

*User Guide*

**UD55**

Cloning interface  
small option module  
for Unidrive  
and  
Commander GP

Part Number: 0460 - 0095

Issue Number: 3

## General Information

The manufacturer accepts no liability for any consequences resulting from inappropriate, negligent or incorrect installation or adjustment of the operating parameters of the equipment or from mismatching the Drive with the motor.

The contents of this Guide are believed to be correct at the time of printing. In the interests of a commitment to a policy of continuous development and improvement, the manufacturer reserves the right to change the specification of the product or its performance, or the contents of this Guide, without notice.

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## Use within the European Union, etc

The following information applies where the end use of the Drive is within the European Union, the European Economic Area, or other regions which have implemented Directives of the European Council or equivalent measures.

The Drive complies with the Low Voltage Directive 73/23/EEC.

The installer is responsible for ensuring that the equipment into which the Drive is incorporated complies with all relevant Directives.

The complete equipment must comply with the EMC Directive 89/336/EEC.

If the Drive is incorporated into a machine, the manufacturer is responsible for ensuring that the machine complies with the Machinery Directive 89/392/EEC. In particular, the electrical equipment should generally comply with European Harmonised standard EN60204-1.

## Important...

### Drive software version

This product is supplied with the latest version of user-interface and machine-control software. If this product is to be used with other Control Techniques variable speed drives in an existing system, there may be some differences between their software and the software in this product. These differences will cause a difference in functions. This may also apply to variable speed drives returned from a Control Techniques Service Centre.

If there is any doubt, contact a Control Techniques Drive Centre.

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Issue Code: 55nu3

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## Contents

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<b>Chapter</b>		
	<b>1 Introduction</b>	<b>1</b>
	1.1 Main features of the UD55	1
	<b>2 Safety Information</b>	<b>2</b>
	2.1 Warnings, Cautions and Notes	2
	2.2 Electrical safety – general warning	2
	2.3 System design	2
	2.4 Environmental limits	3
	2.5 Compliance with regulations	3
	2.6 Safety of personnel	3
	2.7 Risk analysis	4
	2.8 Signal connections	4
	2.9 Adjusting parameters	4
	<b>3 Inserting the UD55 in a Drive</b>	<b>5</b>
	<b>4 Making Connections</b>	<b>7</b>
	4.1 Locations of the terminals	7
	4.2 Functions of the terminals	7
	<b>5 Saving Parameters</b>	<b>8</b>
	<b>6 Loading Parameters</b>	<b>10</b>
	6.1 Loading a Parameter-set from the UD55	10
	6.2 Transferring parameter-sets between Drives of different ratings	11
	6.3 Using the UD55 with other small option modules	12
	6.4 Avoiding problems with inter-related parameters	12
	<b>7 Erasing the entire flash memory of the UD55</b>	<b>13</b>
	<b>8 Related parameters</b>	<b>14</b>
<b>Appendix</b>		
	<b>A Diagnostics</b>	<b>A-1</b>



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# 1 Introduction

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## 1.1 Main features of the UD55

**Note**

**The UD55 can be used only with Drives equipped with version 3 (or later) software. (Parameter 0.50 indicates the software version.)**

**All references to the Advanced Menus in this User Guide are not applicable when using the UD55 with the Commander GP Drive.**

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<b>Parameter-sets</b>	The UD55 Cloning <i>small option module</i> can store up to eight parameter-sets which contain all the read–write parameters for a Drive, and include those in Menus 16 and 20, when applicable. These parameter-sets can be individually recalled for loading into the same or another Drive.
<b>Operating modes</b>	Cloning of Drives can be performed only when the operating mode (Open-loop, Closed-loop Vector, Servo or Regen) of the destination Drive is the same as that of the source Drive.
<b>Installation</b>	The UD55 must be fitted in the <i>small option module</i> bay of the Unidrive. All connections to the Drive are made by a multi-way connector. Connections from external equipment are made to a plug-in 16-way screw-terminal block on the UD55.

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## 2 Safety Information

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2.1

### Warnings, Cautions and Notes

A **Warning** contains information which is essential for avoiding a safety hazard.

A **Caution** contains information which is necessary for avoiding a risk of damage to the product or other equipment.

A **Note** contains information which helps to ensure correct operation of the product.

2.2

### Electrical safety – general warning

The voltages used in the Drive can cause severe electric shock and/or burns, and could be lethal. Extreme care is necessary at all times when working with or adjacent to the Drive.

Specific warnings are given at the relevant places in this User Guide.

The installation must comply with all relevant safety legislation in the country of use.

The Drive contains capacitors that remain charged to a potentially lethal voltage after the AC supply has been disconnected. If the Drive has been energized, the AC supply must be isolated at least ten minutes before work may continue.

2.3

### System design

The Drive is intended as a component for professional incorporation into complete equipment or systems. If installed incorrectly the Drive may present a safety hazard. The Drive uses high voltages and currents, carries a high level of stored electrical energy, and is used to control mechanical equipment which can cause injury.

Close attention is required to the electrical installation and the system-design to avoid hazards either in normal operation or in the event of equipment malfunction. System-design, installation, commissioning and maintenance must be carried out by personnel who have the necessary training and experience. They must read this safety information and this User Guide carefully.

To ensure mechanical safety, additional safety devices such as electro-mechanical interlocks may be required. The Drive must not be used in a safety-critical application without additional high-integrity protection against hazards arising from a malfunction.

## 2.4 Environmental limits

Instructions in the *Unidrive Installation Guide* regarding transport, storage, installation and use of Drives must be complied with, including the specified environmental limits. Drives must not be subjected to excessive physical force.

## 2.5 Compliance with regulations

The installer is responsible for complying with all relevant regulations, such as national wiring regulations, accident prevention regulations and electromagnetic compatibility (EMC) regulations. Particular attention must be given to the cross-sectional areas of conductors, the selection of fuses or other protection, and protective earth (ground) connections.

The *Installation Guide* for the Drive contains instructions for achieving compliance with specific EMC standards.

Within the European Union, all machinery in which this product is used must comply with the following directives:

89/392/EEC: Safety of Machinery

89/336/EEC: Electromagnetic Compatibility.

## 2.6 Safety of personnel

The STOP function of the Drive does not remove dangerous voltages from the output of the Drive or from any external option unit.

The Stop and Start controls or electrical inputs of the Drive must not be relied upon to ensure safety of personnel. If a safety hazard could exist from unexpected starting of the Drive, an interlock that electrically isolates the Drive from the AC supply must be installed to prevent the motor being inadvertently started.

Careful consideration must be given to the functions of the Drive which might result in a hazard, either through their intended functions (eg. Auto-start) or through incorrect operation due to a fault or trip (eg. stop/start, forward/reverse, maximum speed).

Under certain conditions, the Drive can suddenly discontinue control of the motor. If the load on the motor could cause the motor speed to be increased (eg. hoists and cranes), a separate method of braking and stopping the motor must be used (eg. a mechanical brake).

Before connecting the AC supply to the Drive, it is important that you understand the operating controls and their operation. If in doubt, do not adjust the Drive. Damage may occur, or lives put at risk. Carefully follow the instructions in this User Guide.

Before making adjustments to the Drive, ensure all personnel in the area are warned. Make notes of all adjustments that are made.

## **2.7 Risk analysis**

In any application where a malfunction of the Drive could lead to damage, loss of life or injury, a risk analysis must be carried out, and where necessary, further measures taken to reduce the risk. This would normally be an appropriate form of independent safety back-up system using simple electro-mechanical components.

## **2.8 Signal connections**

The control circuits are isolated from the power circuits in the Drive by basic insulation only, as specified in IEC664–1. The installer must ensure that the external control circuits are insulated from human contact by at least one layer of insulation rated for use at the AC supply voltage.

If the control circuits are to be connected to other circuits classified as Safety Extra Low Voltage (SELV) (eg. to a personal computer), an additional isolating barrier must be included in order to maintain the SELV classification.

## **2.9 Adjusting parameters**

Some parameters have a profound effect on the operation of the Drive. They must not be altered without careful consideration of the impact on the controlled system. Measures must be taken to prevent unwanted changes due to error or tampering.

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## 3 Inserting the UD55 in a Drive

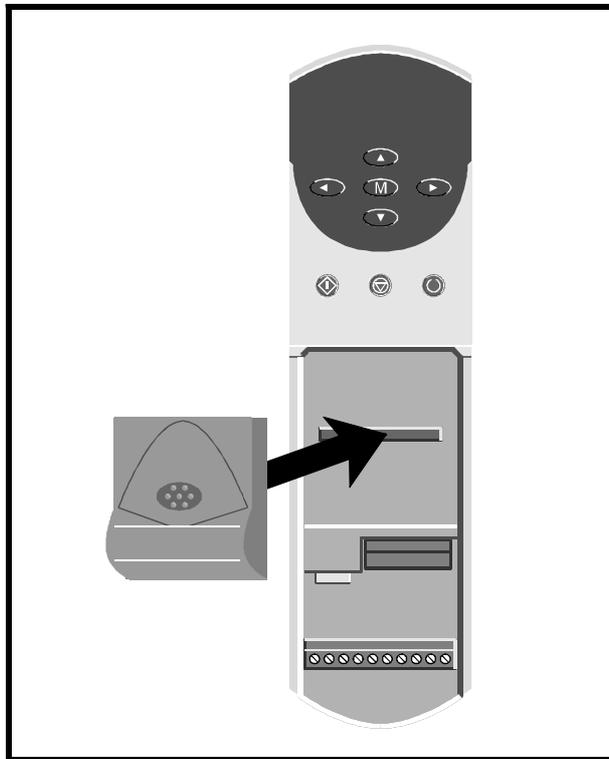
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**Warning**

**Before following these instructions, refer to the Warnings and Notes at the beginning of Chapter 3 *Setting up the Drive* in the *Unidrive User Guide*.**

**The power terminals of the Drive retain a high voltage charge for up to 10 minutes from the time of disconnection of the AC supply. Take care to avoid contact with the power terminals during this time.**



**Figure 1** *Inserting the UD55 in the Unidrive*

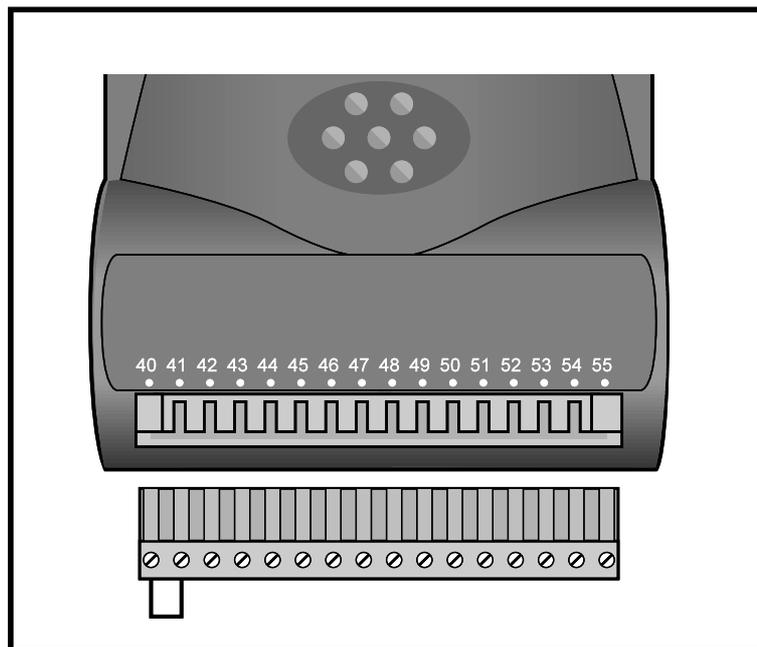
- 1 Disconnect the AC supply from the Drive.
- 2 Check that the exterior of the UD55 is not damaged, and that the multi-way connector is free from dirt and debris. Do not fit a damaged or dirty UD55 in a Drive.
- 3 Remove the terminal cover from the Drive (for removal instructions, see *Installing the Drive* in Chapter 2 of the *Unidrive Installation Guide*).
- 4 If a small option module is already fitted in the Drive, grip the recesses at the ends of the module and pull the module out of the Drive. Keep the module for re-fitting.
- 5 Position the multi-way connector on the rear of the UD55 over the connector in the Drive (see Figure 1), and press on the thumb pad to push the UD55 into place.

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## 4 Making Connections

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### 4.1 Locations of the terminals



**Figure 2** Location of the plug-in terminal block on the UD55

### 4.2 Functions of the terminals

Terminal	Function
40 41	To enable the <i>save</i> function, terminals 40 and 41 should be directly connected together
42 to 55	No connection

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## 5 Saving Parameters

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If the Drive trips and a trip code is displayed while this procedure is being followed, refer to *Appendix A, Diagnostics*. Ensure that all the required parameters have been set up in the source Drive and that new parameter values have been saved.

If a small option module was fitted in the Drive, its associated Menu 16 parameters will be copied to the UD55 in addition to the parameters in the other menus.

- 1 Insert the UD55 in the source Drive (refer to Chapter 3, *Inserting the UD55 in a Drive*).
- 2 Ensure terminal 30 of the Drive *Signal connector* is open-circuit so that the Drive does not become enabled when powered-up.
- 3 On the UD55 connector, connect terminal 40 directly to terminal 41 to enable the *save* function (see Figure 2).
- 4 Re-fit the terminal cover to the Drive.
- 5 Connect the AC supply to the Drive.
- 6 Decide which parameter-set number is to be used in the UD55. If a parameter-set already contains parameter values, these will be over-written without warning. It is recommended that a record is made of at least the following for each parameter-set number:
  - A means of identifying the configuration of the source Drive
  - The model size of the source Drive
  - The type(s) of option module(s) fitted
  - Motor ratings
- 7 Set parameter **.00** (in any menu) at **300X**, where **X** is the required parameter-set number (1 to 8).
- 8 Press . The parameter values are now copied (saved) to the UD55.

Saving takes approximately 5 seconds. When it has finished, parameter **.00** returns to zero.
- 9 It is recommended that parameter **11.38** is set at the number of the parameter-set (value of **X** in step 7) and the value of parameter **11.40** *UD55 full parameter check sum* noted, as a means of identifying the parameter-set at a later date.
- 10 Disconnect the AC supply from the Drive.

- 11 Remove the terminal cover.
- 12 Disconnect the link between terminals 40 and 41 on the UD55 connector.
- 13 Remove the UD55 from the Drive.
- 14 If a small option module was previously fitted in the Drive, re-fit the module.
- 15 Replace the terminal cover.
- 16 The Drive can now be used.

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## 6 Loading Parameters

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### 6.1 Loading a Parameter-set from the UD55

If the Drive trips and a trip code is displayed while this procedure is being followed, refer to *Appendix A, Diagnostics*.

- 1 Ensure the destination Drive is configured in the same operating mode as the source Drive. (The UD55 cannot change the operating mode of the Drive.)
- 2 Ensure terminals 40 and 41 on the UD55 are **not** connected.
- 3 Insert the UD55 in the source Drive.
- 4 Ensure terminal 30 of the Drive *Signal connector* is open-circuit so that the Drive does not become enabled when powered-up.
- 5 Re-fit the terminal cover to the Drive.
- 6 Connect the AC supply to the Drive.
- 7 It is recommended that the following is performed:
  - Set parameter **11.38** at the number of the parameter-set to be used.
  - Note the value of **11.40 UD55 full parameter checksum**.
  - Compare this value against the value noted when the parameter-set was saved in the UD55.

If the values differ, this indicates that a different parameter-set has been selected or the values contained in the parameter-set have been changed.

- 8 Set parameter **.00** (in any menu) at **400X**, where **X** is the parameter-set number of the configuration to be loaded in the destination Drive.

- 9 Press . The parameter values are now copied from the UD55 (loaded) to the Drive. (If the operating mode of the destination differs from that of the source, parameter values will not be loaded and the Drive will trip; the display will indicate **FSH.TYP**).

Loading is almost instantaneous. Parameter **.00** returns to zero.

- 10 Set parameter **.00** at 1000 and press  in order to save the parameter values.
- 11 Disconnect the AC supply from the Drive.
- 12 Remove the terminal cover.

- 13 Remove the UD55 from the Drive; if no other small option module is required in the Drive, the UD55 can remain permanently fitted.
- 14 If required, fit a small option module.
- 15 Replace the terminal cover. The Drive can now be used.

## 6.2 Transferring parameter-sets between Drives of different ratings



### Warning

**Values of certain motor parameters are not scaled correctly when the current or voltage rating of the destination Drive differs from that of the source Drive. For safety, refer to the next instruction.**

When transferring a parameter-set between Drives of different current or voltage rating a **FSH.rng** trip will occur. All parameters will be copied except those below:

- **2.08** *Standard ramp voltage*
- **4.05 – 4.07** *Current limits*
- **4.08** *Torque reference*
- **4.09** *Torque offset*
- **5.07** *Motor – rated current*
- **5.09** *Motor – rated voltage*
- **5.17** *Stator Resistance*
- **5.18** *Switching frequency*
- **5.24** *Motor leakage inductance*
- **5.33** *Thermal model enable*
- **6.06** *D.C. injection braking current*
- **15.07** *Regen unit voltage setpoint*

These parameters will need to be manually entered into the destination Drive if the trip occurs.

### Note

**With software versions before V03.xx.07, no trip will occur and all parameters will be copied. The above parameters should be manually entered into the destination Drive and any other parameters that need to be set up for the application.**

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### 6.3 Using the UD55 with other small option modules

When a UD55 is fitted to the Drive it replaces any small option module that may have been fitted previously. If parameters were last saved in the Drive with a small option module fitted, other than a UD55, then menu 16 will be present and visible via the keypad when a UD55 is subsequently fitted. (If no option module is fitted menu 16 will not be visible.) Therefore menu 16 parameters previously saved for the small option module can be transferred to/from the UD55. To prevent incorrect Drive operation, because the option module is not present, the Drive cannot be enabled when a UD55 is fitted and the Drive contains a parameter set for a small option module. These parameters can be removed from the Drive by saving parameters with no small option module fitted.

#### Note

**With software versions prior to V03.xx.07, it is possible to enable a Drive with the UD55 fitted and Menu 16 present. Terminal 30 of the Drive *Signal connector* must be open-circuit to prevent incorrect Drive operation when using the UD55.**

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### 6.4 Avoiding problems with inter-related parameters

The maximum values of some parameters depend on other parameters, i.e. the current limits (**04.05 – 04.07**) depend on the rated current (**05.07**). With software versions before V03.xx.07 the parameter values for the dependent parameters, i.e. in this case the current limits, may not be correct after they are transferred from a UD55 to the Drive. A second transfer from the UD55 to the Drive will give the correct values. With software versions V03.xx.07 and onwards the parameters are automatically transferred twice from the UD55, and so the resulting values in the Drive will always be correct.

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## 7 Erasing the entire flash memory of the UD55

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- 1 Ensure terminals 40 and 41 on the UD55 are connected.
- 2 Insert the UD55 in a Drive (refer to *Chapter 3, Inserting the UD55 in a Drive*).
- 3 Ensure terminal 30 of the Drive *Signal connector* is open-circuit so that the Drive does not become enabled when powered-up.
- 4 Re-fit the terminal cover to the Drive.
- 5 Connect the AC supply to the Drive.
- 6 Set parameter **.00** (in any menu) at **3099**. **All** the parameter values are now erased from the UD55.  
Erasing takes from 2 to 14 seconds. When it is completed, parameter **.00** returns to zero.
- 7 Disconnect the AC supply from the Drive.
- 8 Remove the terminal cover (refer to *Chapter 3, Inserting the UD55 in a Drive*).
- 9 Remove the UD55 from the Drive.
- 10 If a small option module was previously fitted in the Drive, re-fit the module.
- 11 Replace the terminal cover. The Drive can now be used.

## 8 Related parameters

### (Not applicable to the Commander GP Drive)

Use parameters **11.38** and **11.39** find the operating mode for a particular parameter-set, or to find if a parameter-set is empty.

#### 11.38 UD55 parameter-set selector

↕ (See below)	⇔	0		RW	Uni			P
---------------	---	---	--	----	-----	--	--	---

#### Range

UD55 fitted	1 ~ 8
UD55 not fitted	0

Use **11.38** to select a parameter-set in the UD55.

#### 11.39 UD55 operating-mode indicator

↕	OPEN.LP	⇔	0		RO	Uni			P
	CL.VECt		1						
	SErVO		2						
	rEGEn		3						
	FrEE		4						

**11.39** indicates the operating mode related to the parameter-set selected in **11.38**. When the selected parameter-set contains no values, **11.39** indicates **FrEE**.

#### 11.40 UD55 full parameter checksum

↕ 0 ~ 16383	⇔			RO	Uni			P
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When parameter values are copied to the UD55, a checksum is calculated from all the parameter values. **11.40** contains the value of the checksum of the parameter values contained in the parameter-set selected in **11.38**.

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## A Diagnostics

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### A.1 Trip Codes

The following trip codes are associated with the UD55.

Drive display	No.	Conditions
<b>FSH.Err</b>	182	The UD55 memory has been found to be corrupt. If the trip has been produced at power-up then the memory of the UD55 is automatically reformatted and all parameter-sets are erased. If errors are detected after power-up, the trip will occur but the memory of the UD55 will not be reformatted automatically.
<b>FSH.DAt</b>	183	No values in the selected parameter-set; no values are copied to the destination Drive.
<b>FSH.TYP</b>	184	The operating mode of the destination Drive differs from that related to the parameter-set; no parameter values are copied to the destination Drive. Either select an appropriate parameter-set, or change the operating mode of the destination Drive.
<b>FSH.ACC</b>	185	Write access to the UD55 has not been enabled (terminal 40 not connected to 41); no parameter values are copied to the UD55.
<b>FSH.LO</b>	186	The parameter-set contains values for Menu 20 parameters, but a large option module is not fitted in the destination Drive. Values of Menu 20 parameters are not copied to the destination Drive.
<b>FSH.20</b>	187	The parameter-set does not contain values for Menu 20 parameters, but a large option module is fitted in the destination Drive. Values of Menu 20 parameters are not copied to the destination Drive.
<b>FSH.rng</b>	188	The current or voltage rating of the destination Drive differs from that related to the parameter-set in the UD55. Parameters are copied except for those listed in Section 6.2 of this User Guide.

