SAFETY INSTRUCTIONS

Care has been taken with the design of this product to ensure that it is safe. However, in common with all products of this type, misuse can result in injury or death. Therefore, it is very important that the instructions in this manual and on the product are observed during transportation, commissioning, operation, maintenance and disposal.

This technical manual should be regarded as part of the product. It should be stored with the product and passed on to any subsequent owner or user.

Local safety laws and regulations must always be observed.

Persons working on the product must be suitably skilled and should have been trained in that work for these products.

The product is a component designed for incorporation in installations, apparatus and machines.

The product must not be used as a single item safety system. In applications where maloperation of the product could cause danger, additional means must be used to prevent danger to persons.

Product approvals and certifications will be invalidated if the product is transported, used or stored outside its ratings or if the instructions in this manual are not observed.

In the European Union:

- Products within the scope of the Low Voltage Directive, 73/23/EEC as amended are CE marked.
- The product complies with the essential protection requirements of the EMC directive 89/336/EEC as amended, when installed and used as described in this manual. The requirements of the EMC Directive should be established before any installation, apparatus or machine which incorporates the product is taken into service.
- A machine should not be taken into service until the machine has been declared in conformity with the provisions of the Machinery (Safety) Directive, 98/37/EEC.

Publication No. T1691 Issue 2 (05/01)
### Top Panel
- **Panel Item Name:** Top Panel

- **Specifications:**
  - Provides a short overview of some of the menus held within the ALSPA MV3000 Drive. This panel is intended to act as an aid to the users memory during demonstrations or training. The panel hinges forward to reveal a storage area, see Image 9 below.

### Perspex Cover
- **Panel Item Name:** Perspex Cover

- **Specifications:**
  - Covers the CDC board up to allow annotation with text, which explains what the areas of the CDC do, showing connections and enhancement areas.

### CDC Board
- **Panel Item Name:** CDC Board

- **Specifications:**
  - The ALSPA MV3000 Common Drive Controller board. This board is the same control PCB used in all the MV3000 drives, and runs the same firmware as the drive.

### Mains Switch & Mains Inlet
- **Panel Item Name:** Mains Switch & Mains Inlet

- **Specifications:**
  - The power lead plugs in here and the illuminated switch is used to switch on the power. See section 2 for technical and fuse data.

### Finger Hole and Panel Catch
- **Panel Item Name:** Finger Hole and Panel Catch

- **Specifications:**
  - Rotate the catch a quarter turn to release then insert a finger to pull open the top panel, once open the storage area is revealed. See Section 3.4.3.

### Case Locks and Handle
- **Panel Item Name:** Case Locks and Handle

- **Specifications:**
  - The case can be locked shut using the keys provided. The keys should be attached to the handle on delivery.

### Document & Cable Store
- **Panel Item Name:** Document & Cable Store

- **Specifications:**
  - This area stores the following items when the case is shipped: User guide, power lead, keyboard lead, case to PC lead, various data sheets on the items in the case. See Section 3.4 for a description of the case accessories.

### DDM™ Harbour
- **Panel Item Name:** DDM™ Harbour

- **Specifications:**
  - The harbour is the same item used on the ALSPA MV3000 drives and is used to hold the keypad. The harbour also has status LED’s within it, the meaning of the LED’s is explained in Section 4.6 of this guide.

### Case DDM™ *
- **Panel Item Name:** Case DDM™ *

- **Specifications:**
  - The case includes a fully functional ALSPA MV3000 Drive Data Manager™ (keypad). The function of the DDM is explained in section 4.6 of this guide.

### Bottom Panel
- **Panel Item Name:** Bottom Panel

- **Specifications:**
  - The bottom panel is a fully functional plant and drive simulation area. It allows the user to simulate plant I/O and drive responses for demonstrating and training the ALSPA MV3000. Details of the bottom panel are shown below.

---

### Bottom Panel Details

<table>
<thead>
<tr>
<th>Panel Item No.</th>
<th>Panel Item Name</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Plant Digital Outputs</td>
<td>3 configurable volts free relay outputs. Here shown with red and green LED’s. The red LED is lit when the relay is open. The labels match the default settings as shipped from ALSTOM. See Section 4.3.2 for more details.</td>
</tr>
<tr>
<td>2</td>
<td>Plant Interlock</td>
<td>The plant interlock must be made to allow the drive to run. Pressing the switch will result in the CDC tripping on “interlock”. See Section 4.3.2 for more details.</td>
</tr>
<tr>
<td>3</td>
<td>Plant Digital Inputs</td>
<td>6 configurable digital inputs. Here connected to illuminated switches. The labels match the settings as shipped from ALSTOM. See Section 4.3.2 for more details.</td>
</tr>
<tr>
<td>4</td>
<td>Motor Thermistor Simulation</td>
<td>A true motor PTC input. Here simulated by a 5kΩ potentiometer. The control can be used to simulate a motor overheating. See Section 4.3.2 for more details.</td>
</tr>
<tr>
<td>5</td>
<td>Plant Analogue Inputs</td>
<td>2 configurable analogue inputs. Input 1 is -10V to +10V, Input 2 is 4-20mA. Can be used to simulate plant inputs. See 6 and 9 below and Section 4.3.2.</td>
</tr>
<tr>
<td>6</td>
<td>Analogue DIP Switches</td>
<td>These DIP switches are used to configure the analogue I/O for current or voltage operation. The small legend shows their use and their default settings as shipped from ALSTOM. See Section 4.3.2 for more details.</td>
</tr>
<tr>
<td>7</td>
<td>Drive Power Frame Simulator</td>
<td>This area is a collection of circuits designed to simulate the complete power frame of the ALSPA MV3000 drives. These controls can be used to simulate internal drive conditions and responses, as per their labels.</td>
</tr>
<tr>
<td>8</td>
<td>PC to Case Serial Link Connections</td>
<td>The connections at TB4 have been extended to here for ease. The lead included, allows easy connection to a PC. Details are given in Section 3.4.5.</td>
</tr>
<tr>
<td>9</td>
<td>Plant Analogue Outputs</td>
<td>2 configurable analogue outputs. Both -10V to +10V. They can be used to simulate plant outputs. See 6 above and Section 4.3.2 for extra detail.</td>
</tr>
<tr>
<td>10</td>
<td>4-20mA Loss Switch</td>
<td>This switch is used to switch off the 4-20ma reference from analogue input 2. When the switch is illuminated the 4-20ma reference is healthy. See Section 4.3.2</td>
</tr>
</tbody>
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OVERVIEW AND SALIENT POINTS IN THIS MANUAL (SECTIONS 1 & 2)

TECHNICAL DATA (SECTION 2)
HANDLING INSTRUCTIONS (SECTION 3)

DEFAULT SET-UP + PROCEDURE FOR SWITCHING ON AND A DETAILED EXPLANATION OF THE KEYPAD

STAGES OF USE

DEMONSTRATING USING THE CASE

FULL SYSTEM SOFTWARE DIAGRAMS
SIMPLE APPLICATION EXAMPLES (SECTION 5)

USE OF ON-LINE HELP (SECTION 6)

SPARES & DISPOSAL

HANDLING AND ACCESSORIES

PLANNING DEMONSTRATIONS & TRAINING

EVERY ALSTOM ACCESSORY IS SUPPLIED WITH ITS OWN DATA SHEET

SOFTWARE MANUAL (T1679EN) DETAILED DESCRIPTION OF DRIVE PARAMETERS USEFUL APPLICATION PROGRAMMING EXAMPLES

SOFTWARE MANUAL (T1679EN) DRIVE DIAGNOSTIC FLOWCHARTS EXTRA DRIVE DIAGNOSTIC INFORMATION

HARDWARE MANUAL (T1678EN) FULL DRIVE SPARES LIST

BASIC SPARES (SECTION 7) + DISPOSAL INSTRUCTIONS (SECTION 8)

MAINTENANCE + DIAGNOSTICS

PROGRAMMING USING THE CASE, TO PRACTICE AND DEMONSTRATE
OVERVIEW

Section Page

1. Introduction .......................................................................................... 1-1
Introduces the User Guide and the demonstration case itself, explaining the uses for which it is intended.

2. Technical Data for the Demonstration Case ......................................... 2-1
Provides electrical and mechanical data for the case, including fuse information. Environmental and European standards are included here.

3. Handling and Accessories ...................................................................... 3-1
Explains how to properly transport, carry and open the demonstration case. A full description of the accessories supplied with the case and how to use them, is also given.

4. Switching on and Demonstrating ......................................................... 4-1
Explains how to switch the case on so that the case powers up healthy. All of the controls in the case are described in full, including a complete section on the Drive Data Manager™. An example demonstration is also supplied to allow confidence to be gained.

5. Menus and Parameters ........................................................................ 5-1
An overview of the ALSPA MV3000 software environment is given here to ensure the completeness of the guide. This section will allow more complicated demonstrations to be undertaken and will also allow software to be developed for working plant drives.

6. Diagnostics ........................................................................................... 6-1
What to do if the case displays a WARNING or if it TRIPS. Shows how to display Warning and Trip codes, and tabulates the meaning of these codes. Provides many diagnostic hints to help find possible faults, explains how to reset the case and how to view a history of any previous incidents which may help with diagnosis.

7. Accessories and Spares .......................................................................... 7-1
List of accessories and spares to allow replacement or extra items to be purchased, including manuals and the accessories supplied with the case.

8. Disposal ............................................................................................... 9-1
Provides disposal instructions for the case, and advises of any toxic materials and special procedures to dispose of them.
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<td>4-11</td>
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1. Introduction

1.1 About this User Guide in General

This User Guide provides a competent user trained in electrical installation practice with sufficient information to safely install, operate, maintain and dispose of this case. The guide deals solely with the demonstration case and what it can be used for. Detailed instructions on ALSPA MV3000 installations and programming are contained in the ALSPA MV3000 Getting Started Manual (T1676), the ALSPA MV3000 Hardware Technical Manual (T1678), and ALSPA MV3000 Software Technical Manual (T1679), which are available from ALSTOM as options.

Instructions for high power modular (DELTA) based ALSPA MV3000 drives are provided in T1689, ALSPA MV DELTA, Supplementary Technical Manual to T1641, for MV3000.

This manual should be regarded as part of the Demonstration Case unit. It should be retained for the life of the case and passed on to any subsequent owner or user.

1.2 Labelling Conventions Used in this Guide

For ease of use, the main objects and areas contained within the demonstration case have been labelled. The key to these labels can be found on the inside front cover of this guide. The number labels which have been described on the front cover, appear throughout the user guide to aid identification of the case parts.

For example: Mains switch (❹) and 4 - 20mA loss switch (❼)

1.3 About the ALSPA MV3000 Demonstration Case

The ALSPA MV3000 Demonstration Case has been developed as a portable and user friendly demonstration unit to compliment the range of ALSPA MV3000 variable speed AC drives. The case allows the user to demonstrate features and benefits of the drive product, to train and instruct site personnel in a safe and clean environment and allows application programs to be developed and tested in a safe manner for later inclusion in plant operations. Technical personnel can be trained in the use of the drive and the Drive Data Manager, the methods of fault finding and diagnosis can be learned and refreshed and personnel can become familiar with the general environment contained within the ALSPA MV3000 without having to go any where near to live working plant. This of course ensures that maintenance teams are fully versed in the drive, and any maintenance activities can be carried out with a minimum of down time. A typical ALSPA MV3000 Demonstration Case is shown in Figure 1-1, shown with the case open.

Figure 1-1  ALSPA MV3000 Demonstration Case - open
1. Introduction

1.4 Range of Cases Covered by this Manual

All language versions of the case are covered by this user guide, namely:

MV3000 CASE DEMO/E The ENGLISH version
MV3000 CASE DEMO/F The FRENCH version
MV3000 CASE DEMO/D The GERMAN version

Dimensions and weights are provided in Section 2.1.

1.5 Use of IEC Standards

The ALSPA MV3000 Demonstration Case units have been designed to IEC standards using SI units. In this manual approximate values for inches, lb and hp are also included for convenience.

1.6 Customer Support and Training

ALSTOM provides comprehensive telephone technical support, application planning, service and customer training at the ALSPA Academy.

Contact ALSTOM at the address and the telephone/fax numbers shown on the back cover.

1.7 Associated Publications

T1676 ALSPA MV3000 Getting Started Manual

The manual explains how to install, commission and program an ALSPA MV3000 drive unit for basic operation.

T1678 ALSPA MV3000 Hardware Technical Manual

The manual contains detailed technical information to enable a competent user trained in drives to safely install, commission and operate, maintain and dispose of ALSPA MV3000 drive units for specific applications.

T1679 ALSPA MV3000 Software Technical Manual

This manual contains detailed technical information to enable a competent user trained in drives to safely configure the ALSPA MV3000 drives for specific applications. It includes full descriptions of the menu structure and parameters, also the serial communications systems.

T1689 ALSPA MV DELTA, Supplementary Technical Manual to T1641, for MV3000

This manual includes specifications and instructions to allow a competent user trained in drives to safely install the components of ALSPA MV3000 DELTA systems to construct DELTA drive units.

DELTA drives are a unique system of modular based drive units, 150 kW to 1.8 MW in air-cooled versions, 600kW to 3.6 MW in liquid cooled versions.
## 2. Demo Case Technical Data

### 2.1 Case Technical/Environmental Data

Table 2-1  Case data

<table>
<thead>
<tr>
<th>Environment</th>
<th>Storage</th>
<th>Temperature range</th>
<th>-25°C to +55°C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Relative humidity</td>
<td>5% to 95%, non-condensing</td>
<td></td>
</tr>
<tr>
<td>Transport</td>
<td>Temperature range</td>
<td>-25°C to +70°C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Relative humidity</td>
<td>≤ 95%, non-condensing</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environment</th>
<th>Operating</th>
<th>Altitude (max.)</th>
<th>1000 m</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Temperature range</td>
<td>0°C to 40°C Absolute MAX</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Relative humidity</td>
<td>5% to 95%, non-condensing</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** If the case is taken from a vehicle into a building, care MUST be taken to allow time for the case temperature to stabilise, this will of course reduce the risk of failure due to condensation build-ups and stress caused to the power supply in the case.

**Cooling air:** Clean, free from dust, condensation and conductive or corrosive vapours (i.e. pollution degree 2 according to IEC 60664-1 and UL840).

**Ingress protection:** IP20, (NEMA 1). Indoor use only

<table>
<thead>
<tr>
<th>Environment</th>
<th>Electrical Supply</th>
<th>Voltage range</th>
<th>90Vac to 264Vac single phase. The power supply then provides a regulated 24Vdc supply</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Voltage variation (on voltage range)</td>
<td>The voltage range above is the absolute limit to the range that the case power supply can operate.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Frequency variation</td>
<td>47 Hz, 63 Hz, as per power supply specification</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Power Lead to fit IEC 3 pin mains socket</td>
<td>The case MUST be used with the EARTHED power lead provided and connected to an EARTHED outlet to properly protect the user from electric shock.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Network type</td>
<td>Single phase with earthed/grounded neutral (i.e. TN or TT)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environment</th>
<th>Fuses</th>
<th>Case Fuse</th>
<th>2 Amp 20mm anti-surge glass fuse to IEC ‘EBC’ 127. A spare fuse is supplied inside the case fuse holder which is located underneath the mains input (❶)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Plug Fuse</td>
<td>(UK only, to BS1362)</td>
<td>The fuse supplied in the plug is a standard 5Amp.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environment</th>
<th>Physical Attributes</th>
<th>Dimensions</th>
<th>Case dimensions, when the case is closed and flat on a table.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>H = 165mm (6.5&quot;), W = 490mm (19.25&quot;), D = 400mm (15.75&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environment</th>
<th>Weights</th>
<th>When the case contains all the cables and manuals supplied.</th>
<th>Max weight of loaded case 7kg (15.4lb)</th>
</tr>
</thead>
</table>
2. Demo Case Technical Data

2.2 Standards

2.2.1 Standards which apply to the whole case

The ALSPA MV3000 Demonstration Case complies with the standards listed below, and has been tested in accordance with the standards listed.

**EMI filter**

EN55022 Class B Specification for limits and methods of measurement of radio interference characteristics of information technology equipment.

**Electromagnetic Compatibility**


EN50082-1 Electromagnetic Compatibility. Generic immunity standard. Residential, commercial and light industry.

2.2.2 Standards which apply to the case power supply

These standards were claimed by the proprietary power supply manufacturer. ALSTOM have not attempted to verify these claims but merely give the data as information:

**EMI filter**

FCC 20780 Part 15, class B -

EN55022 Class B Specification for limits and methods of measurement of radio interference characteristics of information technology equipment.

VDE 0878 PT3 Class B -

**Electromagnetic Compatibility**


EN50082-1 Electromagnetic Compatibility. Generic immunity standard. Residential, commercial and light industry.
3. Handling & Accessories

3.1 Introduction

This section covers everything from opening the case, through to the accessories contained within the case and how to use the items supplied, to bring out the features and benefits of the case. This section also briefly deals with the environmental items that should be considered for the successful use of an ALSPA MV3000 Demonstration Case.

3.2 Receipt of Equipment

3.2.1 Inspection

Check the contents of the complete consignment against the Delivery Note for any damage, shortages or loss in transit. If any item is found to be damaged or missing, contact ALSTOM at the address/telephone number shown on the rear cover, quoting the following details:

- List of damaged or missing items with names and part numbers.
- Description of damage.
- Delivery Note numbers and dates, and order and item numbers.

3.2.2 Storage

If the equipment is not to be used immediately:

- Re-pack it in its original packaging material. If this is not possible it should be enclosed in polythene sheet to protect it from the ingress of dust.
- Store it in a clean, dry atmosphere, preferably at room temperature, ensuring that the storage environment meets the requirements of Section 2.1.
- If the case is unpacked in a warm environment condensation may occur. Should condensation be seen, the case should not be used until its temperature has stabilised to that of the working environment.

3.3 Handling the Case

3.3.1 Transporting the case in a vehicle

It is likely that the case will be transported in a vehicle to allow mobile ALSPA MV3000 demonstrations to take place. When the case is removed from the vehicle then taken to the area where the demonstration is to take place, the case should not be used until its temperature has stabilised to that of the working environment.

Transportation by aeroplane may result in mishandling by baggage handling staff. Inspect the case before applying power. If the case is visibly damaged, or if internal damage is suspected, the case should not be powered up and should be returned to ALSTOM for inspection and possible repair.
3. Handling & Accessories

3.3.2 Carrying the Case

The case is housed in a strong ABS plastic briefcase. The weight of the case, including the contents supplied by ALSTOM, is approximately 7kg, which is below the 10kg recommended weight for a table top lift. It is therefore not recommended to put any other items into the case other than those supplied by ALSTOM, to ensure that maximum recommended lifting weights are not exceeded.

3.3.3 Opening and closing the case

The case has 2 locks positioned either side of the handle (❺). With the case flat on a table, insert a finger behind each lock, at the outer edge, then pull forward, the locks will spring forward and release the case lid. Push the lid up and back until the lid is fully upright, it may sometimes be necessary to support the top panel(❶) whilst opening, as the magnetic catches holding it closed, may release.

To close the case, replace the ALSTOM items in the document wallet (❺), ensure the document wallet is closed and the DDM™ (❾) is in its harbour (❽). Pull the case lid forward and lower it carefully, press the outer edge of the case locks in, to fasten the case closed. The case can be locked by using the 2 keys supplied (they should be tied to the case handle on receipt).

3.4 Identifying and Connecting the Case Accessories

3.4.1 List of Case Accessories

The case contains a number of leads and accessories to allow effective demonstrations to be undertaken, this section explains what the items are and how they can be used. The accessories are stored in the document wallet (❺) area of the case. Various accessories are included, a list is provided here:

1. ALSPA MV3000 Drive Data Manager (DDM™) lead
   This is the standard lead used with the ALSPA MV3000 DDM™. The part number for this item can be found in chapter 7, spares and accessories.
   See Section 3.4.3 for an explanation of how to use and connect the lead

2. PC to demonstration case lead
   This lead comprises of an RS232 to 422 converter which is wired to a connector which mates to the PC to case connector (❸).
   See Section 3.4.4 for an explanation of how to use the lead

3. Mains lead
   See section 3.4.5 for more information on the mains lead.
4. Data sheets for the Drive Data Manager - T1915.
5. Data sheets for the PC lead converter.
3.4.2 Opening the Document Wallet (❷)

The top panel (❶) has a finger hole (❹) milled into it. Next to the finger hole is a catch holding the wallet closed, rotate the catch a quarter turn to release it then insert a finger into the hole and pull forward, the document wallet/cable store area will be revealed.

The top panel has a strap to prevent it from falling fully open.

The case user manual, data sheets, power lead and accessories are housed here.

3.4.3 Connecting the Drive Data Manager (DDM™) lead

This lead is designed to be used with the ALSPA MV3000 DDM™. The lead allows the DDM™ to be mounted on a cubicle door or allows the user to hand hold the DDM™.

Connect the special lead as shown in Figure 3-4, looping the cable around the groove provided then underneath the “ear” on the cable connector. If done correctly, the DDM™ should lie flat on its back on a table.

The other end of the cable should be connected to the 9 way “D” connector on the DDM™ Harbour (❽).

Figure 3-5 shows the DDM™ connected in this way.

3.4.4 Connecting a PC to the demonstration case (❸)

The case can be connected to a PC using the lead provided, simply plug the lead into the PC to case connection (❸) on the bottom panel, and into the back of the PC.

This will allow interactive demonstrations with other ALSTOM products, for example SCADA tools and the drive configuration tool, ALSPA Drive Coach.
3. Handling & Accessories

The lead can also be separated, removing the RS232/422 converter, thus allowing direct connection to the RS485 connections on TB4 of the control PCB. This will allow the case to be connected to ALSTÔM HMI products, again allowing the case to perform interactive demonstrations. Section 4 of this guide will give an outline of how to program the case to achieve these communications connections.

The following pin-out is provided to allow other items to be connected to the case successfully:

<table>
<thead>
<tr>
<th>TB4 on CDC</th>
<th>7 way CAN&amp;RS485, PC to case connector (©)</th>
<th>9 way “D” Type connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB4/1 (Tx+)</td>
<td>1</td>
<td>2 (RxA)</td>
</tr>
<tr>
<td>TB4/2 (Tx-)</td>
<td>2</td>
<td>7 (RxB)</td>
</tr>
<tr>
<td>TB4/3 (Rx+)</td>
<td>3</td>
<td>8 (TxA)</td>
</tr>
<tr>
<td>TB4/4 (Rx-)</td>
<td>4</td>
<td>3 (TxB)</td>
</tr>
<tr>
<td>TB4/5 (GND)</td>
<td>5 (connect to screen)</td>
<td>Not Connected</td>
</tr>
<tr>
<td>TB4/6 (CAN HI)</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>TB4/7 (CAN LO)</td>
<td></td>
<td>7</td>
</tr>
</tbody>
</table>

If the lead is separated, care must be taken when re-assembling the lead for PC operation. The lead must be plugged into the RS422 end of the converter, leaving the RS232 end free to connect to the PC, Figure 3-7 shows the connector assembled correctly.

3.4.5 Mains Lead

The case is supplied with a 3 pin IEC style mains lead. The language version of the case, determines the kind of plug connected to the mains lead supplied:

- MV3000 CASE DEMO/E ENGLISH version UK style fused plug
- MV3000 CASE DEMO/F FRENCH version Continental plug
- MV3000 CASE DEMO/D GERMAN version Continental plug

The mains lead is earthed and MUST be connected to an earthed power outlet for safety reasons.
4. Switching On and Demonstrating

4.1 Introduction

This section will explain the case switch on procedure, the use of the DDM™, connection of the case to a PC or other serial linked items, hints on how to use the case to demonstrate and a brief explanation of the ALSPA MV3000 software environment to allow effective demonstrations/simulations to be made.

When the case leaves the factory it is programmed with sensible default values for all parameters, these defaults are of course exactly the same as the ALSPA MV3000 drive.

4.2 Switching the Case On

Before powering up, ensure that the case has been placed on a flat surface and opened as per Section 3.3.3, and the case has been transported to the demonstration place in accordance with the recommendations made in Section 3.3.1.

Power the case up by carrying out the following basic steps:

1. Open the case, see Section 3.3.3
2. Ensure all the potentiometers in the power frame simulator (⑦), are all in the 12 O’clock position.
3. Ensure the green switches in the power frame simulator (⑦), are all ON (pressed in).
4. Ensure the green switch labelled 4-20mA loss (⑬), is switched ON (pressed in).
5. Ensure all the plant digital input switches (⑱) are all OPEN (up).
6. Ensure the Drive Data Manager (❾), is in its harbour (❽).
7. Connect the mains lead to the power inlet (❹) and a suitable supply.
8. Switch the mains power on using the illuminated switch (❹).
9. The case will power up, The yellow LED near to the plant digital outputs (⑲) should be on, the DDM™ (❾) should power up and eventually display P1.00.
10. The CDC board (❸) should be healthy, and this can be determined by the green healthy/standby LED on the DDM™ (❾), the rear cover of this guide has a picture of the DDM™, so the healthy/standby LED can be identified.
11. If the case does not power up healthy, it is possible that the parameters stored in the CDC board (❸) are not at their default settings. Carry out the procedure described in Section 5.1.9, then repeat the power up procedure before referring to the diagnostics section of this guide.

4.3 Uses and Features of the Bottom Panel (❿)

4.3.1 Introduction

The bottom panel is the part of the case where the “plant” and the ALSPA MV3000 power frame has been simulated, for demonstration purposes, this allows the case to perform the function of a drive as fully as possible. The bottom panel is split into 3 main areas, they are briefly described below:
1. **Plant I/O Areas** Pre-wired plant connections.

   LED's, illuminated switches and potentiometers have been fitted to the case and wired to the CDC board (❸) customer inputs. This “plant” wiring has been connected to the CDC Board (❸) in exactly the same configuration as described for the ALSPA MV3000 drive in its default configuration. The labels match this default set-up. This default configuration is described for reference in Section 5.1.10.

2. **Power frame simulation Area** Takes the place of a real drive.

   Key circuits on the drive have been reproduced to allow the monitoring and diagnostic functions of the ALSPA MV3000 to be demonstrated. Illuminated switches, LED’s and potentiometers are used to simulate feedbacks and trip signals.

3. **PC to case connection Area** Connection to CAN & RS485

   Via the lead, described in the accessories section of this guide, a PC can be connected to the case.

4.3.2 **Using the Plant I/O Area (①②③④⑤⑥⑦⑧⑨⑩)**

   The following section describes how these controls and switches can be used. The labels on these controls match the default set-up for the CDC board (❸), which of course matches that of the default ALSPA MV3000. For this explanation to work, the CDC board (❸) needs to be at default, see Section 5.1.9 for the defaulting procedure.

   Use this table to understand how the controls are connected, so that bespoke programming and changes during demonstrations can go smoothly. Sections later in this guide give a brief overview of how to use the case to develop new ALSPA MV3000 programs.

   **Note:** The case output is the simulated IGBT bridge represented by the 6 YELLOW led's which are mounted within the power frame simulation area (⑦).

---

### Table 4-1 Details of the Plant I/O Area

<table>
<thead>
<tr>
<th>Panel Item No.</th>
<th>Panel Item Area</th>
<th>Specific panel name</th>
<th>Function / Use in the case (@ default)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Plant Digital Outputs (MENU 7)</td>
<td>OUTPUT 1 healthy</td>
<td>O N - Green - The case is healthy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OFF - Red -</td>
<td>The case has tripped</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OUTPUT 2 Running</td>
<td>O N - Green - Output is running</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OFF - Red -</td>
<td>Output is NOT running</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OUTPUT 3 At Speed</td>
<td>O N - Green - Ouput at speed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OFF - Red -</td>
<td>Output NOT at speed</td>
</tr>
<tr>
<td>2</td>
<td>Plant Interlock (used for emergency stops)</td>
<td>Interlock</td>
<td>A normally closed push button which is wired to the CDC board (❸) interlock input, when pressed (opened) the case will trip on “interlock” trip, as per a real plant Emergency stop. Releasing the button re-closes the interlock input allowing the case to be made healthy via a reset.</td>
</tr>
</tbody>
</table>
### Panel Item No. | Panel Item Area | Specific panel name | Function / Use in the case (@ default)
--- | --- | --- | ---
3 | Plant Digital Inputs | INPUT 1 Stop | ON - lit Red - When set to “remote”, the stop circuit is “made” and the case output is able to start.
OFF - not lit - A remote stop is issued

INPUT 2 Start | ON - lit Green - When set to “remote”, a start request is issued, the case output will start if the stop circuit is made.
OFF - not lit - The output will remain started (latched) if pressed and released.

Note: This input should be pulsed ON then OFF to perform a start (if stop made).

INPUT 3 Reverse | ON - lit Yellow - The speed reference being used in the case can be reversed, depends on the setting of P5.11 for its function.
OFF - not lit - The reference will remain unaffected.

INPUT 4 Keypad (DDM™) / Remote | ON - lit Yellow - The start/stop controls and the speed reference come from “remote”, which, at default, is the panel plant I/O area.
OFF - not lit - The start/stop and speed reference will come from the DDM™ (❶).

INPUT 5 Ref 1 /Ref 2 | ON - lit Yellow - When in remote, the 4-20mA reference is active on Analogue input 2.
OFF - not lit - When in remote, the +/-10V reference is active on Analogue input 1.

INPUT 6 Trip Reset | ON - lit Yellow - A trip reset pulse is issued.
OFF - not lit - No reset pulse is issued
Note: This input should be pulsed ON then OFF to perform a reset.
### Panel Item No. | Panel Item Area | Specific panel name | Function / Use in the case (@ default)
--- | --- | --- | ---
4 | Motor Thermistor (MENU 2) | Motor Thermistor (A Positive Temperature Co-efficient thermistor I/P) | Menu 2, P2.13, P2.14 and P2.15, set up the way in which a PTC can be connected to the ALSPA MV3000. The Motor thermistor simulation potentiometer allows the case user, to simulate a motor overheating and hence show how the ALSPA MV3000 would react.
5 | Plant Analogue Inputs (MENU 7) | ANALOGUE I/P 1 only works in Remote, see INPUT 4 | A -10V to +10V pot has been connected, to simulate a voltage reference to the ALSPA MV3000. Menu 7 is used to set up the analogue inputs. It is extremely important that the DIP switches are set correctly for this to work.
 | ANALOGUE I/P 2 only works in Remote, see INPUT 4 | A 4-20mA pot has been connected, to simulate a current reference to the ALSPA MV3000. Menu 7 is used to set up the analogue inputs. It is extremely important that the DIP switches are set correctly for this to work.
6 | Analogue DIP Switches | Analogue DIP Switches | Ensure the switches are set as per the graphic on the panel, to set the switches correctly for the default analogue I/O. In reality these DIP switches would be used to configure the analogue I/O for current or voltage operation on the plant.
9 | Plant Analogue outputs (MENU 7) | ANALOGUE O/P’s 1 and 2 | 2 bipolar +/-10V meters will allow the user to “patch” signals to the outside world, as would be done on plant. Once again it is extremely important that the DIP switches are set correctly for this to work.
10 | 4-20mA loss switch (MENU 5) | 4-20mA loss switch | ON - lit Green - The 4-20mA generator in the case is on. OFF - not lit - The 4-20mA generator in the case is off, the drive will trip on reference loss if this reference is selected.

**Operating notes:**
- Use digital input 4 to switch between keypad (DDM™) and remote (off = keypad).
- To achieve a remote start, press in the stop switch in, then pulse the start switch.
- To achieve a remote stop, open the stop switch.
- The Ref1/Ref2 switch is only active in remote.
- The trip reset (on digital input 6) is active in local or remote modes.
### 4.3.3 Using the Power Frame Simulation Area (図)

The power frame simulation area is split into 4 main areas, they represent areas which exist within a standard ALSPA MV3000 drive. Controls are placed within these areas to allow signals to be adjusted for monitoring and diagnostic demonstrations.

<table>
<thead>
<tr>
<th>Simulator (図) Name</th>
<th>Type of Panel Control</th>
<th>Function of Panel Control</th>
<th>Trips, Warnings and Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>I/P Temperature Feedback</td>
<td>Potentiometer</td>
<td>Allows the user to vary the simulated I/P bridge heatsink temperature. The value can be seen at P11.08 in °C.</td>
<td>HEALTHY when the pot is at the 12 o’clock position. Increasing the temperature will trip the case on “Over Temperature”, reducing the temperature will issue a “Low Temperature” warning, then eventually a trip on “Under Temperature”</td>
</tr>
<tr>
<td>INPUT AREA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Precharge Complete</td>
<td>Red LED</td>
<td>Indicates when The CDC board (❸) has determined that DC Link precharge is complete. Raising the DC link feedback can initiate a simulated precharge.</td>
<td>Raise the DC link to greater than 400Vdc (see DC feedback below) and approximately 1 second later the CDC will determine that precharge is complete. When the DC Link feedback is reduced below 400V, an undervoltage will be detected.</td>
</tr>
<tr>
<td>INPUT AREA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D.B. Hardware Over Temperature</td>
<td>Green Illuminated Switch</td>
<td>Simulates a hardware circuit which monitors the D.B. temperature. See Note 1 below.</td>
<td>HEALTHY when the switch is illuminated. Trips case on “D.B. Hardware O.Temp.” when the switch is opened.</td>
</tr>
<tr>
<td>DYNAMIC BRAKE AREA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D.B. Instantaneous Overcurrent</td>
<td>Green Illuminated Switch</td>
<td>Simulates the trip signal returning from the D.B. IGBT power device.</td>
<td>HEALTHY when the switch is illuminated. Trips on case “DB O-Curr Trip.” when the switch is opened.</td>
</tr>
<tr>
<td>DYNAMIC BRAKE AREA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D.B. Temperature Feedback</td>
<td>Potentiometer</td>
<td>Allows the user to vary the simulated D.B. heatsink temperature. The value can be seen at P11.12 in °C.</td>
<td>HEALTHY when the pot is at the 12 o’clock position. Increasing the temperature will trip the case on “Over Temperature”, reducing the temperature will not have any effect, as the pot has not got the range to initiate the UnderTemperature messages.</td>
</tr>
</tbody>
</table>
4. Switching On and Demonstrating

<table>
<thead>
<tr>
<th>Simulator (igy) Name</th>
<th>Type of Panel Control</th>
<th>Function of Panel Control</th>
<th>Trips, Warnings and Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC Link Feedback</td>
<td>Potentiometer</td>
<td>Allows the user to vary the simulated DC Link voltage. The value can be seen at P11.03 in Volts. Varying this value will also be seen as a different PWM pulsing on the YELLO W activity LED’s, as the drive compensates for the differing DC link levels.</td>
<td>HEALTHY when the pot is at the 12 o’clock position. Increasing the value will not trip the case on overvoltage, as this is left to a hardware detector. If the output is running, a high DC link will be interpreted as voltage across the D.B. resistor and associated “DB resistor” warnings and trips will be seen.</td>
</tr>
<tr>
<td>DC Hardware Over Voltage</td>
<td>Green Illuminated Switch</td>
<td>Simulates a hardware circuit which monitors the DC link Voltage. See Note 1 below.</td>
<td>HEALTHY when the switch is illuminated. Trips on “DC Over Voltage” when the switch is opened.</td>
</tr>
<tr>
<td>O/P Temperature Feedback</td>
<td>Potentiometer</td>
<td>Allows the user to vary the simulated O/P bridge heatsink temperature. The value can be seen at P11.05 in °C.</td>
<td>HEALTHY when the pot is at 12 o’clock. Increasing the temperature will trip the case on “O ver Temperature”, detected by the software.</td>
</tr>
<tr>
<td>O/P Hardware Over Temperature</td>
<td>Green Illuminated Switch</td>
<td>Simulates a hardware circuit which monitors the O/P bridge temperature. See Note 1 below.</td>
<td>HEALTHY when the switch is illuminated. Trips case on “ Hardware O.Temp. U” when the switch is opened.</td>
</tr>
<tr>
<td>Overcurrent U,V,W</td>
<td>Green Illuminated Switches</td>
<td>Simulates the Overcurrent trip signals returning from the O/P IGBT power devices.</td>
<td>HEALTHY when the switch is illuminated. Trips on “Inst. O current.” when the switches are opened.</td>
</tr>
<tr>
<td>Bridge Activity LED’s</td>
<td>6 Yellow LED’s</td>
<td>There is one LED connected to where there would normally be an IGBT in the drive. the LED’s are simulating the power bridge of the drive.</td>
<td>When the O/P bridge is running these LED’s light and flicker once per IGBT O N signal. Their flickering alters with speed and DC link volts, showing the interaction of Modulation depth on the PWM signals.</td>
</tr>
</tbody>
</table>

Note 1: For safety, the real ALSPA MV3000 drive monitors certain signals in hardware and software. In the event that the software is not running properly at the time of the problem, then the backup hardware circuit will protect the ALSPA MV3000 against a failure which will damage the product. The case simulates these hardware circuits with switches.
4.3.4 Using the Case Serial Link lead including Connections

Introduction

The 7 pin connector in area (①) extends the standard CDC board (②) RS485 and CAN connections to a convenient position on the case. This connector now allows the case to be connected to an RS485 serial link or a CAN bus. Section 3.4 gives details of the connector pin outs and details of the lead provided in the case. The lead allows easy connection to a PC (via an RS232/422 converter) or other serial device. Connection to **ALSTOM** HMI devices, SCADA devices and PLC’s is now possible. The case can now be used as a safe and convenient simulated ALSPA MV3000, to develop plant programs on the other devices. Parameters edited in the case to facilitate the completion of this simulated plant, can then be uploaded into the ALSPA Drive Coach or into the DDM™ (via P99.16) and transferred to a fully installed ALSPA MV3000.

1. Connecting to the ALSPA Drive Coach
   The ALSPA drive coach is the PC tool available for the ALSPA MV3000 and allows parameter editing and storage, and also allows graphical access to the drives history record, all of which can be demonstrated using the case.

   To gain communication, set the following values:

   \[P32.50 = 6\] Sets 38400 baud
   \[P32.51 = 0\] Sets an RS485 Address of 0
   \[P32.52 = 1\] Sets GEM80 ESP protocol

   Interactive demonstrations, training or parameter uploading can now be undertaken with the ALSPA Drive Coach. The help files on the ALSPA Drive Coach give all the required detail to successfully run the software tool.

2. Connecting to other Serial Devices
   Once suitable electrical connections have been made (see Section 3.4.4), the CDC board (②) RS485 port must be configured. This is done in menu 32, starting at P32.50. Parameters for baud rate etc. must be set to gain communication to the other device.
   The user guide control block diagrams (Section 5.3) pictorially show an overview of the parameters and how to access the other menus. The optional software technical manual (T1679) gives a complete and comprehensive parameter listing, this data will give full details for more comprehensive use of this serial port.

3. The CAN connections are currently not in use.
4.4 Demonstrating - a short example

The following is a short example of how the case can be used in its default format. Read Section 4.5 first to gain the necessary skills required to operate the DDM™.
The example takes the form of a flow chart for ease.

**START HERE**
for this example to work the case must be switched on, following the procedure described in Section 4.2, and at default, see Section 5.1.9 to achieve this.

**OPENING THE OTHER MENUS**
Navigate to P1.31 and edit its value to 2

**RE-CONFIGURING ANALOGUE OUTPUT 2 to Show speed reference**
An optional part of the demo, only makes the demo more visual.
- Navigate to P7.22 and edit its value to 9.00, This sends the speed reference out
- Navigate to P7.24 and edit its value to 1, Sets the output to bipolar
- Navigate to P7.25 and edit its value to 100, Sets the analogue scaling

4.4.1 Starting from the DDM™

**STARTING FROM THE DDM™**
Press the “esc” key twice until Menu 1 is displayed on the DDM™, then press the ▼ arrow on the navigation key to enter Menu 1. The DDM™ will now display P1.00, the speed reference.

1. Press the GREEN Run button on the DDM™.
2. The 6 yellow bridge activity LED’s will light and digital output 2 will show output running.
3. Edit P1.00 to 100%.
4. Analogue output 2 will read +10, and Analogue output 1 will ramp up to +10.
5. The bridge activity LED’s will show PWM switching.
6. The “at speed signal” at digital output 3 will go off then come back on.
7. Edit P1.00 to -100%.
8. Analogue output 2 will read -10, and Analogue output 1 will ramp up to -10.
9. The “at speed signal” at digital output 3 will go off then come back on.
10. Edit P1.00 to 0%.
11. Analogue output 2 will read 0, and Analogue output 1 will ramp up to 0.
12. The “at speed signal” at digital output 3 will go off then come back on.
13. Press the RED Stop button on the keypad.
14. Digital output 2 will show output not running (RED LED)

Parameters in Menu 6 can be adjusted to alter the ramp rates. Analogue output 1 will display the new ramp rates set by the ramp rate parameters, as the speed reference is changed.

**CONTINUE - FOR STARTING FROM THE CASE I/O**
4.4.2 Starting from the Case I/O

STARTING FROM THE CASE I/O

With the keypad still displaying P1.00, the speed reference:

1. Press the YELLOW digital input 4 switch (3), this selects remote control.
2. Pressing the Run button on the DDM™ (9), or attempting to edit P1.00 will result in the keypad reporting that it has not got access to either control or reference.
3. Press the RED stop switch on the I/O panel, connected to digital input 1 (3).
4. Pulse the GREEN start button, connected to digital input 2 (3).
5. The 6 yellow bridge activity LED’s will light (7) and digital output 2 (11) will show output running.
6. Adjust the pot labelled analogue input 1 (5), the +/-10V reference, then leave it still.
7. Analogue output 2 (9) will follow the pot, and Analogue output 1 (9) will ramp up to it.
8. The bridge activity LED’s will show PWM switching (7).
9. The at speed signal at digital output 3 (11) will go off then come back on.
10. Press the YELLOW Ref1/Ref2 switch, connected to digital input 5 (3).
11. Analogue input 2 (5), the 4-20mA reference, will now be active.
12. Adjust the potentiometer labelled analogue input 2 (9), the 4-20mA reference, then leave it still.
13. Analogue output 2 (9) will follow the pot, and Analogue output 1 will ramp up to it.
14. The at speed signal at digital output 3 (11) will go off then come back on.
15. Set analogue input 2 (5), to 4mA
16. Analogue output 2 (9) will read 0, and Analogue output 1 (9) will ramp up to 0.
17. The at speed signal at digital output 3 (11) will go off then come back on.
18. Open the RED Stop switch on the I/O panel, connected to digital input 1 (3).
19. Digital output 2 will show output not running (RED LED) (11)

Parameters in Menu 6 can be adjusted to alter the ramp rates. Analogue output 1 will display the new ramp rates set by the ramp rate parameters, as the speed reference is changed.

GETTING HELP WITH DIAGNOSTICS

With the I/O switches left as above, close the stop switch (illuminates RED) and pulse the start, to get the output running:

1. Open the GREEN switch marked 4-20mA loss (3).
2. The case will trip (red flashing LED on the DDM™ (9)).
3. Press the “?” key on the DDM™ (9). From the menu choose, view trips.
4. Close the 4-20mA loss switch (3) so that it illuminates GReen.
5. Press the “?” key on the keypad, from the menu choose, reset trips, the case will become healthy

GETTING HELP WITH PARAMETERS

With the case healthy, navigate to P5.01. Use the “?” key to get parameter help. Repeatedly pressing the “?” key or pressing ➔ arrow on the navigation key, gives the next piece of HELP.
4. Switching On and Demonstrating ALSPA MV3000 Demonstration Case

4.5 Drive Data Manager™ (DDM™) Functions

The Drive Data Manager™ provides Keypad functionality to configure the drive, in addition to providing motor control, diagnostic functions and condition monitoring.

Note: A diagram of the DDM™ is provided for reference inside the rear cover.

4.5.1 Navigation Key

The 4-way Navigation key is used to navigate menus and parameters, and to edit parameter values. Operation of the Navigation key is shown inside the rear cover.

4.5.2 Navigating to Menus and Parameters

Figure 4-1 shows how to navigate the menus and parameters to find any parameter. Menu 1 and its parameters are illustrated as an example, other menus are treated in exactly the same way. To access menus other than Menu 1, edit parameter P1.31 as shown in Section 5.1.7.

The start-up screen which is displayed when the case is first switched on, with the DDM™ connected, is labelled below, this shows the default value for P1.00.
4.5.3 SHORTCUT Method of Entering a Parameter Number

If the parameter number is known, it can be entered directly using a shortcut method. From the parameter or menu level, proceed as follows:

For example, the key Sequence to shortcut to P1.00, the Speed Reference:

```
P1.00 <Enter>
```

4.5.4 Editing Parameters

Two types of parameter may be edited:
- **NUMERICAL** parameters – to change the value
- **LIST** parameters – to choose from a list

**NUMERICAL parameter**

As an example of editing numerical parameters, Figure 4-2 shows how to edit the value of the Motor Base Frequency parameter P2.00.

![Diagram showing editing process](image_url)

Figure 4-2 Editing a numerical parameter
LIST parameter

This type of parameter contains a list of choices or items etc. Figure 4-3 shows how to select from a list parameter, using the Speed Reference 1 Source parameter P5.01 as an example.

The options in a list parameter can either be determined by consulting the optional software manual (T1679) or by simply pressing the "?” key, this key gives context sensitive help when required, here parameter help is given. The diagram shows how the help key can be used to determine a required selection.

![Diagram showing how to select from a list parameter]({})

**Figure 4-3 Editing a "List" parameter**

### 4.5.5 Using the DDM™ HELP (?) Key

The help key can provide diagnostic help or parameter help, this help function is context sensitive. See Section 6 for a detailed use of the "?” key during diagnostics and Section 4.5.4, List parameters, for an example of how to get Parameter help.
4.5.6 DDM™ (keypad) Removal Checks

Note: To allow the drive to make the necessary safety checks, this removal procedure should always be followed. A trip may result if this procedure is not followed.

The drive checks if DDM™ removal is allowed as the DDM™ may have Start/Stop control, or the DDM™ Speed Reference may be active.

To remove the DDM™, continue as shown in Table 4-3.

<table>
<thead>
<tr>
<th>Do What?</th>
<th>How?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong> Ensure the Keypad (DDM™) is neither in control of the Start/Stop nor the Keypad Speed Reference is active</td>
<td>AT DEFAULT: Close DIG IN 4, this will select Remote. ELSE: Gain the necessary authorisation before continuing. a) Make P4.09 = 1, to set CF116 ON, this removes the Start/Stop Control from the Keypad (DDM™). b) The Keypad (DDM™) must not be either the active reference source or the backup reference source. The reference sources are held in P5.01 to P5.05 and are made active by CF4 to CF7 (P5.07 to P5.10) respectively. The backup reference is P5.06.</td>
</tr>
<tr>
<td><strong>2</strong> Access the Keypad removal screen</td>
<td>Press the “esc” key repeatedly.</td>
</tr>
<tr>
<td>1. REMOVAL CHECK 2. RETURN TO PARAMS.</td>
<td></td>
</tr>
<tr>
<td><strong>3</strong> Select “REMOVAL CHECK”</td>
<td>Press the “1” key on the Keypad (DDM™). The drive checks to see if the Keypad is allowed to be removed. As well as the above control and reference checks, P35.01 (Allow Keypad Removal) is also checked.</td>
</tr>
<tr>
<td><strong>4</strong> Remove Keypad if the screen allows: <strong><strong>KEYPAD READY</strong></strong> <strong><strong>FOR REMOVAL</strong></strong></td>
<td>A message may be flashed disallowing removal because the Keypad is either still in control, still has active/backup reference (see step 1 above) or if it is simply disallowed (see step 3 above).</td>
</tr>
</tbody>
</table>

Note: If the DDM™ is neither in control or is a valid reference choice, the DDM™ can be removed without a trip and without invoking the above procedure, HOWEVER it is useful to make a habit of the above removal procedure so that the ALSPA MV3000 is able to make the necessary checks.
4.6 DDM™ Harbour (❺)

4.6.1 Harbour LED Indicators

If the DDM™ is not fitted, or the DDM™ is fitted via its lead and is being hand held, four LED’s on the DDM™ Harbour indicate drive status as shown in Figure 4-4 below. These LED’s are duplicated on the DDM™.

4.6.2 Removing the DDM™ from the Harbour, and re-fitting.

The DDM™ (❺) is removed by first carrying out the correct removal checks, which is detailed in Section 4.5.6, then, grasp the DDM™ (❺) at the bottom and press fingers and thumbs into the depressions in the harbour (❺) moulding (as draw above in Figure 4-4), the DDM™ (❺) will snap out.

Re-fitting the DDM™ (❺) is described on the data sheet (T1915) which is supplied as an accessory and is stored in the case document wallet.

4.7 Limitations of this Demonstration Case

As the output bridge of the ALSPA MV3000 is simulated here by 6 LED’s, and since there is not a motor connected to the case, some of the monitoring and feedback parameters in the menu structure will give a false reading. The parameters associated with current and power are the ones which are effected.

Setting Vector control in P99.01 may also give a variety of faults for the same reasons.
5. Menus and Parameters

5.1 MV3000 Menus and Parameters Overview

5.1.1 Introduction

The purpose of this section is to introduce the user to the software environment of the ALSPA MV3000. This will allow more effective demonstrations to be given and also allow the case to be used to develop and practise software writing for the drive.

5.1.2 What is a Parameter?

The ALSPA MV3000 software uses system constants, scaling factors and other data, collectively referred to as PARAMETERS, which are arranged into MENUS for ease of use. Menus group parameters by like function e.g. Menu 6 contains Ramp Settings. The complete menu listing is shown in Table 5-1. Some Parameters are duplicated into more than one menu to make them easier to locate.

Every parameter has a Parameter Number, which includes the menu in which it is located. See opposite for an example:

The parameters can be accessed by navigating or shortcutting to them. Refer to section 4 for how to use the DDM™.

5.1.3 Parameter Attributes

All parameters have attributes which specify how they may be accessed. Attributes are determined by the parameter function, e.g. security or user level password requirement, or the type of parameter, e.g. a List. The DDM™ will display these attributes when the “?” is pressed. The types of attribute are described below.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Security / User Level / Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>Engineer accessible - only accessible if the engineering password has been entered into P99.06 or P1.32, see Section 5.1.4.</td>
</tr>
<tr>
<td>L</td>
<td>List parameter, value selected from a pre-defined list</td>
</tr>
<tr>
<td>N</td>
<td>Enter (eNter) has to be pressed to update</td>
</tr>
<tr>
<td>O</td>
<td>Operator accessible - only accessible if the operator password has been entered in P99.06 or P1.32, see Section 5.1.4.</td>
</tr>
<tr>
<td>R</td>
<td>Read only (monitoring parameters)</td>
</tr>
<tr>
<td>S</td>
<td>Stop to edit, the output must be stopped to allow editing</td>
</tr>
</tbody>
</table>

5.1.4 Parameter Passwords

A simple system of passwords allows control of access to parameters, the method of entry is described below. Two levels of access are provided:

<table>
<thead>
<tr>
<th>Access Level</th>
<th>Default Password</th>
<th>Default Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>0</td>
<td>Unlocked</td>
</tr>
<tr>
<td>Engineer</td>
<td>0</td>
<td>Unlocked</td>
</tr>
</tbody>
</table>
Using the passwords

1. The Engineer’s password is stored in P99.08 (a 4 digit code).
2. The Operator’s password is stored in P99.07 (a 4 digit code).
3. Enter the "key" code into P99.06 (or P1.32, its duplicate). If the key matches either the Engineer’s or the Operator’s code, then that relevant level is unlocked, and parameters with those attributes can be edited.
4. Once unlocked, new passwords can be edited into P99.08 or P99.07.

5.1.5 A Complete Menu Listing

Table 5-1 Complete Menu listing

<table>
<thead>
<tr>
<th>Menu</th>
<th>Description</th>
<th>Menu</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>User configured menu</td>
<td>27</td>
<td>History log playback settings</td>
</tr>
<tr>
<td>2</td>
<td>Basic motor settings</td>
<td>28</td>
<td>Auto-reset settings</td>
</tr>
<tr>
<td>3</td>
<td>Frequency control settings</td>
<td>29</td>
<td>Speed and torque monitor settings</td>
</tr>
<tr>
<td>4</td>
<td>Start and stop control</td>
<td>30</td>
<td>Logic block settings</td>
</tr>
<tr>
<td>5</td>
<td>Speed reference settings</td>
<td>31</td>
<td>Status flag generator settings</td>
</tr>
<tr>
<td>6</td>
<td>Ramp settings</td>
<td>32</td>
<td>Serial links settings</td>
</tr>
<tr>
<td>7</td>
<td>Plant I/O settings</td>
<td>33</td>
<td>Control flag 0 to 99 source settings</td>
</tr>
<tr>
<td>8</td>
<td>Torque limit settings</td>
<td>34</td>
<td>Control flag 100 to 126 source settings</td>
</tr>
<tr>
<td>9</td>
<td>Basic drive monitoring</td>
<td>35</td>
<td>Miscellaneous features settings</td>
</tr>
<tr>
<td>10</td>
<td>Trips and warnings</td>
<td>36</td>
<td>Position controller settings (encoder only)</td>
</tr>
<tr>
<td>11</td>
<td>Advanced drive monitoring</td>
<td>37</td>
<td>Position reference settings (encoder only)</td>
</tr>
<tr>
<td>12</td>
<td>Motor advanced settings (vector only)</td>
<td>38</td>
<td>Position controller monitor (encoder only)</td>
</tr>
<tr>
<td>13</td>
<td>Speed feedback settings (vector only)</td>
<td>39</td>
<td>User configurable menu (Menu 1) settings</td>
</tr>
<tr>
<td>14</td>
<td>Speed loop settings (vector only)</td>
<td>40</td>
<td>Summing nodes settings</td>
</tr>
<tr>
<td>15</td>
<td>Torque reference settings (vector only)</td>
<td>41</td>
<td>Programmable status word settings</td>
</tr>
<tr>
<td>16</td>
<td>PID controller settings</td>
<td>42</td>
<td>Pointer source settings</td>
</tr>
<tr>
<td>17</td>
<td>Reference sequencer settings</td>
<td>43</td>
<td>Load fault detection window settings</td>
</tr>
<tr>
<td>18</td>
<td>Motorised potentiometer settings</td>
<td>44</td>
<td>Reference shaper settings</td>
</tr>
<tr>
<td>19</td>
<td>Trim reference settings</td>
<td>80</td>
<td>FIP - Configuration and status data</td>
</tr>
<tr>
<td>20</td>
<td>High speed digital I/O settings</td>
<td>83</td>
<td>FIP - Fast produced VCO Ms</td>
</tr>
<tr>
<td>21</td>
<td>Fixed reference settings</td>
<td>84</td>
<td>FIP - Fast consumed VCO Ms</td>
</tr>
<tr>
<td>22</td>
<td>Skip speed settings</td>
<td>85</td>
<td>FIP - Slow VCO Ms and FIP refs.</td>
</tr>
<tr>
<td>23</td>
<td>Dynamic brake control settings</td>
<td>89</td>
<td>FIP - Data spy module</td>
</tr>
<tr>
<td>24</td>
<td>Speed trim settings</td>
<td>98</td>
<td>Menu enable selection settings</td>
</tr>
<tr>
<td>25</td>
<td>Inertia compensation settings</td>
<td>99</td>
<td>Configuration settings</td>
</tr>
<tr>
<td>26</td>
<td>History log settings</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5.1.6 User Configurable Menu 1

This is a special menu containing a selection of 30 parameters copied from the drive’s complete parameter list. Menu 1 can be configured via Menu 39 to hold the most useful parameters in any application. Table 5-2 shows the parameters copied into Menu 1 by ALSTOM. The table also shows the identity of the source parameters.

### Table 5-2  Menu 1 – User Configurable Menu

<table>
<thead>
<tr>
<th>Parameter No.</th>
<th>Source Parameter Configured by Menu 39</th>
<th>Function</th>
<th>Parameter No.</th>
<th>Source Parameter Configured by Menu 39</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1.00</td>
<td>P9.00</td>
<td>Speed Reference</td>
<td>P1.17</td>
<td>P5.17</td>
<td>Minimum Speed Fwd</td>
</tr>
<tr>
<td>P1.01</td>
<td>P9.01</td>
<td>Speed Feedback</td>
<td>P1.18</td>
<td>P5.18</td>
<td>Minimum Speed Rev</td>
</tr>
<tr>
<td>P1.02</td>
<td>P9.05</td>
<td>Motor Current</td>
<td>P1.19</td>
<td>P3.00</td>
<td>Fluxing Control</td>
</tr>
<tr>
<td>P1.03</td>
<td>P9.09</td>
<td>Frequency Feedback</td>
<td>P1.20</td>
<td>P3.01</td>
<td>Fixed Volts Boost</td>
</tr>
<tr>
<td>P1.04</td>
<td>P9.07</td>
<td>Motor Volts</td>
<td>P1.21</td>
<td>P3.31</td>
<td>Economy Factor</td>
</tr>
<tr>
<td>P1.05</td>
<td>P9.08</td>
<td>Motor Power</td>
<td>P1.22</td>
<td>P6.00</td>
<td>Accel. Rate Fwd.</td>
</tr>
<tr>
<td>P1.06</td>
<td>P10.00</td>
<td>Warning No. 1</td>
<td>P1.23</td>
<td>P6.02</td>
<td>Decel. Rate Fwd.</td>
</tr>
<tr>
<td>P1.07</td>
<td>P10.10</td>
<td>Trip No. 1</td>
<td>P1.24</td>
<td>P4.00</td>
<td>Start Mode</td>
</tr>
<tr>
<td>P1.08</td>
<td>P10.11</td>
<td>Trip No. 2</td>
<td>P1.25</td>
<td>P4.07</td>
<td>Normal Stop Mode</td>
</tr>
<tr>
<td>P1.09</td>
<td>P99.10</td>
<td>User Text Language</td>
<td>P1.26</td>
<td>P3.05</td>
<td>Fixed Current Limit</td>
</tr>
<tr>
<td>P1.10</td>
<td>P2.01</td>
<td>Motor Base Voltage</td>
<td>P1.27</td>
<td>P99.05</td>
<td>Drive Nominal Current</td>
</tr>
<tr>
<td>P1.11</td>
<td>P2.00</td>
<td>Motor Base Frequency</td>
<td>P1.28</td>
<td>P4.12</td>
<td>Motor Regen. kW Limit</td>
</tr>
<tr>
<td>P1.12</td>
<td>P2.02</td>
<td>Motor Full Load Current</td>
<td>P1.29</td>
<td>P99.02</td>
<td>Overload Duty</td>
</tr>
<tr>
<td>P1.13</td>
<td>P2.04</td>
<td>Motor Nominal Speed</td>
<td>P1.30</td>
<td>P99.00</td>
<td>Number of Deltas</td>
</tr>
<tr>
<td>P1.14</td>
<td>P2.05</td>
<td>Motor Full Load Power Factor</td>
<td>The following parameters are <strong>ALWAYS</strong> present in Menu 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1.15</td>
<td>P5.15</td>
<td>Maximum Speed Fwd</td>
<td>P1.31</td>
<td>Advanced Menus, initially only Menu 1 is open, see Section 5.1.7.</td>
<td></td>
</tr>
<tr>
<td>P1.16</td>
<td>P5.16</td>
<td>Maximum Speed Rev</td>
<td>P1.32</td>
<td>Security Code (as parameter P99.06), allows the user to “lock” the access to the menus</td>
<td></td>
</tr>
</tbody>
</table>

5.1.7 Access to Other Menus (P1.31)

As shipped, only Menu 1 is accessible. Access to other menus is controlled by the value entered into parameter P1.31, which determines the menus that can be displayed by the DDM™. Three levels of access are provided:

<table>
<thead>
<tr>
<th>P1.31 value</th>
<th>Access level</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Show Menu 1 only (by default, only Menu 1 is shown)</td>
</tr>
<tr>
<td>1</td>
<td>As specified by Menu 98 (can choose which individual menus are open by setting parameters in menu 98)</td>
</tr>
<tr>
<td>2</td>
<td>All menus open</td>
</tr>
</tbody>
</table>

Note: P1.31 is controlled by an Engineering password. Refer to Section 5.1.4.
5.1.8 Reviewing Parameter Edits Made

There are 2 ways of reviewing the edits made to the CDC board (θ) parameters with the items supplied with the case. One method is to use the ALSPA Drive Coach PC tool, the other is to view the edits via the DDM™.

To use the DDM™ proceed as follows:

1. Set parameter P1.31 = 2.
2. Navigate to P35.03 and edit its value to 1, to set up a review of edits.
3. Press ▶ to scroll through the current user edits; note these values.
4. When P35.03 re-appears all user edits have been displayed. Change P35.03 back to 0.

To use the ALSPA Drive Coach

1. Refer to section 4.3.4 for details of how to connect the case to a PC
2. Refer to the Coach help files to upload a “User Edits only” parameter listing.

5.1.9 Returning to Factory Default Settings

CAUTION
When the product is reset to factory default, all customised parameter settings will be lost. Record customised parameter settings before the drive is reset. They can be re-entered when required.

If incorrect data is entered during programming, the factory default settings can be regained using the following procedure. The procedure, described is in 2 parts, record the current settings for reference, then default the parameters:

1. Carry out a review of parameters if required, see section 5.1.8
2. Navigate to P99.06 and enter the password for engineer access (see Section 5.1.4)
3. Set P99.17 = 1 and press ↵
4. The DDM™ communications will re-initiate, then display P1.00.
5. The drive will now be at default settings.
5. Menus and Parameters

5.1.10 Default Configuration, as shipped by ALSTOM

When the MV3000 (hence the case) leaves the factory, all the parameters are pre-loaded with default values which allow it to drive a motor safely and in a sensible manner. Table 5-3 will provide help in understanding the default settings for Start/Stop control and Speed reference selection. The table should be read in conjunction with sheet 3 of the control block diagrams (Section 5.3) and the explanation of Control Flags (CF) and Status Flags (SF) in Section 5.2.1. Figure 5-1 shows the I/O connections to the MV3000, provided solely for reference.

Table 5-3 Start/Stop and reference selecting at default

<table>
<thead>
<tr>
<th>LOCAL CONTROL</th>
<th>REMOTE CONTROL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WHEN</strong></td>
<td>** WHEN**</td>
</tr>
<tr>
<td><strong>IS</strong></td>
<td><strong>IS</strong></td>
</tr>
<tr>
<td>O PEN</td>
<td>CLO SED</td>
</tr>
<tr>
<td><strong>IT SELECTS</strong></td>
<td></td>
</tr>
<tr>
<td>Keypad (DDM™) Control &amp; Reference Selection #1</td>
<td>Remote Control &amp; The next priority reference selection becomes active</td>
</tr>
<tr>
<td><strong>BECAUSE</strong></td>
<td><strong>BECAUSE</strong></td>
</tr>
<tr>
<td>CF116 is set O FF, as it is connected to DIGIN4</td>
<td>CF4 is set O N, as it is connected to the INV of DIGIN4</td>
</tr>
<tr>
<td>(P4.09 = 1.004)</td>
<td>(P5.07 = -1.004)</td>
</tr>
<tr>
<td><strong>WHICH MEANS</strong></td>
<td>Reference chosen by P5.01 is active, the default for which is Keypad (DDM™).</td>
</tr>
<tr>
<td>Keypad (DDM™) has Start/Stop Control</td>
<td>(P5.01 = 1)</td>
</tr>
<tr>
<td><strong>NOTE</strong></td>
<td><strong>NOTE</strong></td>
</tr>
<tr>
<td>All other Start/Stops are inactive</td>
<td>Lowest Control Flag reference selector takes priority, thus when CF4 is O N the others (CF5, CF6, CF7) are ignored.</td>
</tr>
</tbody>
</table>

Programming the case adjusts these defaults. If for any reason programming the case results in an unworkable system, it is possible to restore the default values - see Section 5.1.9 on how to restore defaults.
To run drive, INTERLOCK must be connected to +24V.

At factory default state, Analogue References are only available in REMOTE mode.

High Speed Digital I/O

To Programmable logic controller...etc. (Optional)

To run drive, INTERLOCK must be connected to +24V.

At factory default state, Analogue References are only available in REMOTE mode.

High Speed Digital I/O

To Programmable logic controller...etc. (Optional)

Set the DIP switches to configure the analogue I/O for Current or Voltage operation. Then refer to menu 7, to configure the relevant parameters.

A description of suitable cabinet layouts, and the need for the options, is described in Section 3 of this manual.
5.2 Practise Application Programming

The case can be used to develop application programs or simply to practise programming in the ALSPA MV3000 environment. Programs developed can be transferred to a real working drive either via the ALSPA Drive Coach or via the DDM™ (using P99.16) and transferred to a fully installed ALSPA MV3000.

The key to understanding the drive is to refer to Control block diagrams. These diagrams have been created to show the ALSPA MV3000 software as a picture. Software flow, special functions and parameter numbers can all be identified from the diagram. The diagrams are stored in Section 5.3.

The ALSPA MV3000 software contains a large number of pre-defined special functions and a range of freely connectable logic, which, when combined, will allow the user to solve many application problems and generally enhance the final application solution.

Special functions such as speed and torque monitors can be used to generate conditional outputs to allow hoist brake control or duty standby pump control. A full position controller is included and a function called Load Fault Detection, which will allow a the drive to “condition monitor” the application so that preventive maintenance can take place.

The following sections provide hints about how to achieve these application solutions. Detailed parameter descriptions are contained within the optional Software Technical Manual T1679.

5.2.1 Control Flags and Status Flags

The ALSPA MV3000 system employs two kinds of flags. These flags either allow the user to CONTROL a function (Control Flag), e.g. Enable Jogging, or the drive can report the STATUS of a function (Status Flag), e.g. Overspeed. In this manual these flags are shown as below, where xx represents the flag number.

<table>
<thead>
<tr>
<th>Status Flag (SF)</th>
<th>Control Flag (CF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>xx</td>
<td>xx</td>
</tr>
</tbody>
</table>

The flags can be combined together to form elegant application solutions or simply passed to digital outputs or serial links to gain status information about the drive’s condition. The most used flags are connected up already by the factory default conditions. The default conditions are clearly marked on the user block diagrams.

The Control flags have parameters which allow the user to “patch” them to other parts of the drive system. The control flag parameters appear in two logical places:

1. In the menus local to the function associated with the flag, e.g. the START flag is available in Menu 4 ,Starting and Stopping, and is parameter P4.04.

2. In the control flag menus, Menu 33 and 34, where all the flags are grouped together for easy location, e.g. the Start flag (CF1) is also P33.01, see the “rules” below.

The Status flags have no parameters associated with them, as they are simply possible connection sources for the Control flags, digital outputs and serial links etc.
5.2.2 Rules for Using the Flags

1. Refer to the control block diagram to determine the Control flag required. The diagram actually has the “Local” menu parameter number printed next to it.

2. Alternatively determine the Control flag parameter number thus:
   P33.xx, where xx is the control flag number
   CF1 = P33.01
   CF9 = P33.09 etc.
   CF116 = P34.16 (the hundreds are in Menu 34)

3. Edit a value into the Control Flag parameter, this value will determine what the flag is connected to. Table 5-4 summarises the possible choices:

Table 5-4 Control flag and digital I/O connections

<table>
<thead>
<tr>
<th>Value</th>
<th>Control Flag (CF) or Digital Output is connected to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.000 or 0</td>
<td>OFF</td>
</tr>
<tr>
<td>0.001 or 1</td>
<td>ON</td>
</tr>
<tr>
<td>1.001 to 1.006</td>
<td>DIGITAL INPUT 1 to 6</td>
</tr>
<tr>
<td>2.000 to 2.110</td>
<td>STATUS FLAGS 0 to 110</td>
</tr>
<tr>
<td>3.000 to 3.015, 3.100 to 3.115</td>
<td>RS485 CONTROL WORDS 0 and 1, BITS 0 to 15</td>
</tr>
<tr>
<td>4.000 to 4.015, 4.100 to 4.115</td>
<td>RS232 CONTROL WORDS 0 and 1, BITS 0 to 15</td>
</tr>
<tr>
<td>5.100 to 5.115, 5.200 to 5.215</td>
<td>FIP CONTROL WORDS 1 and 2, BITS 0 to 15</td>
</tr>
<tr>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>ON</td>
<td></td>
</tr>
<tr>
<td>DIGITAL INPUT 1 to 6</td>
<td></td>
</tr>
<tr>
<td>STATUS FLAGS 0 to 110</td>
<td></td>
</tr>
<tr>
<td>RS485 CONTROL WORDS 0 and 1, BITS 0 to 15</td>
<td></td>
</tr>
<tr>
<td>RS232 CONTROL WORDS 0 and 1, BITS 0 to 15</td>
<td></td>
</tr>
<tr>
<td>FIP CONTROL WORDS 1 and 2, BITS 0 to 15</td>
<td></td>
</tr>
</tbody>
</table>

Note: Any of the signals above can be inverted without the need to “waste” logic gates by simply preceding the value with a “-” sign. Thus if:

if P33.01 = 1.002, then Control flag 1 will be connected to digital input 2

or if P33.01 = -1.002, then Control flag 1 will be connected to the INV of input 2.

**Example 1: How the Start Flag is connected**

At default the drive has the Start flag connected to digital input 2, this example shows the software connections and the required edits, by way of a Control flag programming example:

![Diagram](example1)

**Example 2: How to connect Control and Status flags together**

This example shows a simple connection which might be made to the logic blocks

![Diagram](example2)
5.2.3 Programming Digital I/O

Sheet 2 of the control block diagrams shows the parameters associated with the digital I/O.

The digital I/O is programmed and used in exactly the same way as the Control and Status flags. The digital inputs are used like Status flags, and appear in the list of possible values which can be edited into the Control flag parameters (see Section 5.2.2). The Digital outputs have parameters and are programmed like Control Flags, having access to all of the same possible connections (see Section 5.2.2). The Control block diagram plant I/O sheet (sheet 2) shows the plant I/O.

Example 1: How the “O/P Running” output is connected

5.2.4 Programming Analogue I/O

Sheet 2 of the control block diagrams shows the parameters associated with the analogue I/O.

Analogue Inputs

The 2 inputs can be put into either current or voltage modes. The mode is chosen by combining the mode parameter with the analogue DIP switches. If a voltage mode is chosen, the relevant switch must be in its voltage position. The analogue input then appears as an option in all of the reference parameters lists. Alternatively, the analogue value can be picked as a source for the comparator logic (sheet 8) or a pointer (sheet 10).

Scaling and Offsets. If a minimum speed is programmed, and the full range of the analogue input is required to span minimum speed to maximum speed, then the scaling and offset values must be set, example as follows:

P5.15 = Maximum speed forward = 1500rpm
P5.17 = Minimum speed forward = 150rpm

Then set:

P7.01 = \( \frac{150 \times 100}{1500} = 10\% \) offset,
P7.02 = \( \frac{1500 - 150}{1500} = 0.9 \) gain

Analogue Outputs

The 2 outputs can be put into either current or voltage modes. The mode is chosen by combining the mode parameter with the analogue DIP switches. If a voltage mode is chosen, the relevant switch must be in its voltage position. Any parameter within the ALSPA MV3000 software can then be output via an analogue output and either displayed on a meter or passed to another case or drive.
Scaling and Polarity. Once a parameter has been chosen for output, the relevant scaling and polarity must be applied so that a sensible value appears. The scaling parameter will automatically acquire the units of the parameter being output, then simply edit the scaling to be the value that is required to represent full scale deflection of the analogue output, for example:

To “send” DC link volts to an analogue output, then:

P7.17 = 11.03 (Parameter P11.03, DC link volts)
P7.19 = 0 (monopolar)
P7.20 = 560 (at 560Vdc the analogue output will show full scale)

5.3 Using the Control Block Diagrams

The Control Block Diagrams for the ALSPA MV3000 drive are shown on the following pages. These diagrams graphically represent most of the drive’s parameters. They are designed to show the inter-relationship of the drive functions and features and form a set of sheets which will allow the user to completely design customised application solutions and to understand the ALSPA MV3000 software.

Functions within the drive either output a value, which can be the source for an analogue output or for another function, or they output status information (Status Flags), e.g. Overspeed. The functions also accept control inputs (Control Flags), e.g. Enable Jog, or freeze ramps etc. The diagrams clearly show this information by easily recognised symbols. The symbols are shown in a key which is featured on each of the diagrams.

Sheet 1 is an overview of the menus and the other nine sheets, and can be used as a reference sheet.

Figure 5-2 shows how to use the control block diagrams to assist in configuring the drive for an application.

1 Simply consult the sheets to fully understand the flexibility and scope of the ALSPA MV3000 parameter set.

2 Choose the functions which will allow the application to be solved or enhanced.

3 Edit values into the dedicated function’s parameters to configure them to the application needs, and if necessary, combine the functions together.

4 Use P99.16 to backup the configuration either to the backup parameter set or to the keypad.

Use the security parameters in menu 99 to “lock” these sensitive parameters away. See Section 5.1.4
5. Menus and Parameters

Control System Overview

**MACHINE BRIDGE CONTROL SYSTEM OVERVIEW**

**REFERENCE SELECTOR**
- Speed Control
- Direction Control
- Position Control
- Analogue and Digital Inputs
- Keypad Speed Reference
- Starting and Stopping
- Trips/Warnings
- Monitoring
- Application Logic

**MACHINE CONTROL MODES**

**SFE MODE (MAINS CONTROL)**

**SFE CONTROL SYSTEM OVERVIEW**

**REFERENCE SELECTOR**
- DC Link Voltage Control
- Current Control
- Mains Monitoring
- Load Power Feedforward
- Analogue and Digital Inputs
- Keypad Reference
- Analogue and Digital Inputs
- Starting and Stopping
- Trips/Warnings
- Monitoring
- Application Logic

**KEY**
- DIGOUT
- CONTROL FLAG
- ANALOG IC
- DEFAULT SETTING
- DIGIN
- STATUS FLAG
- MONITOR POINT
- DEFAULT CONNECTION

Note: Option 4 is displayed only if the bridge is a bi-directional converter, or a DELTA with a Mains Voltage Monitor unit connected.
Menus and Parameters

SELECT 110% or 150%
OVERLOAD DUTY
P99.02 (P1.29)

USING "NOT" TRIPPED ENSURES THAT WARNINGS DO NOT AFFECT THE HEALTHY OUTPUT

SUMMING NODES, SWITCHES AND POINTERS

PROGRAMMABLE SUMMING NODES, ALLOWING SCALING AND SUMMATION OF ANY SFE PARAMETER.

APPLICATION LOGIC, SPECIAL MONITORING FUNCTIONS

STATUS FLAG
BINARY GENERATOR

LOGIC GATES
COMPARATORS
DELAYS

STARTING AND STOPPING

AUTO-RESETTING/STARTING
CONFIGURE THE SFE TO AUTO-RESET/RESTART AFTER A TRIP
CUSTOMER SELECTABLE RESET ENABLES NUMBER OF RESETS AND TIMES OF RESETS

TRIPS/WARNINGS/DIAGNOSTIC MONITORS

HISTORY RECORDING
10 CHANNELS
MONITOR ANY SFE PARAMETER
TRIGGER SET-UP
PRE AND POST TRIG
MANUAL TRIGGER

TRIPPED
TRIP MONITORING SYSTEM
10 PRESENT TRIPS.
10 PRESENT WARNINGS.
10 TRIP HISTORY STORAGE.
USER CONFIGURABLE TRIPS.

TRIP
RESET
CONTROL
FLAG
STATUS
FLAG
xxDIGOUT
DIGIN xx

PLANT INTERLOCK (IF THIS INPUT IS OPEN, THE SFE WILL TRIP)

SFE CONTROL SYSTEM OVERVIEW

SFE VECTOR CONTROL, PART 1

REFERENCE SOURCE SELECTION
DC LINK VOLTAGE CONTROL
LOAD POWER FEEDFORWARD
VECTOR CONTROL, PART 2

CURRENT CONTROL
LOAD POWER FEEDFORWARD

SFE MONITORING MENUS

SFE TEMPERATURES
MONITORING OF SFE VARIABLES, INCLUDING TEMPERATURES, CONTROL AND STATUS FLAGS
HOURS RUN, DIGITAL I/O STATES, ANALOGUE INPUT AND OUTPUT VALUES AND OTHERS.
SFE VOLTS, CURRENTS, POWER FEEDBACKS

SFE RUNNING
SHEET 11

DIGOUT 1
DIGOUT 2
DIGOUT 3

DIGIN 1
START
DIGIN 2
STOP
DIGIN 4
KEYPAD
DIGIN 3
START/STOP

TRIPS/WARNINGS/DIAGNOSTIC MONITORS

TOP MONITORS SYSTEM TO PRESENT TRIPS, WARNINGS AND DIAGNOSTICS. USER CONFIGURABLE TRIPS
USER CONFIGURABLE TIMES
MONITORING OF DIGITAL OUTPUTS

KEY
DIGOUT
CONTROL FLAG
xx ANALOG I/O (A) DEFAULT SETTING
DIGIN
STATUS FLAG
xx MONITOR POINT
xx MONITOR CONNECTION

SHEET 2

SHEET 3

SHEET 4

SHEET 12

SHEET 14

SHEET 11

SHEET 7

SHEET 10

SHEET 6
Machine Bridge Control System Overview

**INTERLOCK**

- PLANT INTERLOCK (IF THIS INPUT IS OPEN, THE DRIVE WILL TRIP)

**FOR PLANT I/O SEE MENU 7, SHEET 6**

**DIGIN 3**
- REVUSER
- REVERSE

**DIGIN 4**
- KEYPAD
- KEYPAD

**DIGIN 5**
- ALREADY
- REFUSED

**ANALOG**
- REF 1
- #1 (DEFAULT)

**ANALOG**
- REF 2
- #2

**KEYPAD**
- START/STOP

**SPEED REF**
- KEYPAD/REMOTE

**STARTING AND STOPPING**

- DIGIN 1
  - STOP
- DIGIN 2
  - START
- DIGIN 4
  - KEYPAD/REMOTE

**TRIPS/WARNINGS/DIAGNOSTIC MONITORS**

- DIGIN 6
  - TRIP
  - PROJECT

**TRIP MONITORED SYSTEM**

- USER MONITORED TRIP
- USER MONITORED TRIP
- USER MONITORED TRIP

**SUMMING NODES, SWITCHES AND POINTERS**

- DIGOUT 1
  - CONTROL
  - DIGOUT
- DIGOUT 2
  - STATUS
- DIGOUT 3
  - MONITOR
  - POINT

**APPLICATION LOGIC, SPECIAL MONITORING FUNCTIONS**

- OTHER USEFUL MENUS
  - MENU 19
    - X-REFS
    - X-REFS
    - X-REFS

**DRIVE MONITORING MENUS**

- MENUS 9, 11 and 38
  - MENU 11
    - MENU 12
    - MENU 13

**Machine Bridge Control System Overview**

**DIGITAL INPUTS AND OUTPUTS**

- DIGOUT
  - DIGOUT
  - DIGOUT

**SENSORS**

- PULSES
- PULSES
- PULSES

**DIGITAL MONITORS**

- DIGOUT
  - DIGOUT
  - DIGOUT

**APPLICATION LOGIC, SPECIAL MONITORING FUNCTIONS**

- OTHER USEFUL MENUS
  - MENU 19
    - X-REFS
    - X-REFS
    - X-REFS

**DRIVE MONITORING MENUS**

- MENUS 9, 11 and 38
  - MENU 11
    - MENU 12
    - MENU 13
### Plant I/O and Serial Links

#### RS232 Serial Link

**DEFAULT CONNECTIONS TO DIGITAL O/P SHOWN**

- **DIGOUT 1**
  - RS232 REFERENCE 1
  - Rs232 REFERENCE 2
  - Rs232 Time Out Period

- **DIGOUT 2**
  - Rs232 Control Words @ Loss Action

- **DIGOUT 3**
  - Rs232 User Page Elements 1 to 20

### RS485 Serial Link

**DEFAULT CONNECTIONS TO DIGITAL I/P SHOWN**

- **DIGIN 1**
  - Rs485 Reference 1
  - Rs485 Reference 2
  - Rs485 Parity

- **DIGIN 2**
  - Rs485 Time Out Period

- **DIGIN 3**
  - Rs485 User Page 2 Size

- **DIGIN 4**
  - Rs485 Control Words @ Loss Action

- **DIGIN 5**
  - Rs485 Loss Action

- **DIGIN 6**
  - Rs485 Control Word 0

### Analog I/P References

- **ANALOG I/P REF 1**
  - Rs485 User Page 1 Size

- **ANALOG I/P REF 2**
  - Rs485 Control Words @ Loss Action

**WHEN USING THE O/P SCALERS, SIMPLY EDIT IN THE VALUE THAT IS REQUIRED TO BE 100%.

#### KEY

- **MONITOR**
- **CONTROL**
- **FREE**
- **DIGOUT**
- **DIGIN**
- **STATUS**
- **ANALOG**
- **DEFAULT**
Menu 5.20

Reference Arbitration and Starting/Stopping

Only applicable for Motor Control Modes, P99.01 = 1, 2, 3
5. Menus and Parameters

Motor Frequency Control

Only applicable for Motor Frequency Control, P99.01 = 1

Menu and Parameters ALSPA MV3000 Demonstration Case

Motor Frequency Control

ONLY APPLICABLE FOR MOTOR FREQUENCY CONTROL, P99.01 = 1
### Trips/Warnings and Diagnostic Monitoring

**MOTOR MONITORING (MOTOR CONTROL MODES ONLY)**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC+</td>
<td>Drive Current (A)</td>
</tr>
<tr>
<td>DC-</td>
<td>Drive Current (%).</td>
</tr>
<tr>
<td>P11.03 - P11.11 IGBT BRIDGE TEMPERATURE</td>
<td></td>
</tr>
<tr>
<td>P9.05</td>
<td>Motor Voltage (V)</td>
</tr>
<tr>
<td>P9.06 - P9.07</td>
<td>Motor Power (kW)</td>
</tr>
<tr>
<td>P11.23</td>
<td>HOURS/DAYS RUN</td>
</tr>
<tr>
<td>P11.25 - P11.31 IGBT BRIDGE TEMPERATURE (CDC)</td>
<td></td>
</tr>
<tr>
<td>P2.10</td>
<td>Action on Motor P150% overload</td>
</tr>
<tr>
<td>P2.11</td>
<td>Max ever electronics temp.</td>
</tr>
<tr>
<td>P2.13</td>
<td>Min ever electronics temp.</td>
</tr>
<tr>
<td>P35.10 - P35.11</td>
<td>Drive resistor - Motor control</td>
</tr>
<tr>
<td>P35.12 - P35.11</td>
<td>Drive resistor - Motor control</td>
</tr>
<tr>
<td>P38.10, P38.11</td>
<td>Drive resistor - Motor control</td>
</tr>
<tr>
<td>P10.30, P10.31</td>
<td>Trip resetting and user trip</td>
</tr>
<tr>
<td>P10.32, P10.33</td>
<td>Trip resetting and user trip</td>
</tr>
<tr>
<td>P26.00 - P26.20 IGBT BRIDGE TEMPERATURE</td>
<td></td>
</tr>
<tr>
<td>P26.01 - P26.20 IGBT BRIDGE TEMPERATURE</td>
<td></td>
</tr>
<tr>
<td>P27.00 - P27.10 IGBT BRIDGE TEMPERATURE</td>
<td></td>
</tr>
<tr>
<td>P27.01 - P27.10 IGBT BRIDGE TEMPERATURE</td>
<td></td>
</tr>
<tr>
<td>P28.00 - P28.06 TRIPS AND WARNINGS</td>
<td></td>
</tr>
</tbody>
</table>

**MOTOR PROTECTION/TRIP AVOIDANCE (MOTOR CONTROL MODES ONLY)**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>P2.07</td>
<td>Dynamic Action on Motor PT C</td>
</tr>
<tr>
<td>P2.15</td>
<td>Measured PTC resistance</td>
</tr>
<tr>
<td>P2.14</td>
<td>PTC resistor value</td>
</tr>
<tr>
<td>P2.16</td>
<td>Motor 150% overload time</td>
</tr>
<tr>
<td>P2.12</td>
<td>Trip to motor FR</td>
</tr>
<tr>
<td>P2.14</td>
<td>Trip to motor FR</td>
</tr>
<tr>
<td>P2.13</td>
<td>Trip to motor FR</td>
</tr>
<tr>
<td>P11.13 - P11.14 IGBT BRIDGE TEMPERATURE (CDC)</td>
<td></td>
</tr>
</tbody>
</table>

**TRIP RESETTING and USER TRIPS (ALL CONTROL MODES)**

- **DIGIN 6** - User configurable trip settings
- **TRIP RESET** - User configurable trip settings
- **ON BOARD DIAGNOSTIC HISTORY CHART RECORDER**
- **CP PATCHED** - User configurable trip settings

**WARNING**

If the drive is configured to auto-restart, the motor can start rotating without an operator command. Take precautions to prevent injury to personnel.
5. Menus and Parameters

**ALSPA MV3000 Demonstration Case**

**Summing Nodes and Pointers**

THE EQUATION BELOW SHOWS HOW SUMMING NODES A, B, C & D OPERATE. THE FOUR DIAGRAMS ARE A LOGICAL REPRESENTATION.

\[
\text{SUMMING NODE OUTPUT} = \left( \frac{\text{SUMMING NODE INPUT 1 \times SUMMING NODE SCALE 1}}{100.00}\right) + \left( \frac{\text{SUMMING NODE INPUT 2 \times SUMMING NODE SCALE 2}}{100.00}\right)
\]

WHERE ? IS THE CHOSEN MODE (+, -, x or ÷)

THE POINTERS BELOW CAN BE USED BY SIMPLY SELECTING THE RELEVANT POINTER FROM THE LIST OFFERED IN THE RELEVANT REFERENCE CHOICE.

E.G. CHOOSE POINTER 1 FROM THE SPEED REFERENCE CHOICE SELECTION (SHEET 2) THEN CONFIGURE POINTER 1 BELOW.

THE POINTER SOURCES CAN BE ANY DRIVE PARAMETER.

**KEY**

- DIGOUT: DIGITAL OUTPUT
- CONTROL FLAG: DIGITAL OUTPUT FLAG
- ANALOG: ANALOG INPUT
- (A): DEFAULT SETTING
- DIGIN: DIGITAL INPUT
- STATUS FLAG: DIGITAL INPUT FLAG
- MONITOR: MONITOR POINT
- DEFAULT CONNECTION

**Sheet 14**

Demonstration Case User Manual (T1691) Issue (05/01)
6. Diagnostics

6.1 Describing the Diagnostic Philosophy

This section of the guide deals with 2 main issues. Problems with using the case and the way in which the ALSPA MV3000 presents diagnostic information to the user of the drive. The case has been designed to allow the extensive diagnostic features of the ALSPA MV3000 to be demonstrated in a safe and convenient way.

The case diagnostics are dealt with in Section 6.3, and allow the user to successfully diagnose problems whilst operating the case.

The rest of Section 6 is a generic description of the ALSPA MV3000 diagnostic system, re-produced here, so that effective demonstrations can be performed.

6.2 LED Fault Indicators

A fault condition is indicated by illumination of the WARNING or flashing TRIPPED indicator and extinguishing of the HEALTHY/STANDBY indicator.

The four LED indicators on the DDM™ (❾) are repeated on the DDM™ Harbour (❽) and give a first indication of case status. The DDM™ Harbour indicators are shown in Section 4.6.1 and the DDM™ indicators are shown on the rear cover.

6.3 Diagnosing faults with the Case

Whilst using the case, problems may be experienced. Many of these problems can be solved by correct use of the case controls. For convenience, a list of likely problems and their solutions are given on the inside rear cover of this guide, however:

In general, most of the problems encountered when using the case can be corrected by carrying out the following short procedure:

1. Ensure all the potentiometers in the power frame simulator (~), are all in the 12 O’clock position.
2. Ensure the green switches in the power frame simulator (~), are all ON (press in).
3. Ensure the green switch labelled 4-20mA loss (), is switched ON (press in).
4. Ensure all the plant digital input switches (z) are all OPEN (up).
5. Ensure the Drive Data Manager (❾), is in its harbour (❽) or on its lead.
6. Carry out a trip reset by pressing the “?” key on the DDM™ (❾), and choosing option 3 from the menu which is provided
7. The CDC board (❸) should be healthy, and this can be determined by the green healthy/standby LED on the DDM™ (❾), the rear cover of this guide has a picture of the DDM™, so the healthy/standby LED can be identified.

If the case does not power up healthy, it is possible that the parameter edits stored in the CDC board (❸) are at fault, as the user is able to generate faults, e.g. User Trip 1. Default the parameters by carrying out the procedure described in section 5.1.9, then repeat the above procedure.
6. Diagnostics

6.4 Warnings

It is possible to use the controls on the case to simulate warning conditions. A list of warnings which can be simulated by the case is shown on the rear cover and a description of how to use the controls to produce these faults is described in Section 4.3. A complete list of ALSPA MV3000 warnings is given in the optional software manual T1678 and the Getting Stated Manual T1676.

If the WARNING indicator is lit a problem has occurred which is not sufficiently serious to trip the case. A warning code is stored in one of 10 locations in the Warning Record, parameters P10.00 to P10.09, the code stored in P10.00 being for the most recent warning, it is important that all warning codes are viewed to gain a complete picture.

Note: Warnings are not latched and if the warning condition ceases, the WARNING indicator will extinguish. (At default, Warning 1 is duplicated at P1.06).

6.5 Trips

It is possible to use the controls on the case to simulate trip conditions. A list of trips which can be simulated by the case is shown on the rear cover and a description of how to use the controls to produce these faults is described in Section 4.3. A complete list of ALSPA MV3000 trips is given in the optional software manual T1678 and the Getting Stated Manual T1676.

If the TRIPPED indicator is flashing, a fault has occurred which has caused the case to shut down. In a real plant situation, the drive may be at fault, but usually the drive has tripped in response to a problem on the plant, and the drive has protected the installation.

Each time a trip occurs a Fault is stored in one of ten locations in the Active Trip record, parameters P10.10 to P10.19, the fault stored in P10.10 being for the most recent trip, it is important that all trip codes are viewed to gain a complete picture. These trips are then stored forever in a Trip History, storing the last 10 active trips, in P10.20 to P10.29.

Note: Trips are latched and must be reset before the case can be operated again. See Section 6.6.3 to reset the trip.

6.6 Viewing Warnings and Trips

Parameters in the case report the trip or warning currently present, and other parameters hold a history of the last 10 trips. These parameters display codes and text which describe particular warnings or trips, the DDM™ automatically displays these text messages. Menu 10 is dedicated to trips and warnings, but at default Menu 1 also has some of these parameters collected together for easy access.

Available parameters in Menu 01
P1.06 = FIRST WARNING
P1.07 - P1.08 = FIRST 2 TRIPS

Available parameters in Menu 10
P10.00 - P10.09 = WARNINGS 1 to 10
P10.10 - P10.19 = CURRENT TRIPS 1 to 10
P10.20 - P10.29 = TRIP HISTORY 1 to 10
Viewing using the navigation keys

Navigate to one of the above parameters, either a Trip or a Warning, and note the code and the text message, remember to view all, not just the first one.

Viewing using the "help" key

1. When the drive is showing either a Trip or Warning, press to view diagnostic menu. If the DDM™ is connected and has not been used for about 5 minutes, this menu will appear automatically. See Section 6.7 for more information on using the help key.

2. The DDM™ will display a diagnostics menu, choose the relevant option.

3. See Section 6.6.1 and Section 6.6.2 for what to do when a trip or warning occurs.

6.6.1 Action in the Event of a Warning

1. Press and select "2" – Display Warnings. See Section 6.7 for more information on using the help key.

2. P10.00 will be displayed, note the first warning. This is the problem which is causing the warning indication.

3. In turn, Display P10.01 to P10.09 and note any additional warnings. Any warnings in these locations will be for secondary problems and will help with diagnosis.

4. Refer to the rear cover and check the meaning of each warning. Take corrective action as necessary.

6.6.2 Action in the Event of a Trip

1. Press and select "2" – Display Trips. See Section 6.7 for more information on using the help key.

2. P10.10 will be displayed, note the most recent trip. This is the problem which has caused the trip indication. (For the default configuration, Trips 1/2 are located at P1.07/P1.08).

3. In turn, Display P10.11 to P10.19 and record any additional trips which may be present.

4. Refer to the table inside the rear cover and check the meaning of each fault. Take corrective action as necessary.

5. See Section 6.6.3 for resetting trips.

6.6.3 Resetting Trips

From the Digital Inputs

From Default, toggle ON then OFF the switch wired to DIGIN 6.

Note: At Default, DIGIN 6 is connected to Control Flag 9 (the Reset flag) which may have been re-programmed.

From the DDM™

Press and select option 3 (Attempt Trip Reset), see Section 6.7 for more information on using the help key.
6.4 Fault Codes

Some of the more common Trip and Warning fault codes are listed inside the rear cover. For this user guide, the codes are specific to those which can be seen whilst using the demonstration case.

For a full listing and description, refer to the optional Software Technical Manual T1679.

6.7 Using the HELP Key for diagnostics

If the case trips, get information on the trip by pressing \( ? \).

A screen appears, giving four choices, as shown:

- **1. PARAMETER HELP**
  - Allows the user to view parameter help when a trip is present.

- **2. DISPLAY TRIPS**
  - Displays parameter P10.10 – giving information about the trip.

- **3. ATTEMPT RESET**
  - Attempts to reset the trip. If the attempt fails, this screen re-appears.

- **4. BACK TO PARAMETER**
  - Return to the parameter being viewed before the “?” was pressed, with no further help.

If the case shows a Warning, get information on the warning by pressing \( ? \).

The HELP system works as described for trips, except the diagnostic menu is modified to allow warnings to be displayed. Pressing option 2 displays P10.00.
6.8 Diagnostic Hints

There are a number of approaches the user can take to diagnose a problem:

1. Refer to Section 6.3, for a list of actions to take to make the case healthy.

2. There is a list of helpful hints recorded on the inside of the rear cover of this user manual.

3. Use Sections 6.6 and 6.7 to find out what the problem is. The trip or warning messages give a clue to the problem and the trip.warning meanings inside the rear cover of this guide will also help.

4. The case will normally only trip if one or more of the controls of the case are in a state which simulates a fault, so the trip code will point towards one of the case controls.

5. View the trip history in P10.20 to P10.29 for a list of the last 10 reasons why the case has tripped. This list however, will only be a record of the last 10 things the case has been asked to trip on by adjusting the relevant controls.

6.9 Changing a Case Fuse

The case fuse may blow during the life of the equipment, carry out the following procedure when changing the fuse:

1. Disconnect the case from the mains by switching the mains off at the case and pulling the IEC mains cable out ( ohio).

2. The mains connector ( ohio) has a small draw which can be levered open with a terminal screw driver.

3. Inside the draw is a spare fuse of the correct type. The fuse at the front of the draw is the spare, the fuse at the back is the one in use.

4. Remove the damaged fuse and replace it with the spare, ensuring that a replacement of the correct type is obtained, the specification for which is given in Section 2.1 of this user guide.

5. Before switching back on, inspect the case and its controls for a possible reason for the fuse failure.

6. If the case continues to blow fuses, return the case to ALSTOM at the address shown on the rear cover of this guide.
6.10 Failure of CDC Board (❸) Firmware

6.10.1 General Description

Should a fault develop in the CDC firmware, normal software operation will stop. If a DDM™ is plugged in it will display:

FIRMWARE INTEGRITY
FAILURE
(E000)
SEE USER MANUAL

To assist ALSTOM personnel in diagnosing the cause of the software malfunction, the memory contents of the drive can be uploaded to a PC as shown in Section 6.10.2 and sent to ALSTOM at the address shown on the rear cover.

6.10.2 Uploading the failed CDC Board (❸) firmware diagnostics

Proceed as follows:

1. Connect the COM port of a PC to the RS232 port of the drive (DDM™ port). A pin-to-pin 9-way D-type lead is required (the DDM™ lead supplied with the case will work).
2. Run a simple terminal program on the PC (Telix, Windows Terminal etc.).
3. Set the COM port parameters to 9600 baud, no parity, one stop bit.
4. Set the terminal program to upload an ASCII file to disk.
5. Press 'G' on the PC to start the upload.
6. The drive will then upload its entire memory map to the PC (takes about 10 minutes).
7. The upload can be terminated at any time by pressing 'E' on the PC.
8. When the upload is complete, the produced file (about 1MB large) should be E-mailed to ALSTOM for analysis (preferably compressed with PkZip/WinZip).
9. The CDC Board (❸) software can then be re-started by pressing '.' on the DDM™ or the PC, whichever is connected.
7. Accessories and Spares

7.1 Accessories

7.1.1 Accessory listing

The parts listed below are standard ALSPA MV3000 parts. Some of these items will have been included in the case at the time of purchase (see section 3 for details). The numbers are provided to allow additional or new items to be ordered.

<table>
<thead>
<tr>
<th>Item</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALSPA MV3000 Drive Data Manager™</td>
<td>MVS3000-4001</td>
<td>A multi-function unit with Keypad functionality that can be used to edit and monitor drive parameters, extract warnings and trip reports, and provide parameter specific help. The DDM™ has a large, easy to read, backlit display and can be mounted to the case, held in the hand or permanently mounted on any suitable surface. The DDM™ incorporates special keys to start and stop a motor, and to control its speed.</td>
</tr>
<tr>
<td>ALSPA MV3000 Drive Data Manager™ Lead and Door Mounting Kit</td>
<td>MVS3001-4001</td>
<td>A DDM™-to-drive interconnection cable, mounting gasket and drilling template to allow the DDM™ to be mounted on a flat surface, e.g. the cabinet door. Note: The case only includes the lead as standard.</td>
</tr>
<tr>
<td>ALSPA MV3000 direct FIP communications card</td>
<td>MVS3002-4001</td>
<td>When connected to the CDC Board (⑨), underneath the perspex cover (④), the case can be connected directly to a FIP fieldbus. A special bracket which is required to support the FIP card, order these items together.</td>
</tr>
<tr>
<td>ALSPA MV3000 Getting Started Manual</td>
<td>T1676 EN,G,F</td>
<td>The manual shipped with the ALSPA MV3000 drive. English, German and French versions are available.</td>
</tr>
<tr>
<td>ALSPA MV3000 Hardware Technical Manual</td>
<td>T1678 EN,G,F</td>
<td>Full installation manual for the ALSPA MV3000. English, German and French versions are available.</td>
</tr>
<tr>
<td>ALSPA MV3000 Software Technical Manual</td>
<td>T1679 EN,G,F</td>
<td>All parameter and function explained in full. English, German and French versions are available.</td>
</tr>
</tbody>
</table>

7.1.2 Fitting Communication Accessories after sale

Most of the accessories described above are included with the case, extra details can be found in Section 3.4 of this guide. Communications cards (like FIP) however, may be purchased at a later stage, proceed as follows:

1. Remove power from the case before proceeding.

2. With an anti-static wrist strap fitted, remove the perspex cover (④) over the CDC board (⑨) by carefully pulling upwards, the plastic rivets will slide out of the pillars.
3. Undo the M4 nut positioned behind TB2 on the CDC (θ).

4. With an anti-static wrist strap fitted, fit the Serial link support plate using the M4 nut removed above, the communications card will steady the plate when fitted.

5. With an anti-static wrist strap fitted, fit the communications card into the 96 way connector and into the Serial link support plate, following the instructions supplied with the card.

6. Carefully slide apart the plastic rivets on the perspex cover (θ), but do not completely separate them, this will make the end of the rivets small enough to slide back into the pillars.

7. Re-fit the perspex cover (θ) by locating the plastic rivets into the pillars and pressing the top of the rivet firmly home, this will expand the rivet again allowing it to grip the pillar.

8. Switch the case on and follow the operating instructions supplied with the communications card.

7.2 Spares

The only item which is user changeable in the demonstration case, is the mains fuse. The fuse is stored in the mains inlet (❹). A spare fuse is supplied with the case, for details on fuse changing, see Section 6.9. The fuse used is an easily obtained proprietary one, the details of which can be found in Section 2.1 of this guide.
8. Disposal

This equipment or any part of the equipment should be disposed of in accordance with the laws of the country of use.

Modern high technology materials have been used in the manufacture of the equipment to ensure optimum performance. Care has been taken with the selection of these materials to minimise risks to health and safety. However, some materials require special consideration during disposal.
CASE WARNING & TRIP CODES

This is not a full list of ALSPA MV3000C fault codes, these codes are the only ones which are relevant to the case.

<table>
<thead>
<tr>
<th>WARNING CODE</th>
<th>TRIP CODE</th>
<th>TRIP DESCRIPTION</th>
<th>CASE CONTROL RESPONSIBLE, DIAGNOSTIC HINT</th>
</tr>
</thead>
<tbody>
<tr>
<td>- 1</td>
<td>Interlock</td>
<td>Plant Interlock (I) has been pressed</td>
<td></td>
</tr>
<tr>
<td>105</td>
<td>2</td>
<td>Reference Loss</td>
<td>The primary reference has been lost, e.g. 4-20mA (A) switched off</td>
</tr>
<tr>
<td>- 3</td>
<td>DC Overv</td>
<td>DC Hardware Overvoltage switch is open (F)</td>
<td></td>
</tr>
<tr>
<td>- 4</td>
<td>DC Underv</td>
<td>DC Link feedback is low (F)</td>
<td></td>
</tr>
<tr>
<td>107</td>
<td>5</td>
<td>High/Over Temperature</td>
<td>Any of the temperature feedbacks (T) is too high, use menu 11 to solve</td>
</tr>
<tr>
<td>- 6</td>
<td>Intermittent Overtimes</td>
<td>Over current switches LUV or W open (F)</td>
<td></td>
</tr>
<tr>
<td>- 9</td>
<td>7</td>
<td>Interlock Plant interlock</td>
<td>DC Hardware Overvoltage switch is open (F)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The primary reference has been lost, e.g. 4-20mA (A) switched off</td>
<td></td>
</tr>
<tr>
<td>- 8</td>
<td>U-Phase - OverTemp</td>
<td>DC Hardware OverTemperature switch is open (F)</td>
<td></td>
</tr>
<tr>
<td>- 9</td>
<td>11</td>
<td>Aux 15 V Fail</td>
<td>Internal CDC board (V) voltage has failed</td>
</tr>
<tr>
<td>- 10</td>
<td>12</td>
<td>Aux 24 V Fail</td>
<td>The user 24V has failed, the mains fuse (F)</td>
</tr>
<tr>
<td>- 11</td>
<td>13</td>
<td>18 History Restore Fail</td>
<td>At power up, the history record could not be recovered. INFO only</td>
</tr>
<tr>
<td>- 12</td>
<td>14</td>
<td>Motor Thermostat</td>
<td>Controlling the start/stop or is the source of the speed reference. There is a procedure described in Section 4.5.5. Note if the keypad is not in control, or is not the speed reference, then it can simply be removed without a problem.</td>
</tr>
<tr>
<td>- 13</td>
<td>15</td>
<td>Motor PTC</td>
<td>The motor thermistor control (E) is set too high, see P2.14</td>
</tr>
<tr>
<td>- 14</td>
<td>16</td>
<td>Encoder Loss</td>
<td>The speed feedback source (P13.00, P13.01) has detected low current, the case cannot simulate any motor current</td>
</tr>
<tr>
<td>- 15</td>
<td>17</td>
<td>User Trip 1</td>
<td>Control Flag 10, or something connected to it - Hit</td>
</tr>
<tr>
<td>- 16</td>
<td>18</td>
<td>User Trip 2</td>
<td>Control Flag 112, or something connected to it - Hit</td>
</tr>
<tr>
<td>- 17</td>
<td>19</td>
<td>Encoder P/W Error</td>
<td>Please report this problem to ALSTOM</td>
</tr>
<tr>
<td>100</td>
<td>21</td>
<td>Motor Thermostat</td>
<td>Motor thermostat has opened. Block diagrams sheet 7, P21.10, P21.11</td>
</tr>
<tr>
<td>112</td>
<td>23</td>
<td>RS232 Loss</td>
<td>RS232 link has timed out, see menu 32, Block diagrams sheet 2</td>
</tr>
<tr>
<td>113</td>
<td>24</td>
<td>RS485 Loss</td>
<td>RS485 link has timed out, see menu 32, Block diagrams sheet 2</td>
</tr>
<tr>
<td>- 25</td>
<td>26</td>
<td>Internal Reference Fail</td>
<td>CDC board has failed, return the case for repair.</td>
</tr>
<tr>
<td>- 27</td>
<td>28</td>
<td>Inverse Voltage</td>
<td>The drive must be in Remote control. Check that DIN1 is closed, use a DVM or view P11.21. DIGI1 is connected to CF116 which selects local/remote (LO/open for keypad). See Section 5.1.10 for a detailed look at local/remote control.</td>
</tr>
<tr>
<td>- 28</td>
<td>29</td>
<td>Drive OverVoltage</td>
<td>Driving the case in vector mode causes this trip (P99.01)</td>
</tr>
<tr>
<td>- 29</td>
<td>30</td>
<td>Current Control Fail</td>
<td>To achieve any Remote reference, ensure DIGI 4 is closed. To select between Remote references ANIN1 and ANIN2, toggle DIGI 5. See Section 5.1.10 for a detailed look at local/remote control.</td>
</tr>
<tr>
<td>- 30</td>
<td>31</td>
<td>Encoder Loss</td>
<td>The speed feedback source (P13.00, P13.01) has been set to encoder, the case cannot simulate any motor current</td>
</tr>
<tr>
<td>- 31</td>
<td>32</td>
<td>User Trip 1</td>
<td>Control Flag 10, or something connected to it - Hit</td>
</tr>
<tr>
<td>- 32</td>
<td>33</td>
<td>User Trip 2</td>
<td>Control Flag 112, or something connected to it - Hit</td>
</tr>
<tr>
<td>- 33</td>
<td>34</td>
<td>Encoder P/W Error</td>
<td>Please report this problem to ALSTOM</td>
</tr>
<tr>
<td>120-125</td>
<td>150</td>
<td>Internal Software/PWM Error</td>
<td>Please report this problem to ALSTOM</td>
</tr>
<tr>
<td>- 126</td>
<td>151</td>
<td>DB Overcurrent Trip</td>
<td>D.B. Overcurrent switch is open (F)</td>
</tr>
<tr>
<td>- 128</td>
<td>152</td>
<td>DB Hardware OverTemp Trip</td>
<td>DB Hardware OverTemp switch is open (F)</td>
</tr>
</tbody>
</table>

VIEWING WARNINGS AND TRIPS

| MENU 10 |
|-----------------|-----------------|-----------------|-----------------|
| Parameter View  | View            | View            | View            |
| 12.00-12.09     | Warning Nos. 1 - 10 | Warning Nos. 1 - 10 | Warning Nos. 1 - 10 |
| 12.10-12.19     | Trip Nos. 1 - 10 | Trip Nos. 1 - 10 | Trip Nos. 1 - 10 |
| 12.20-12.29     | Trip History Nos. 1 - 10 | Trip History Nos. 1 - 10 | Trip History Nos. 1 - 10 |
| 12.30-12.39     | Secs Since Trip | Secs Since Trip | Secs Since Trip |
| 12.40-12.49     | Hours Since Trip | Hours Since Trip | Hours Since Trip |
| 12.50-12.59     | CF10 - User Trip 1 | CF10 - User Trip 1 | CF10 - User Trip 1 |
| 12.60-12.69     | CF112 - User Trip 2 | CF112 - User Trip 2 | CF112 - User Trip 2 |
| 12.70-12.79     | CF9 - Trip Reset | CF9 - Trip Reset | CF9 - Trip Reset |

HISTORY

THE DRIVE IS EQUIPPED WITH A 10-CHANNEL HISTORY RECORDER.

MENU 26 – ALLOWS SET-UP OF THE LOG

MENU 27 – ALLOWS PLAYBACK OF THE LOG

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Note: These hints are aimed mainly at the DEFAULT case, to help with problems which may be experienced while working with this user guide.

**DIAGNOSTIC HINTS**

- **Warning:**
- **Trip Code:**
- **Warning/TRIP DESCRIPTION:**
- **Case Control Responsible:**
- **Diagnostic Hint:**

**Case not powering up**

Check the fuse in the UK mains lead. Check the mains switch is on and illuminated. If the transportation recommendations in Section 3.3, have not been followed, adverse effects to the case internal power supply may have occurred, thus blowing the fuse. Change the fuse, allow the case environment to stabilise, then try again.

**Healthy LED is not lit.**

Ensure the “switch on” procedure in Section 6.4.1 has been followed. When the trips and determine the case, remember that, programming the parameters in the case can cause a trip to be permanently set (for example, incorrect use of the user trips), so a parameter default may be necessary.

**The case will not run from the Keypad.**

The drive must be in “Keypad control” (i.e. Local control). Check that DIN1 is open. Use a DVM or view P11.21. DIN1 is connected to CF116 which selects local/remote (LO/open for keypad). See Section 5.1.10 for a detailed look at local/remote control.

**The case will not run from the terminals.**

The drive must be in “Remote control”. Check that DIN1 is closed, use a DVM or view P11.21. DIN1 is connected to CF116 which selects local/remote (HI/closed for remote). See Section 5.1.10 for a detailed look at local/remote control.

**All LED’s flashing**

This indicates a major software or hardware fault with the controller. Normal software operation cannot continue. Refer to Section 6.8.1.

**The speed reference is not working.**

The default drive has 3 speed references programmed:
- a) Local (Keypad) reference value entered in P1.00
- b) Remote ANIN1, programmed to be 0 - 10 V, view value P1.36
- c) Remote ANIN2, programmed to be 4 - 20mA, view value P1.37
  - Monitor P1.00 whilst operating the required reference.
  - To achieve Keypad reference, ensure DIN1 is open.
  - To achieve any Remote reference, ensure DIN1 is closed.
  - To select between Remote references ANIN1 and ANIN2, toggle DIN1 5.
  - See Section 5.1.10 for a detailed look at local/remote control.

**The analogue input references are not functioning as expected.**

The default setting for ANIN1 is 0 - 10 V (0 - 100%) and the default for ANIN2 is 4 - 20mA (20% - 100%). The DIP switches configure the inputs for current or voltage.
- Check the DIP switches (F) against the graphic on the panel.
- Check the analogue input settings in P7.00 to P7.07 against default settings.
  - Check the values entering the analogue inputs in P7.07, P7.07 respectively.
  - See Section 5.2.4 for a detailed look at Analogue I/O.

**The analogue outputs are not functioning as expected.**

The default settings for ANOP1 and ANOP2 are 0 - 10 V, 0 - 100%. The DIP switches configure the outputs for current or voltage.
- Check the DIP switches (F) against the graphic on the panel.
- Check the analogue output settings in P7.17 to P7.26 against default settings.
  - Check the values coming from the analogue outputs in P7.21, P7.26 respectively.
  - See Section 5.2.4 for a detailed look at Analogue O/U.

**Deceleration ramps not being followed, seems to take longer than set.**

The drive is programmed at the factory to prevent itself tripping on overvoltage trips. When an AC motor is decelerated, the motor generates voltage back to the drive DC link, the amount of voltage depends on the speed of the deceleration and the load inertia. The case can simulate this effect by the set level of the DC Link Feedback (T). If the time taken to ramp down is too long:
  - Check the deceleration rates set in P1.23 or P6.02, P6.03 (duplicates).
  - Check the value of the DC link feedback in P11.03, adjust the relevant power frame simulation panel (F) to give about 460V.
  - Check the value set in P4.12 and adjust it, this tells the software to absorb more simulated watts, thus allowing the required deceleration to occur.

**Case trips when the keypad (I) is removed.**

For safety on a real plant, it is not allowed to simply remove the keypad if the keypad has control of the start/stop or is the source of the speed reference. There is a procedure described in Section 4.5.5. Note if the keypad is not in control, or is not the speed reference, then it can simply be removed without a problem.
DRIVE DATA MANAGER™

KEYPAD FUNCTIONS

RUNNING led (Green)

HEALTHY (STANDBY) led (Green)

RAISE and LOWER keys
Used to raise and lower the reference when keypad reference is selected as a reference source.

START/RUN key
Press to run the output bridge when in keypad

STOP key
Press to stop the output bridge when in keypad

ENTER key
Press to enter a menu, to initiate editing or to load an edit

HELP key
Press to get context sensitive diagnostic help when either a trip or a warning is displayed. Parameter help is also available. see Section 4.5.4 and Section 6.

ESC key
Used whilst editing and navigating, see Section 4.5

Alpha/Numeric keys
Used whilst editing or short cutting parameters

At Default, DDM™ (Keypad) control is selected by digital input 4, which in turn operates Control Flag 116. Keypad reference is also selected by digital input 4. Refer to Section 5.1.10 and the control block diagrams, sheet 3, for more information.

THE NAVIGATION KEY

NAVIGATION

Increment Menu or Parameter no.
Decrement Menu or Parameter no.
Go to Menu level
Go to Parameter level

EDITING

Increment Value
Decrement Value
Move Cursor Left (Delete/Backspace)
Move Cursor Right

SHORTCUTTING TO PARAMETERS

If the parameter number is known, it can be entered directly using a shortcut method.

For example, the key Sequence to shortcut to P1.00, the Speed Reference:

6 1 0 0 0 0 P1.00 <Enter>

See over for Diagnostics and Help