-net Modes and each of the Omni Modes – Exit, Speed Adjust, Sleep, Lights and Settings.

If set to Blank, then there will be no menu item displayed.

If set to Exit, then selecting that option will take you back to Drive Mode.

Below is an example of programming:

Position 1:	Seating	Position 6:	Exit
Position 2:	Drive	Position 7:	Blank
Position 3:	Speed Adjust			
Position 4:	Drive	Position 16:	Blank
Position 5:	Settings		

The User Menu would appear as follows:

EXIT   **>**
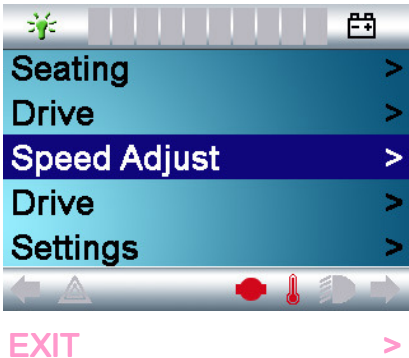
> **It is possible to set items to appear multiple times in the menu.**

2.8.2 Position 1 Type to Position 16 Type

This sets the "type" of the menu item on the screen.

There are three programmable options: Entry, List and Select. These parameters affect only menu items that are genuine R-net Modes, they do not affect the Omni Modes.

The best way to explain each of the settings is in a series of examples. (For Single Switch Scanner Type SIDs replace 'left and right SID commands' with 'short User Switch operations).

Assume Position 1 = Drive and Position 1 Type = Entry, then the menu item would appear as below.

       Drive   >

The effect of Entry is to display the Mode Name and an entry >. A right SID command will enter the Mode.

Assume Position 1 = Drive and Position 1 Type = List, then the menu would appear as below.

       1: Profile 1   >

       2: Profile 2   >

       3: Profile 3   >

etc.

The effect of List is to list all the available Profiles for the Mode. In this case, all the available Drive Profiles. The first number denotes the actual Profile number, while the text will be as set by the standard R-net parameter, Profile Name. A right SID command will enter the highlighted Profile.

Assume Position 1 = Drive and Position 1 Type = Select, then the menu item would appear as below.

    Profile   < 3 >

The effect of Select is to allow a new Profile to be selected, but not necessarily entered. Selection is via left and right SID commands. There would be a further menu item, Drive, that would enter Drive Mode in the selected Profile. This method reflects the functionality of the Pilot+ Omni+

All these examples use Drive Mode, which conventionally has multiple Profiles. However, other Modes are generally only present in one Profile; meaning that, in practice, a setting of Entry will be the most commonly used for non-Drive Modes. However, for completeness, the Omni does offer the capability of working with multiple Profiles in non-Drive Modes. Again, this is best explained in an example, as follows.

Assume it is required to have non-latched and latched seating control. This can be achieved by enabling Seating Mode in two Profiles via the standard R-net parameter, Mode Enable. The conventional way of doing this would be settings such as below. Latched seating control would also need to be set in one of the Profiles via the standard R-net parameter, Latched Actuators.

	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5
Mode Enable	12	12	1	1	1

Assume Position 1 = Seating and Position 1 Type = Entry, then the menu item would appear as below.

    Seating   >

The effect of Entry is to display the Mode Name and an entry >. A right SID command will enter the Mode. The Mode will be entered in the Profile in which it was last used
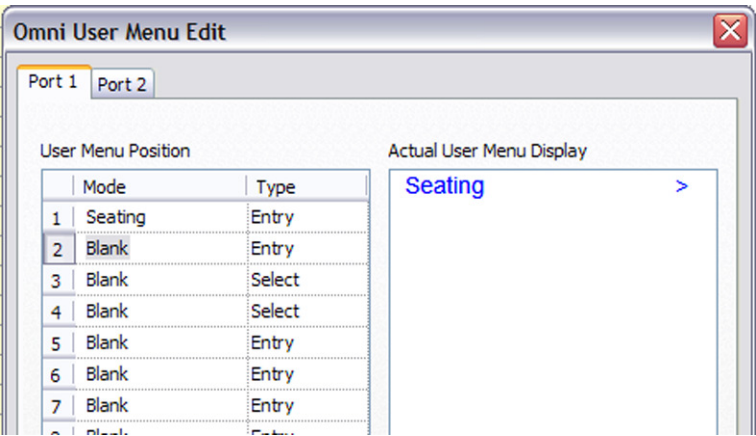
Assume Position 1 = Seating and Position 1 Type = List, then the menu would appear as below.

Seating 1   >

Seating 2   >

The effect of List is to list all the available Profiles for the Mode. In this case the two Seating Profiles. The first line denotes the lowest numbered Profile and the second line the next highest number Profile. In this case Seating Mode in Profile 1 and then Profile 2. The text will be as set by the standard R-net parameter, Mode Name. Note: although it does in this case, the number does not necessarily reflect the actual Profile number. Instead Seating 1 would actually enter the lowest numbered Profile that had Seating Mode enabled, while Seating 2 would actually enter the next highest numbered Profile. A right SID command will enter the highlighted Profile.

Assume Position 1 = Seating and Position 1 Type = Select, then the menu item would appear as below.

Seating   < 1 >

The effect of Select is to allow a new Profile to be selected, but not necessarily entered. Selection is via left and right SID commands. There would be a further menu item, Seating, that would enter Seating Mode in the selected Profile.

> Although it does in these examples, the number does not necessarily reflect the actual Profile number. Instead Seating 1 would actually enter the lowest numbered Profile that had Seating Mode enabled, while Seating 2 would actually enter the next highest numbered Profile.

2.79   Omni - Beeps

2.9.1   Profile Change

This sets the type of beep that occurs upon a Profile change.

The programmable options are: Off, Short and Long.

> If set to Off, there will be no beep upon a Profile change.
>
> If set to Short, there will be a short beep upon a Profile change.
>
> If set to Long, there will be a long beep upon a Profile change.

2.9.2   Mode Change

This sets the type of beep that occurs upon a Mode change.

The programmable options are: Off, Short and Long.

> If set to Off, there will be no beep upon a Mode change.
>
> If set to Short, there will be a short beep upon a Mode change.
>
> If set to Long, there will be a long beep upon a Mode change.

2.9.3   User Menu Entry

This sets the type of beep that occurs upon entry to the User Menu.

The programmable options are: Off, Short and Long.

> If set to Off, there will be no beep upon entry to the User Menu.
>
> If set to Short, there will be a short beep upon entry to the User Menu.
>
> If set to Long, there will be a long beep upon entry to the User Menu.

2.9.4 User Menu Scroll

This sets the type of beep that occurs when scrolling through the User Menu, Lights Menu and Settings Menu.

The programmable options are Off, Short and Long.

> If set to Off, there will be no beep during scanning.

> If set to Short, there will be a short beep each time the scanner moves to a new line.

> If set to Long, there will be a long beep each time the scanner moves to a new line.

2.9.5 Profile Identifier

This can be set to issue a number of beeps corresponding to the Profile number. The beeps are of a lower tone to the Profile Change, Mode Change and User Menu Entry beeps, and will occur after these.

Depending on how the Omni is set-up, the beeps will occur as below.

> Menu operation with Drive Position Type set to Entry: no beep sequence supported.

> Menu operation with Drive Position Type set to List: beeps will occur when a particular Profile is highlighted on the User Menu.

> Menu operation with Drive Position Type set to Select: beeps will occur when the Profile selection is changed on the User Menu.

> Sequence operation with Drive Position Type set to Entry: no beep sequence supported.

> Sequence operation with Drive Position Type set to List: beeps will occur when a particular Profile is entered.

> Sequence operation with Drive Position Type set to Select: a Profile Select screen, as shown below, will entered and the beeps will reflect the selected Profile. Left and right SID movements will select the next available Profiles and the corresponding number of beeps will occur. To enter the selected Profile, operate the User Switch.

If User Menu Position beeps are also set to occur, they will be issued prior to the Profile identifier beeps.

It is not advisable to program the menu option, 'profile select', if the Sequence method is being used with Single Switch Scanner Type SIDs.

2.9.6 Axis Identifier

This sets whether a series of beeps, corresponding to the actuator axis number, occurs when that axis is selected.

There are three programmable options: Off, Long and Short. Note: currently, the PC Programmer suggests just two options, On and Off. This will change.

> If set to Off, then no beeps will occur.
>
> If set to Short, then upon a change of axis selection, then there will be a series of short beeps corresponding to the number of the newly selected axis.
>
> If set to Long, then upon a change of axis selection, then there will be a series of long beeps corresponding to the number of the newly selected axis.

In both the latter cases, there will always be an initial short beep to indicate an axis change. There will then be a short pause before the series of beeps.

If an "Exit" axis is being used, see section Actuator Selection, this is indicated by a single beep of opposite duration to the beep series.

> **If you are uncertain of the number of each actuator axis, then put the Omni into OBP Mode and select the Seating Mode. The axis number will be displayed at the bottom left of the screen.**

2.9.7 Position 1 to Position 16

This sets the number of beeps that will occur when each line of the User Menu is highlighted. Because it is possible for the same item to appear on multiple lines, then the number of beeps is independent from the position number.

The programmable range is 0 to 16 in steps of 1.

2.10 Training Mode

2.10.1 Forward Inhibit

This allows the forward directional command of the SID to be inhibited.

The programmable options are On and Off.

> If set to On forward drive will be inhibited.

> If set to Off forward drive will not be inhibited.

2.10.2 Reverse Inhibit

This allows the reverse directional command of the SID to be inhibited.

The programmable options are On and Off.

> If set to On reverse drive will be inhibited.

> If set to Off reverse drive will not be inhibited.

2.10.3 Right Inhibit

This allows the right directional command of the SID to be inhibited.

The programmable options are On and Off.

If set to On right drive will be inhibited.

If set to Off right drive will not be inhibited.

2.10.4 Left Inhibit

This allows the left directional command of the SID to be inhibited.

The programmable options are On and Off.

If set to On left drive will be inhibited.

If set to Off left drive will not be inhibited.

2.11 Settings

2.11.1   Set Time

This sets the time of the clock.

2.11.2   Display Time

This sets whether the time is displayed on screen or not.

Options are Off, 12hr and 24hr format.

2.11.2   Backlight

This sets the intensity of the backlight.

The programmable range is 0 – 100 in steps of 10%.

2.11.3   Background

This sets which Screen display will be shown.

There are three programmable options, Blue, White and Auto.

Blue is the standard Omni graphical display

White is the High Contrast display, ideal for operations outside or in brightly lit environments.

Auto allows the Background to be set by the Profiling.

For the parameter Omni – Profile – Background to work effectively, this parameter must be set to Auto.

CHAPTER 4 – PROGRAMMING ADVANCED

1   Introduction

Before reading this section, it is recommended that you first read and understand the Standard section.

It is recommended that you use an R-net PC Programmer if you are undertaking the programming described in this section. Some of the programming is possible via OBP or by using the HHP, but it is more intuitive and user-friendly to use the PC Programmer

2   Using the Omni in Conjunction with a Standard JSM

Refer to the sections Profiles and Modes Explained, Input Devices Explained and Configuration Explained in the R-net PC Programmer help text or in the R-net Technical Manual Programming chapter.

The R-net system can be set-up to operate with an Omni and a JSM in two ways – Universal or Input Device Specific, i.e. The Omni controls some Profiles and the JSM controls other Profiles. This is defined by the setting of the standard R-net parameter, Input Device Type, which is a profile dependent parameter, i.e. it can be set differently in each of the available Profiles.

2.1   Universal Set-up

This is simply achieved by setting the parameter, Input Device Type to Universal. This means that the Input Device that powered-up the system will be in control. To transfer control to the other Input Device, power-down the system and re-power using the other Input Device.

2.2   Input Device Specific Set-up

With this set-up, each Profile can only be accessed by one of the Input Devices. To transfer control between the Input Devices, the Profile button or User Switch of the device that requires control has to be operated.

There are four programming steps to follow.

1   Decide which Profiles are to be associated with each Input Device and set the parameter Input Device Type accordingly.

2   Set the parameter Profile Enable to enable only the required Profiles.

3   Ensure the parameter Mode Enable is set to enable the required Modes for both Input Devices.

4   Decide upon appropriate names for each of the Profiles and set the parameter Profile Name accordingly.

Example:

It is required that a standard JSM controls Profiles 1 to 3 and that the Omni controls Profiles 4 to 6. All Modes can be controlled via either of the Input Devices and the Profiles are to be named: JSM Slow, JSM Medium, JSM Fast, Omni Slow, Omni Medium and Omni Fast.

Profile Management	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Profile 6	Profile 7	Profile 8
Profile Name	JSM Slow	JSM Medium	JSM Fast	Omni Slow	Omni Medium	Omni Fast	Profile 7	Attendant
Profile Enable	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Mode Enable	[12345678]	[1]	[1]	[12345678]	[1]	[1]	[1]	[12345678]
Input Device Type	JSM	JSM	JSM	Omni	Omni	Omni	Universal	Attendant

1   Set the Input Device type parameter for each of the relevant Profiles.

2   Disable Profile 7, as it is not required. There is no need to disable Profile 8, as it is reserved for use by an Attendant type device.

3   Enable all Modes in the first Omni Profile.

4   Set the Profile names.

The Omni should now be programmed to suit the user and the SID, as explained in the Standard section.

3   Using Omni with Two SIDs

Refer to the sections Profiles and Modes Explained, Input Devices Explained and Configuration Explained in the R-net PC Programmer help text or in the R-net Technical Manual Programming chapter.

Two SIDs can be connected to the Omni at any time. The connections are made via Port 1 and Port 2, which are the 9-way D-type connectors on the underside of the Omni.

There are four programming steps to follow.

> 1   Decide which Profiles are to be associated with each SID and into which Port each SID will connect, then set the parameter Port accordingly.

> 2   Set the parameter Profile Enable to enable only the required Profiles.

> 3   Ensure the parameter Mode Enable is set to enable the required Modes for both SIDs.

> 4   Decide upon appropriate names for each of the Profiles and set the parameter Profile Name accordingly.

Example:

It is required that two SIDs are to be connected to the Omni. SID 1 will control Profiles 1 to 3 and be connected to Port 1, while SID 2 will control Profiles 4 to 6 and be connected to Profile 2. All Modes can be controlled via either of the SIDs and the Profiles are to be named: SID1 Slow, SID1 Medium, SID3 Fast, SID2 Slow, SID2 Medium and SID3 Fast.

Profile Management	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Profile 6	Profile 7	Profile 8
Profile Name	SID1 Slow	SID1 Medium	SID 1 Fast	SID2 Slow	SID2 Medium	SID2 Fast	Profile 7	Attendant
Profile Enable	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Mode Enable	[12345678]	[1]	[1]	[2345678]	[1]	[1]	[1]	[12345678]
Input Device Type	Universal	Universal	Universal	Universal	Universal	Universal	Universal	Attendant

Omni								
Profiled	SID1 Slow	SID1 Medium	SID 1 Fast	SID2 Slow	SID2 Medium	SID2 Fast	Profile 7	Attendant
Port	1	1	1	2	2	2	1	1

> 1   Assign the SID 1 Profiles to Port 1 and the SID 2 Profiles to Port 2.

2   Disable Profile 7, as it is not required. There is no need to disable Profile 8, as it is reserved for use by an Attendant type device.

3   Enable all Modes in the first SID 2 Profile.

4   Set the Profile names.

The Omni should now be programmed to suit the user and the SID, as explained in the Standard section.

4   Using the Omni with Two SIDs and in Conjunction with a Standard JSM

Refer to the sections Profiles and Modes Explained, Input Devices Explained and Configuration Explained in the R-net PC Programmer help text or in the R-net Technical Manual Programming chapter.

This is essentially a combination of the previous two examples.

There are five programming steps to follow:

1   Decide which Profiles are to be associated with the JSM and which Profiles are to be associated with the Omni, and set the parameter Input Device Type accordingly.

2   Decide which Profiles are to be associated with each SID and into which Port each SID will connect, then set the parameter Port accordingly.

3   Set the parameter Profile Enable to enable only the required Profiles.

4   Ensure the parameter Mode Enable is set to enable the required Modes for the JSM and both SIDs.

5   Decide upon appropriate names for each of the Profiles and set the parameter Profile Name accordingly.

Example:

It is required that a standard JSM controls Profiles 1 and 2, and that the Omni controls Profiles 3 to 6. Of the Omni Profiles, 3 and 4 will be controlled by SID 1 connected to Port 1, while Profiles 5 and 6 will be controlled by SID 2 connected to Port 2. All Modes can be controlled by the JSM and each of the

SIDs. Profiles are to be named JSM Slow, JSM Fast, SID1 Slow, SID1 Fast, SID2 Slow and SID2 Fast.

Profile Management	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Profile 6	Profile 7	Profile 8
Profile Name	JSM Slow	JSM Fast	SID1 Slow	SID1 Fast	SID2 Slow	SID2 Fast	Profile 7	Attendant
Profile Enable	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Mode Enable	[12345678]	[1]	[12345678]	[1]	[12345678]	[1	]	[12345678]
Input Device Type	JSM	JSM	Omni	Omni	Omni	Omni	Universal	Attendant

Omni > Profiled > Port	JSM Slow	JSM Fast	SID1 Slow	SID1 Fast	SID2 Slow	SID2 Fast	Profile 7	Attendant
Port	1	1	1	1	2	2	1	1

1   Set the Input Device type parameter for each of the relevant Profiles.

2   Assign the SID 1 Profiles to Port 1 and the SID 2 Profiles to Port 2.

3   Disable Profile 7, as it is not required. There is no need to disable Profile 8, as it is reserved for use by an Attendant type device.

4   Enable all Modes in the first Profile for each SID.

5   Set the Profile names.

The Omni should now be programmed to suit the user and the SID, as explained in the Standard section.

5   Using the Omni by Sound

It is possible to set-up the Omni so that it issues audible beeps, in order to allow the user to know where they are in the User Menu or Sequence. This is particularly useful for users who cannot easily read the Omni's screen.

The following parameters set how and when the beeps occur. For more details of each of these parameters, refer to the Programming chapter.

5.1   Profile Change

This can be set to issue no beep, a short beep or a long beep upon a change of Profile.

5.2   Mode Change

This can be set to issue no beep, a short beep or a long beep upon change of Mode.

5.3   User Menu Entry

This can be set to issue no beep, a short beep or a long beep upon entry of the User Menu.

5.4   User Menu Scroll

This can be set to issue no beep, a short beep or a long beep when scanning through user menus.

5.5   Profile Identifier

This can be set to issue a number of beeps corresponding to the Profile number. The beeps are of a lower tone to the Profile Change, Mode Change and User Menu Entry beeps, and will occur after these.

Depending on how the Omni is set-up, the beeps will occur as below.

> Menu operation with Drive Position Type set to Entry: no beep sequence supported.

> Menu operation with Drive Position Type set to List: beeps will occur when a particular Profile is highlighted on the User Menu.

> Menu operation with Drive Position Type set to Select: beeps will occur when the Profile selection is changed on the User Menu.

> Sequence operation with Drive Position Type set to Entry: no beep sequence supported.

> Sequence operation with Drive Position Type set to List: beeps will occur when a particular Profile is entered.

> Sequence operation with Drive Position Type set to Select: a Profile Select screen, as shown below, will entered and the beeps will reflect the selected Profile. Left and right SID movements will select the next available Profiles and the corresponding number of beeps will occur. To enter the selected Profile, operate the User Switch.

> If User Menu Position beeps are also set to occur,
> they will be issued prior to the Profile identifier beeps.

5.6   Axis Identifier

This can be set to issue a number of beeps corresponding to the actuator axis number. The beeps are of a lower tone to the axis change beep and will occur after that beep.

The beeps will occur regardless of whether Actuator Selection is set to SID or Switch. In the latter case, there will be no beeps if Exit is the selected "axis".

5.7   Position

This sets the number of beeps that will occur when a new line (Position) in the User Menu is highlighted. If Sequence operation is selected, the beeps will also occur, but upon entry to the Mode that corresponds to the User Menu position.

If set to 0, then no beeps will occur for the position.

> If a User Menu Position Type is set to List, all items
> in the list are considered to be one position. See
> example below.

If the Omni is setup as:

>   Position 1 = Drive
>
>   Position 1 Type = List
>
>   Position 1 = 1beep
>
>   Position 2 = 2 beeps

Then the User Menu would appear as:

>   1: Profile 1
>
>   2: Profile 2
>
>   3: Profile 3
>
>   Seating

For the top 3 lines, there would only be 1 beep, as those lines all relate to Position 1. For the fourth line, there would be 2 beeps, as that line effectively relates to Position 2. Therefore, in this instance, a more sensible programming arrangement may be.

>   Position 1 = Drive
>
>   Position 1 Type = List
>
>   Position 1 = 0 beep
>
>   Profile Identifier # = On
>
>   Position 2 = 4 beeps

This would result in 1 to 3 beeps for the first 2 lines and 4 beeps for the fourth line.

CHAPTER 5 – DIAGNOSTICS

1   Introduction

The primary objective of this chapter is to assist service personnel in finding the likely area of a detected trip within the whole wheelchair electrical system. It is important to realize that even though the control system is signaling a trip, it may not be the control system itself that is defective. This is because the control system is able to detect problems in other electrical components (motors, batteries, solenoid brakes, etc.) or, more importantly, the wiring to them. When a control system has detected a trip, a system trip is indicated.

This chapter covers the diagnostic process for the R-net control system, including; Omni trip display analysis, accessing the system log using OBP, trip identification and possible restorative guidelines.

Diagnostics should only be conducted by healthcare professionals with in-depth knowledge of PGDT electronic control systems. An incorrect or badly effected repair could result in an unsafe set-up of a wheelchair. PGDT accept no liability for losses of any kind arising from an incorrect or badly effected repair.

1.1 Diagnostic Procedure

To diagnose a trip please follow this procedure:

• Read and note the Trip Text displayed, the Identified Module and the Trip Code. Refer to section 2.

• Switch off the control system.

• Make sure that all connectors on the listed Module and the wheelchair are mated securely. Check the condition of the battery.

• Find the definition of the Trip Text, and take the required action. Refer to section 3.

• Switch on the control system again and try to drive the wheelchair. If the safety circuits operate again, switch off and do not try to use the wheelchair.

Contact your service agent.

2   Diagnostic Screens

2.1 Current Diagnostic Screen

When the control system safety circuits have operated and the control system has been prevented from moving the wheelchair a diagnostics screen will be displayed.

This indicates a system trip, i.e. the R-net has detected a problem somewhere in the wheelchair's electrical system.

If the error is in a non-active module, for example in the ISM but with a Drive Mode is selected, then drive will still be possible, however, the diagnostic screen will appear intermittently.
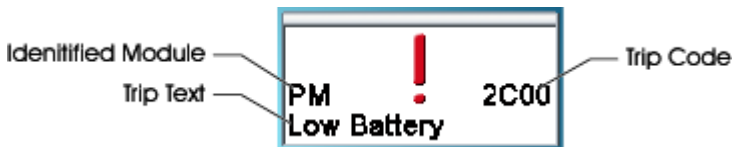
2.1.1   Identified Module

This identifies which module of the control system has registered the problem.

      PM   Power Module

      JSM   Joystick Module

      ISM   Intelligent Seating/lighting Module

      OMNI   Omni

2.1.2   Trip Text

The Trip Text gives a brief description of the trip type.

2.1.3   Trip Code

The 4 digit code displayed gives the exact trip that has been recorded.

2.1.4   Example

The example screen shown in section 2.1 show the following information

     Identified Module   Power Module Trip.

     Trip Text   Low Battery

     Trip Code   2C00

This means the battery needs charging or there is a bad connection to the battery.

*   Check the connections to the battery. If the connections are good, try charging the battery.

2.2   System Log Screen

All trips are stored in the system log, whether they have been resolved or are still active. The system log stores the Trip Text and the number of occurrences. The trips are stored in their respective Modules within the system.

The System Log is entered using OBP.

Enter OBP Mode.

*   Select System from the menu.

*   Select Diagnostics from the menu.

*   This displays the Diagnostic screen that shows the connected modules and the version history. See following diagram.
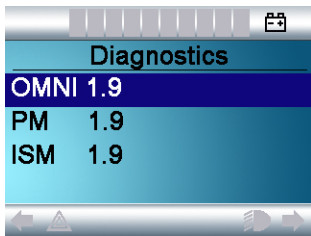
*   If a Module has had no trips then the message No Entries will be displayed, otherwise something similar to the following screen will be displayed.
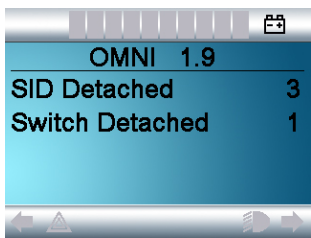
2.3   Connections

The R-net has various connections that are referred to by the diagnostic text. These connections can be on the Power Module(PM), Joystick Module(JSM), the Intelligent Seating/Lighting Module(ISM) and the Omni. The following diagrams show the connections on these Modules.
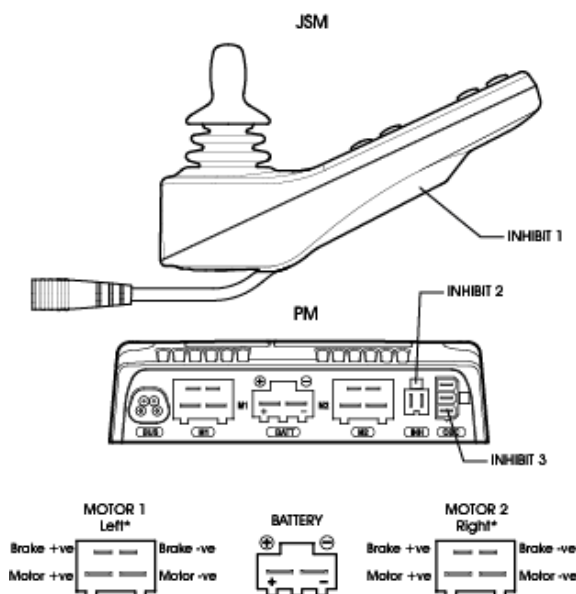
Joystick Movement	M1	M 2	Actual Movement	
Forward	+ve	+ve	Forward	*
Backward	-ve	-ve	Backward	*

* Assumes no Motor Swap or Invert programming has been undertaken

INHIBIT 2

INH-2	Function
1	0V
2	Inhibit 2

ON-BOARD CHARGER

OBC	Function
1	Battery +ve
2	Inhibit 3
3	0V

LIGHTS

LEFT

RIGHT

Lights	Function
1	Gnd
2	Lights
3	Indicator
4	Brake/Horn

ACTUATORS

1, 3 & 5

2, 4 & 6

Joystick Movement	Pin 1	Pin 2	Actuator Movement	
Forward	-ve	+ve	Channel Up	*
Backward	+ve	-ve	Channel Down	*

* Assumes no Joystick Orientation or Invert Axis Direction programming has been undertaken

INHIBITS
4 & 5

INHIBIT - 4	Function
1	0V
2	Inhibit 4

INHIBIT - 5	Function
1	0V
2	Inhibit 5

The R-net has 5 Inhibit connections within these 3 Modules, but programming allows for multiple inhibit connections to be added in further PGDT and 3rd party Modules. For details of these inhibit connections refer to the Wheelchair Manufacturers documentation.
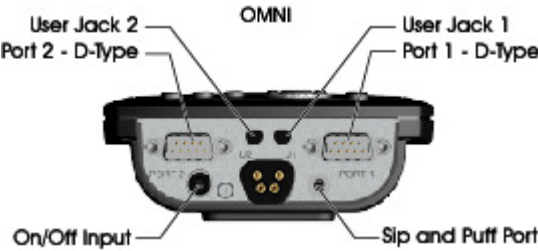
3   Diagnostic Text Definitions

Once a trip text and module have been established use the following definitions to ascertain the possible cause and required corrective procedure.

Trip Text	Referral point
Center Joystick	Refer to section 3.1
Low Battery	Refer to section 3.2
High Battery	Refer to section 3.3
M1 Brake Error	Refer to section 3.4
M2 Brake Error	Refer to section 3.4
M1 Motor Error	Refer to section 3.5
M2 Motor Error	Refer to section 3.5
Inhibit Active	Refer to section 3.6
Jstick Cal Error	Refer to section 3.7
Latched Timeout	Refer to section 3.8
Brake Lamp Short	Refer to section 3.9
Left Lamp Short	Refer to section 3.10
Right Lamp Short	Refer to section 3.10
L Ind Lamp Short	Refer to section 3.11

R Ind Lamp Short	Refer to section 3.11
L Ind Lamp Failed	Refer to section 3.12
R Ind Lamp Failed	Refer to section 3.12
Over-current	Refer to section 3.13
Overtemp. (Acts)	Refer to section 3.14
Overtemp. (Lamps)	Refer to section 3.15
DIME Error	Refer to section 3.16
Memory Error	Refer to section 3.17
PM Memory Error	Refer to section 3.18
Bad Cable	Refer to section 3.19
Bad Settings	Refer to section 3.20
Module Error	Refer to section 3.21
System Error	Refer to section 3.22
SID Detached	Refer to section 3.23
User Switch Detached	Refer to section 3.24
Over Pressure	Refer to section 3.25
Gone to Sleep	Refer to section 3.26
Charging	Refer to section 3.27

3.1   Center Joystick

The most common cause of this trip is if the SID is deflected away from center before and during the time the control system is switched on. The joystick displaced screen will be displayed for 5 seconds, if the SID is not released within that time then a trip is registered. Although a trip screen is not displayed the system log will show the trip and numbers of occurrences.

•   **Ensure that the SID is centered and power-up the control system.**

If the trip is still present then the SID or Omni may be defective.

Depending on the Wheelchair Manufacturer's service agreement, the joystick may be replaced as a separate part. Otherwise refer to section 5.

3.2   Low Battery

This occurs when the control system detects that the battery voltage has fallen below 16V.

• **Check the condition of the batteries and the connections to the control system.**

If the trip is still present after the batteries and connections have been checked, then the Power Module may be defective. Refer to section 5.

3.3   High Battery Voltage

This occurs when the control system detects that the battery voltage has risen above 35V. The most common reasons for this are overcharging of the battery or bad connections between the control system and the batteries.

• **Check the condition of the batteries and the connections to the control system.**

If the trip is still present after the batteries and connections have been checked, then the Power Module may be defective. Refer to Section 5.

3.4   Brake Error

This occurs when the control system detects a problem in the solenoid brakes or the connections to them.

1505 -   M1 Brake Error - Refer to section 2.3 for connection details

1506 -   M2 Brake Error - Refer to section 2.3 for connection details

• **Check the solenoid brakes, cables and connections to the control system.**

If the trip is still present after the above checks have been made, then the Power Module may be defective. Refer to Section 5.

3.5   Motor Error

This occurs when the control system detects that a motor has become disconnected.

> 3B00 -   M1 Motor Error - Refer to section 2.3 for connection details

> 3C00 -   M2 Motor Error - Refer to section 2.3 for connection details

•   Check the motors, cables and connections to the control system.

If the trip is still present after the above checks have been made, then the Power Module may be defective. Refer to Section 5.

3.6   Inhibit Active

This occurs when any of the Inhibit inputs are active and in a latched state.

The actual inhibit that is active is indicated by the last 2 digits in the Trip Code. The code is in Hex.

> 1E01 -   For Inhibit 1 - Refer to section 2.3 for connection details

> 1E09 -   For Inhibit 9 - Refer to section 2.3 for connection details

> 1E0A -   For Inhibit 10 - Refer to section 2.3 for connection details

•   Cycle the power. This will drop out of Latched Mode that might clear the trip.

•   Check all wiring and switches connected to the indicated Inhibits.

If the trip is still present after the above checks have been made, then the ISM may be defective. Refer to Section 5.

3.7   Joystick Calibration Error

This occurs when the Joystick type SID Calibration process has not been successful.

•   Enter OBP and attempt calibration.

If the trip is still present after the above has been attempted, then the Omni may be defective. Refer to Section 5.

3.8   Latched Timeout

This occurs when the control system detects that the Latched Timeout programmed time has been exceeded. For example, the Input Device, Joystick, Head Array, Sip and Puff, etc. has not been operated frequently enough.

The trip is a notification of why the control system has dropped out of Latched Mode.

• **Cycle the power.**

• **Initiate Latched Mode.**

If the trip is still present after the above checks have been made, then the Input Device may be defective. Refer to Section 5.

3.9   Brake Lamp Short

This occurs when the control system detects a short in the Brake Lamp Circuit. Refer to section 2.3 for connection details.

• **Check the brake lamps, cables and connections to the control system.**

If the trip is still present after the above checks have been made, then the ISM may be defective. Refer to Section 5.

3.10   Lamp Short

This occurs when the control system detects a short in either of the Lamp Circuits. Refer to section 2.3 for connection details.

    7205 -   Left Lamp Short

    7209 -   Right Lamp Short

• **Check the lamps, cables and connections to the control system.**

If the trip is still present after the above checks have been made, then the ISM may be defective. Refer to Section 5.

3.11   Indicator Lamp Short

This occurs when the control system detects a short in either of the Indicator Circuits. Refer to section 2.3 for connection details.

7206 -   Left Indicator Short

720A -   Right Indicator Short

• Check the indicators, cables and connections to the control system.

If the trip is still present after the above checks have been made, then the ISM may be defective. Refer to Section 5.

3.12   Indicator Lamp Failed

This occurs when the control system detects a failure in either of the Indicator Circuits. This is most likely to be an indicator bulb failure. Refer to section 2.3 for connection details

7207 -   Left Indicator Failed

7208 -   Right Indicator Failed

• Check the indicator bulbs, cables and connections to the control system.

If the trip is still present after the above checks have been made, then the ISM may be defective. Refer to Section 5.

3.13   Over-current

This occurs when the control system detects an excessive amount of current in an Actuator Channel.

This may be due to a faulty endstop switch, actuator motor, cables or connections.

• Check the movement of the actuator is not obstructed.

• Check the endstop switches (if fitted) are terminating the power to the actuator motor.

If the trip is still present after the above checks have been made, then the ISM may be defective. Refer to Section 5.

3.14   Overtemp (acts)

This occurs when the control system detects that the ISM's actuator circuitry has become too hot. The control system will cease drive to the actuator motor in question.

- Allow the ISM to cool.

- If the ISM is frequently overheating check the condition of the actuator motors and the connections to them.

- If the trip persists contact your service agent.

3.15   Overtemp (lamps)

This occurs when the control system detects that ISM's lighting circuitry has become too hot. The control system will cease supplying current to the lamp in question.

- Allow the ISM to cool.

- If the ISM is frequently overheating check the condition of all the connected bulbs and lamps.

- If the trip persists contact your service agent.

3.16   DIME Error

This occurs when the control system detects an identification conflict between two modules in the system.

If a new module has been introduced:

- Disconnect the new module and cycle the power.

- If no trip is present connect the new module to the system and cycle the power.

- If the trip reappears then the new module must be the cause of the problem.

If there has been no additions:

- Disconnect one module at a time and cycle the power.

If the trip is still present after the above checks have been made, contact your service agent.

3.17   Memory Error

This is a none specific memory error which could be caused by any of the modules within the system.

- Check all cables and connections.

- Cycle the power.

If the trip is still present and the system contains 3rd party Modules:

- Disconnect all none PGDT modules and cycle the power.

If this has cleared the trip:

- Connect each 3rd party module in turn, cycling the power each time.

- If the trip reappears after one of the power cycles then the last module to have been added to the system must be defective.

If the trip is still present after the above checks have been made, then the PM may be defective. Refer to Section 5.

3.18   PM Memory Error

This is a specific Power Module based trip.

- Check all cables and connections.

- Using the R-net PC Programmer, re-program the control system.

This should be done with either the most current specific program file for the wheelchair or the manufacturers original programming file.

Programming should only be conducted by healthcare professionals with in-depth knowledge of PGDT control systems. Incorrect programming could result in an unsafe set-up of a wheelchair for a user. PGDT accept no responsibility for losses of any kind if the programming of the control system is altered from the factory pre-set values.

If the trip is still present after the above checks have been made, then the PM may be defective. Refer to Section 5.

3.19   Bad Cable

This occurs when the control system detects a fault in the wiring in the communication cables between any of the modules.

- Check all cables and connections for continuity.

- If there is any visible damage to cables, replace and cycle power.

- Disconnect one cable from the system at a time cycling the power after each disconnection.

If the trip is still present after the above checks have been made, then the PM may be defective. Refer to Section 5.

3.20 Bad Settings

This occurs when the control system detects incorrect or invalid program settings.

- Check all parameter settings and re-program the control system using the R-net PC Programmer.

- Make a note of the current parameter settings and then reset the control system to default settings.

- Re-program the required settings in small groups, cycling the power after each group to see if the trip occurs.

If the trip is still present after the above checks have been made, then the PM may be defective. Refer to Section 5.

3.21   Module Error

This occurs when the control system detects a trip within a specific module. The module will be identified on the diagnostics screen as described in section 2.

- Check all cables and connections.

- Cycle the power.

If the trip is still present after the above checks have been made, then the module identified may be defective. Refer to Section 5.

3.22 System Error

This occurs when the system detects a trip that cannot be attributed to a specific module.

- Check all cables and connections.

- Cycle the power.

If the trip is still present and the system contains 3rd party Modules:

- Disconnect all none PGDT modules and cycle the power.

If this has cleared the trip:

- Connect each 3rd party module in turn, cycling the power each time.

- If the trip reappears after one of the power cycles then the last module to have been added to the system must be defective.

If the trip is still present after the above checks have been made, then the PGDT control system may be defective. Refer to Section 5.

3.23 SID Disconnected

The Omni has detected that the Specialty Input Device (SID) has become disconnected.

- Check all cables and connectors between the Omni and the SID.

If the error persists:

- Check that the setting of the parameter, 9-Way Detect, is appropriate for the SID that is being used. For example, if the SID has no detect-link, then this parameter should be set to Off.

If the trip is still present after the above checks have been made, then the Input Device may be defective. Contact your service agent.

3.24 User Switch Detached

The Omni has detected that the User Switch has become disconnected.

- Check all cables and connectors between the Omni and the User Switch.

If the trip is still present after the above checks have been made, then the User Switch may be defective. Contact your service agent.

If it is required to use the Omni without a User Switch being connected, then the parameter, Switch Detect, should be set to Off. If a User Switch is not used the responsibility for that decision lies with the healthcare professional.

Because a disconnected User Switch means there is no emergency stop function, PG Drives Technology

recommend that Switch Detect is this option is always set to On. PG Drives Technology will accept no liability for any losses resulting from any other setting of this parameter.

3.25   Over Pressure

The Omni has detected that the pressure on the Sip and Puff transducer has exceeded its maximum level. Although a trip screen is not displayed the system log will show the trip and number of occurrences.

- **Check the user is operating the Sip and Puff device correctly.**

If the trip is still present after the above check has been made, then the Omni may be defective. Refer to section 5.

3.26   Gone to Sleep

This occurs when the control system has been left inactive for a time greater than the parameter Sleep Timer.

An entry is made in the system log each time this occurs.

3.27   Charging

This occurs when the control system detects that a charger is connected to either Inhibit 1 or Inhibit 3. Refer to section 2.3 for connection details

The Battery charging screen will be displayed during charger connection.

An entry is made in the system log each time this occurs.

If an On-Board Charger is used:

- **Disconnect the charger from the AC supply.**

If an Off-Board Charger is used:

- **Disconnect the charger from the Wheelchair.**

If the trip is still present after the charger has been disconnected then the Omni may be defective. Refer to Section 5.

4   Basic Tests

After a repair has been completed, the following tests should be carried out. These are minimum recommendations, depending on the nature of the original trip then additional tests may be required.

These tests are a minimum recommendation only. It is the responsibility of the service person(s) to perform other tests relevant to the original trip and wheelchair type are carried out. Refer to the wheelchair's Technical Manual for exact information of other tests. PGDT accept no liability for losses of any kind arising from the carrying out of the described tests, or from not carrying out additional relevant tests.

These tests should be conducted in an open space and a restraining device such as a seat belt should always be used. PGDT accepts no liability for losses of any kind arising from failure to comply with this condition.

4.1   General Inspection

Make sure all connectors are securely mated.

- Check the condition of all cables and connectors for damage.

- Check the rubber gaiter or boot around the base of the joystick shaft for damage. Check visually only, do not handle the gaiter.

- Make sure that all components of the control system are securely mounted.

- Do not overtighten any securing screws.

4.2   Brake Test

These tests should be carried out on a level floor with at least one meter clear space around the wheelchair.

- Switch on the control system.

- Check the screen remains on after initialization.

- Push the joystick slowly forwards until you hear the parking brakes operate. The wheelchair may start to move.

- Immediately release the joystick. You must be able to hear each parking brake operate within 2 seconds.

- Repeat the test a further three times, pushing the joystick slowly backwards, left and right.

4.3   Drive Test

With the maximum speed control in the minimum position, drive the wheelchair in all directions, ensuring the drive is comfortable and easy to control for the user.

Repeat the above but with the speed control set to maximum.

4.4   Gradient Test

> **Before carrying out this test ensure another person is present to prevent the wheelchair from tipping backwards.**

Drive the wheelchair forwards up its maximum rated gradient. While on the gradient release the joystick and ensure the wheelchair comes to rest and the brakes are applied without the front wheels lifting of the ground.

Deflect the joystick forwards and continue driving up the slope. Ensure the pick up is smooth and positive.

Stop the wheelchair and reverse down the gradient. While on the gradient release the joystick and ensure the wheelchair comes to rest and the brakes are applied without the front wheels lifting of the ground.

4.5   Lights, Indicators and Hazard Lamps Test

If lights are fitted:

- Visually check each bulb for correct illumination.

- Check each bulb for correct illumination and that the flash-rate is 1.5Hz $\pm$ 0.5Hz.

- Disconnect each bulb in turn and check that the remaining bulb for that side flashes at 3Hz $\pm$ 0.5Hz.

If hazard lamps are fitted:

- Check each bulb for correct illumination and that the flashrate is 1.5Hz $\pm$ 0.5Hz.

4.6   Actuator Test

If actuators are fitted:

- Check each motor for correct direction of movement.

- Ensure the mechanical end-stops are secure and that they stall the actuator motors, thus operating the ISM's automatic end-stop detection.

4.7   Inhibit Input Test

Insert an appropriate battery charger, or equivalent inhibit connection, into the Charger Connector on the Omni and ensure that drive is inhibited.

If Inhibits 2, 3, 4 and 5 are used for inhibit or speed limiting purposes, suitable tests should be devised to ensure correct operation.

5   Servicing of Defective Units

Excluding specific OEM approved replacement parts (for details of these contact the wheelchair manufacturer), there are no serviceable parts in the R-net control system. Consequently, any defective units must be returned to PGDT or a PGDT approved service organization for repair.

Any replacement work carried out without the wheelchair manufacturer's permission will invalidate the control system's warranty.

Opening or making any unauthorized adjustments or modifications to the R-net control system or its components will invalidate any warranty and may result in hazards to the vehicle user, and is strictly forbidden.

PGDT accept no liability for losses of any kind arising from unauthorized opening, adjustments or modifications to any component of the R-net control system.

CHAPTER 6 – SPECIFICATIONS

> The information in this section can be used to design Specialty Input Devices compatible with the Omni. The input device manufacturer must ensure that the SID design is safe under all conditions, in particular, single component failures must be detected and the input device put into a safe condition. PG Drives Technology accept no responsibility for losses of any kind resulting from an unsuitable SID design.

1   9-way D Type Pin-out

OMNI 9 WAY D-TYPE
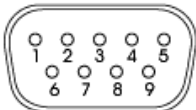
VIEWED FROM BELOW

Pin	Analog Function	Digital Function
1	Joystick Speed	Forward
2	Joystick Direction	Reverse
3	Joystick Reference	Left
4	-	Right
5	Detect	Detect
6	-	Fifth Switch
7	12V, 100mA	12V, 100mA
8	Joystick Ground	0V
9	Connected to 7	Connected to 7

The pins of the 9-way D type connector will have a different function depending on whether the Omni is configured for an analogue or a digital type input device.
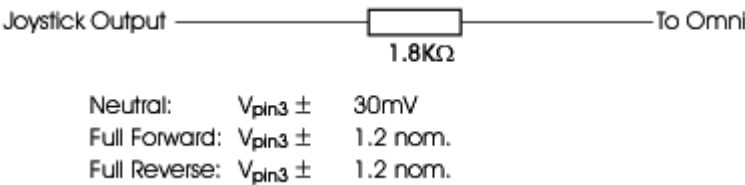
The mating 9-way D type connector (socket) should always be fitted with gold contacts and a suitable backshell with locking screws. These locking screws should be used to mechanically hold the connector firmly in place.

2   Analog Signal Levels

The analogue inputs are compatible with PGDT JC200BR3K1Y and Flightlink I5X1SSG251020 joysticks.

2.1   Pin 1 - Joystick speed

This is the joystick signal that determines the forward/reverse component of wheelchair movement. The joystick has a 1.8KΩ resistor in series with the speed output as shown below. All voltage levels apply to the actual joystick output, i.e. no load values. The Omni has an input resistance of 100KΩ to 0V.

| Joystick Output ——————————[1.8KΩ]—————————— To Omni |

Neutral:	$V_{pin3} \pm$	30mV
Full Forward:	$V_{pin3} \pm$	1.2 nom.
Full Reverse:	$V_{pin3} \pm$	1.2 nom.

For optimum performance, The Omni should be calibrated for individual joysticks. The voltage swing of 1.2V is a nominal value, actual values of between 1.1V and 1.3V will be accepted by a calibration sequence.

If the voltage swing with respect to Vpin3 exceeds 3.0V, then the Omni will assume a fault condition.

2.2   Pin 2 - Joystick direction

This is the joystick signal which determines the turning component of wheelchair movement. The joystick has a 1.8KΩ resistor in series with the direction output as shown below. All voltage levels apply to the actual joystick output, i.e. no load values. The Omni has an input resistance of 100KΩ to 0V.

Joystick Output ──────────[ ]────────── To Omni

1.8KΩ

Neutral: V_{pin3} ±   30mV
Full Forward: V_{pin3} ±   1.2 nom.
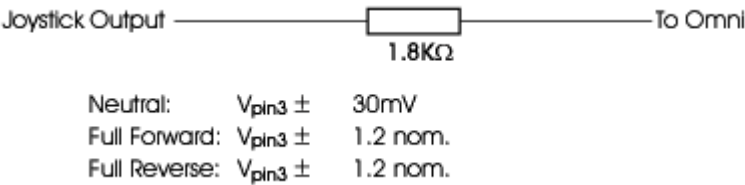Full Reverse: V_{pin3} ±   1.2 nom.

For optimum performance, The Omni should be calibrated for individual joysticks. The voltage swing of 1.2V is a nominal value, actual values of between 1.1V and 1.3V will be accepted by a calibration sequence.

If the voltage swing with respect to Vpin3 exceeds 3.0V, then the Omni will assume a fault condition.

2.3   Pin 3 - Joystick reference

This is the joystick center point reference. The joystick has a 470Ω resistor in series with the reference output as shown below. All voltage levels apply to the actual joystick output, i.e. no load values. The Omni has an input resistance of 200KΩ to 0V.

Joystick Output ──────────[ ]────────── To Omni

470Ω

Reference $= (V_{pin7} /2) \pm (0.01 \times V_{pin7})$
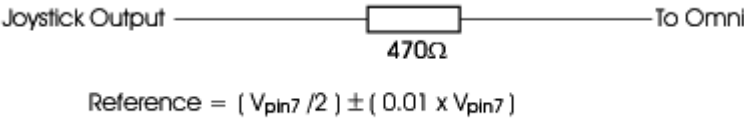
2.4   Pin 5 – Detect

This pin should be linked to 0V inside the input device. This link allows the Omni to detect if the SID is connected. If the link is not fitted, the Omni should be configured to ignore the absence of the link.

2.5   Pins 7 and 9 – 12V 100mA

These pins are connected together inside the Omni and provide a 12V supply to the joystick. The total combined current capability is 100mA.

2.6   Pin 8 – Joystick ground

A 0V supply for the joystick.

3   Digital Signal Levels

3.1   Pins 1,2,3 and 4 - Direction

Low signal < 0.7V

High signal > 1.4V

Impedance: 132KΩ to 3V

3.2   Pin 6 – Fifth Switch

Low signal < 0.7V

High signal > 1.4V

Impedance: 100KΩ to 5V

3.3   Pin 5 – Detect

This pin should be linked to 0V inside the input device. This link allows the Omni to detect if the input device is connected. If the link is not fitted, the Omni should be configured to ignore the absence of the link.

34   Pins 7 and 9 – 12V 100mA

These pins are connected together inside the Omni and provide a 12V supply to the input device. The total combined current capability is 100mA.

3.5   Pin 8 – 0V

A 0V supply for the input device.

4   User Switch

This section refers to the 3.5mm/1/8" jack sockets on the underside of the Omni See the connections diagram in chapter 1 for more details.

If the Omni is configured for a normally closed User switch, there should be a permanent low signal and a high signal will be interpreted as a switch operation. If the Omni is configured for a normally open User switch, the opposite will apply.

4.1   Signal levels

Low signal < 0.8V

High signal > 4.0V

Impedance: 10KΩ to 5V

5   On/Off Switch

This section refers to the 3.5mm/1/8" jack socket on the underside of the Omni. See the connections diagram in chapter 1 for more details.

A normally open switch should be connected. A low signal is interpreted as a switch transition and will switch the Omni on or off.

5.1   Signal levels

Low signal < 0.8V

High signal > 4.0V

Impedance: 10KΩ to 5V

6   Sip and Puff Input

This section refers to the pneumatic inlet on the underside of the Omni Module. See the connections diagram in chapter 1 for more details.

Approximate pressure levels for full hard sips and puffs are:

       Full puff   1PSI or 69mbar

       Full sip   -1.2PSI or –83mbar

CHAPTER 7 – WARNING SUMMARY

1   Introduction

This section summarises all of the very important warnings for use that appear throughout the text of this manual. Do not install, maintain or operate the Omni+ controller without reading, understanding and observing the following warnings. Failure to observe these warnings could result in UNSAFE CONDITIONS for the user of a wheelchair or affect the reliability of the Omni+ controller. PG Drives Technology accepts no liability for losses of any kind arising from failure to comply with any of the conditions in the warnings listed below.

The wheelchair manufacturer may wish to use this section as a check list, to ensure that the risk areas identified below have been addressed within their own chair designs and associated documentation.

2   Warnings

2.1   Introduction

Programming and diagnostics should only be conducted by healthcare professionals with in-depth knowledge of PG Drives Technology electronic control systems. Incorrect programming could result in an unsafe setup of a vehicle for a user. PG Drives Technology accept no liability for any losses of any kind if the programming of the control system is altered from the factory preset values. Chapter 1 section 1.

2.2   Assessing the User's Needs

This should only be conducted by a healthcare professional. PG Drives Technology accept no liability for losses of any kind resulting in an incorrect assessment of a user's abilities. Chapter 1 section 4.

2.3   Installing the SID onto a Powerchair

The SID should be fitted to the powerchair in accordance with the instructions of both the SID and powerchair manufacturers. PG Drives Technology accept no liability for losses of any kind resulting from an incorrect installation of a SID. Chapter I section 6.

2.4   User Switch

For a truly fail-safe system a normally closed User Switch is recommended. This ensures that, if the switch becomes accidentally disconnected the powerchair will default to a stopped condition. It is possible to configure the Omni to function with normally open switch types, see section User Switch in the Programming chapter for details. PG Drives Technology recommend that, whenever possible, a normally closed switch should be used. If a normally open switch is used the responsibility for that decision lies with the healthcare professional. PG Drives Technology accept no liability for any losses resulting from the use of a non-normally closed User Switch.

Because a disconnected User Switch means there is no emergency stop function, PG Drives Technology recommend that Switch Detect is always set to On. PG Drives Technology will accept no liability for any losses resulting from any other setting of this parameter. Chapter I section 6.2.

2.5   D-type Connector

The SID's D-type connector should always be fitted with gold contacts and a suitable backshell with locking screws. The locking screws should be used to

mechanically hold the connector in place. PG Drives Technology accept no liability for losses of any kind if these conditions are not met. Chapter 1 section 6.3.

2.6   Using the Omni without a User Switch

PG Drives Technology accept no liability for losses arising from the non-use of a User Switch. Chapter 1 section 8.7.

2.7   Programming the Omni to Suit the User

Ensure the R-net Control System's Drive, Acceleration and Deceleration settings are at a comfortable and safe level prior to attempting to program the Omni to suit the user. Refer to the R-net Technical Manual SK77981 or the On-Board Programming Manual SK78571 for details of how to program the R-net Control System.

Programming should only be conducted by healthcare professionals with in-depth knowledge of PG Drives Technology electronic control systems. Incorrect programming could result in an unsafe set-up of a wheelchair for a user. PG Drives Technology accept no liability for losses of any kind if these conditions are not met. Chapter 1 section 9.

2.8   Program the R-net Driving Characteristics to Suit the User

Select values that are comfortable and safe for the powerchair user. It is the responsibility of the healthcare professional to ensure these values are comfortable and safe. PGDT accept no liability for any losses resulting from unsuitable values. Chapter 1 section 10.

2.9   Programming - Introduction

Programming should only be conducted by healthcare professionals with in-depth knowledge of PGDT control systems. Incorrect programming could result in an unsafe set-up of a wheelchair for a user. PGDT accept no liability for losses of any kind if the programming is inappropriate for the SID type or user. Chapter 3 section 1.

2.10   User Switch

PGDT recommend the use of a normally-closed User Switch. PGDT accept no liability for losses of any kind arising from the use of any other type of switch. Chapter 3 section 2.4.1.

2.11   Switch Detect

PGDT recommend this parameter is always set to On. PGDT accept no liability for losses of any kind arising from any other setting. Chapter 3 section 2.4.2.

2.12   Diagnostics - Introduction

Diagnostics should only be conducted by healthcare professionals with in-depth knowledge of PGDT electronic control systems. An incorrect or badly effected repair could result in an unsafe set-up of a wheelchair. PGDT accept no liability for losses of any kind arising from an incorrect or badly effected repair. Chapter 5 section 1.

2.13   PM Memory Error

Programming should only be conducted by healthcare professionals with in-depth knowledge of PGDT control systems. Incorrect programming could result in an unsafe set-up of a wheelchair for a user. PGDT accept no responsibility for losses of any kind if the programming of the control system is altered from the factory pre-set values. Chapter 5 section 3.1.8.

2.14   User Switch Detached

Because a disconnected User Switch means there is no emergency stop function, PG Drives Technology recommend that Switch Detect is this option is always set to On. PG Drives Technology will accept no liability for any losses resulting from any other setting of this parameter. Chapter 5 section 3.2.4.

2.15   Basic Tests

These tests are a minimum recommendation only. It is the responsibility of the service person(s) to perform other tests relevant to the original trip and wheelchair type are carried out. Refer to the wheelchair's Technical Manual for exact information of other tests. PGDT accept no liability for losses of any kind arising from the carrying out of the described tests, or from not carrying out additional relevant tests.

These tests should be conducted in an open space and a restraining device such as a seat belt should always be used. PGDT accepts no liability for losses of any kind arising from failure to comply with this condition. Chapter 5 section 4.

2.16   Servicing of Defective Units

Any replacement work carried out without the wheelchair manufacturer's permission will invalidate the control system's warranty.

PGDT accept no liability for losses of any kind arising from unauthorized opening, adjustments or modifications to any component of the R-net control system. Chapter 5 section 5.

2.17   Specifications - Introduction

The information in this section can be used to design Specialty Input Devices compatible with the Omni. The input device manufacturer must ensure that the SID design is safe under all conditions, in particular, single component failures must be detected and the input device put into a safe condition. PG Drives Technology accept no responsibility for losses of any kind resulting from an unsuitable SID design. Chapter 6.

2.18   9-way D Type Pin-out

The mating 9-way D type connector (socket) should always be fitted with gold contacts and a suitable backshell with locking screws. These locking screws should be used to mechanically hold the connector firmly in place. Chapter 6 section 1.