

AC Reciprocator Controller 2002

Manual P/N 768 647 A
– English –



NORDSON (UK) LTD. D STOCKPORT



Order number

P/N = Order number for Nordson products

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98/37/EC

73/23/EEC

We,

Nordson (U.K.) Limited

of

**Ashurst Drive, Cheadle Heath, Stockport, Cheshire, SK3 0RY,
United Kingdom**

declare that under our sole responsibility for supply/manufacture of the product(s)

Product Name AC Reciprocator Controller, 2002

Model Number(s) 736332 and 736333

Product Options All

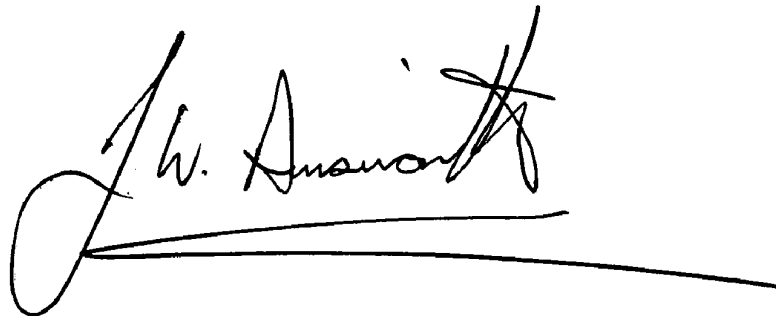
to which this declaration relates, is in conformity with the following standards and other normative documents

Safety BS EN 60204-1:1993
"Safety of Machinery – Electrical equipment of machines"

EN 60335:Part 1:1988
"Safety of household and similar electrical appliances"

BS EN 292:1991
"Safety of machinery – Basic concepts, general principles for design"

following the provisions of 98/37/EC and 73/23/EEC Directives

A handwritten signature in black ink, appearing to read 'J. Ainsworth', with a long horizontal line extending from the end of the signature.

Jim Ainsworth
General Manager

Nordson (U.K.) Ltd., 14th December 2002

NB ref EN45014 (BS7514)

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Congratulations on the Purchase of Your Nordson Product

Nordson equipment is engineered and manufactured in accordance with strict specifications, using high quality components and state-of-the-art technologies that assure reliable, long-term performance. Your product was thoroughly tested for proper operation prior to shipment.

Before unpacking and installing your new equipment, please read this manual. It is your guide to safe installation, productive operation and effective maintenance. We recommend that you keep the manual available for future reference.

Your Safety is Important to Nordson

Carefully read the *Safety* section. Your product is designed for safe operation when used according to the published instructions. Potential hazards exist when operating instructions are not followed.

Manufacturer of Equipment

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For a list of local Nordson organisations, see *Nordson International*.

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Austria		43-1-707 5521	43-1-707 5517
Belgium		31-13-511 8700	31-13-511 3995
Czech Republic		4205-4159 2411	4205-4124 4971
Denmark	<i>Hot Melt</i>	45-43-66 0123	45-43-64 1101
	<i>Finishing</i>	45-43-66 1133	45-43-66 1123
Finland		358-9-530 8080	358-9-530 80850
France		33-1-6412 1400	33-1-6412 1401
Germany	<i>Erkrath</i>	49-211-92050	49-211-254 658
	<i>Lüneburg</i>	49-4131-8940	49-4131-894 149
	<i>Düsseldorf - Nordson UV</i>	49-211-3613 169	49-211-3613 527
Italy		39-02-904 691	39-02-9078 2485
Netherlands		31-13-511 8700	31-13-511 3995
Norway	<i>Hot Melt</i>	47-23 03 6160	47-22 68 3636
	<i>Finishing</i>	47-22-65 6100	47-22-65 8858
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Slovak Republic		4205-4159 2411	4205-4124 4971
Spain		34-96-313 2090	34-96-313 2244
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	<i>Finishing</i>	46 (0) 303 66950	46 (0) 303 66959
Switzerland		41-61-411 3838	41-61-411 3818
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	<i>Finishing</i>	44-161-495 4200	44-161-428 6716
	<i>Nordson UV</i>	44-1753-558 000	44-1753-558 100

Distributors in Eastern & Southern Europe

DED, Germany	49-211-92050	49-211-254 658
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Hors d'Europe /
Fuera de Europa***

- S For your nearest Nordson office outside Europe, contact the Nordson offices below for detailed information.
- S Pour toutes informations sur représentations de Nordson dans votre pays, veuillez contacter l'un de bureaux ci-dessous.
- S Para obtener la dirección de la oficina correspondiente, por favor dirijase a unas de las oficinas principales que siguen abajo.

Contact Nordson	Phone	Fax
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Africa / Middle East

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Japan

Japan	81-3-5762 2700	81-3-5762 2701
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Canada		1-905-475 6730	1-905-475 8821
USA	Hot Melt	1-770-497 3400	1-770-497 3500
	Finishing	1-440-988 9411	1-440-985 1417
	Nordson UV	1-440-985 4592	1-440-985 4593

Section 1

Safety

Section 1

Safety

1. Introduction

Read and follow these safety instructions. Task and equipment specific warnings, cautions, and instructions are included in equipment documentation where appropriate.

Make sure all equipment documentation, including these instructions, is accessible to all persons operating or servicing equipment.

2. Qualified Personnel

Equipment owners are responsible for making sure that Nordson equipment is installed, operated, and serviced by qualified personnel. Qualified personnel are those employees or contractors who are trained to safely perform their assigned tasks. They are familiar with all relevant safety rules and regulations and are physically capable of performing their assigned tasks.

3. Intended Use

Use of Nordson equipment in ways other than those described in the documentation supplied with the equipment may result in injury to persons or damage to property.

Some examples of unintended use of equipment include

- S using incompatible materials
- S making unauthorized modifications
- S removing or bypassing safety guards or interlocks
- S using incompatible or damaged parts
- S using unapproved auxiliary equipment
- S operating equipment in excess of maximum ratings

4. Regulations and Approvals

Make sure all equipment is rated and approved for the environment in which it is used. Any approvals obtained for Nordson equipment will be voided if instructions for installation, operation, and service are not followed.

5. *Personal Safety*

To prevent injury follow these instructions.

- S Do not operate or service equipment unless you are qualified.
- S Do not operate equipment unless safety guards, doors, or covers are intact and automatic interlocks are operating properly. Do not bypass or disarm any safety devices.
- S Keep clear of moving equipment. Before adjusting or servicing any moving equipment, shut off the power supply and wait until the equipment comes to a complete stop. Lock out power and secure the equipment to prevent unexpected movement.
- S Relieve (bleed off) hydraulic and pneumatic pressure before adjusting or servicing pressurized systems or components. Disconnect, lock out, and tag switches before servicing electrical equipment.
- S While operating manual electrostatic spray guns, make sure you are grounded. Wear electrically conductive gloves or a grounding strap connected to the gun handle or other true earth ground. Do not wear or carry metallic objects such as jewelry or tools.
- S If you receive even a slight electrical shock, shut down all electrical or electrostatic equipment immediately. Do not restart the equipment until the problem has been identified and corrected.
- S Obtain and read Material Safety Data Sheets (MSDS) for all materials used. Follow the manufacturer's instructions for safe handling and use of materials, and use recommended personal protection devices.
- S To prevent injury, be aware of less-obvious dangers in the workplace that often cannot be completely eliminated, such as hot surfaces, sharp edges, energized electrical circuits, and moving parts that cannot be enclosed or otherwise guarded for practical reasons.

6. Fire Safety

To avoid a fire or explosion, follow these instructions.

- S Ground all conductive equipment in the spray area. Check equipment and workpiece grounding devices regularly. Resistance to ground must not exceed one mega-ohm.
- S Shut down all equipment immediately if you notice static sparking or arcing. Do not restart the equipment until the cause has been identified and corrected.
- S Do not smoke, weld, grind, or use open flames where flammable materials are being used or stored.
- S Provide adequate ventilation to prevent dangerous concentrations of volatile materials or vapors. Refer to local codes or your material MSDS for guidance.
- S Do not disconnect live electrical circuits while working with flammable materials. Shut off power at a disconnect switch first to prevent sparking.
- S Know where emergency stop buttons, shutoff valves, and fire extinguishers are located. If a fire starts in a spray booth, immediately shut off the spray system and exhaust fans.
- S Shut off electrostatic power and ground the charging system before adjusting, cleaning, or repairing electrostatic equipment.
- S Clean, maintain, test, and repair equipment according to the instructions in your equipment documentation.
- S Use only replacement parts that are designed for use with original equipment. Contact your Nordson representative for parts information and advice.

**7. *Action in the Event of a
Malfunction***

If a system or any equipment in a system malfunctions, shut off the system immediately and perform the following steps:

- S Disconnect and lock out electrical power. Close pneumatic shutoff valves and relieve pressures.

- S Identify the reason for the malfunction and correct it before restarting the equipment.

8. *Disposal*

Dispose of equipment and materials used in operation and servicing according to local codes.

Section 2

Description

Section 2

Description

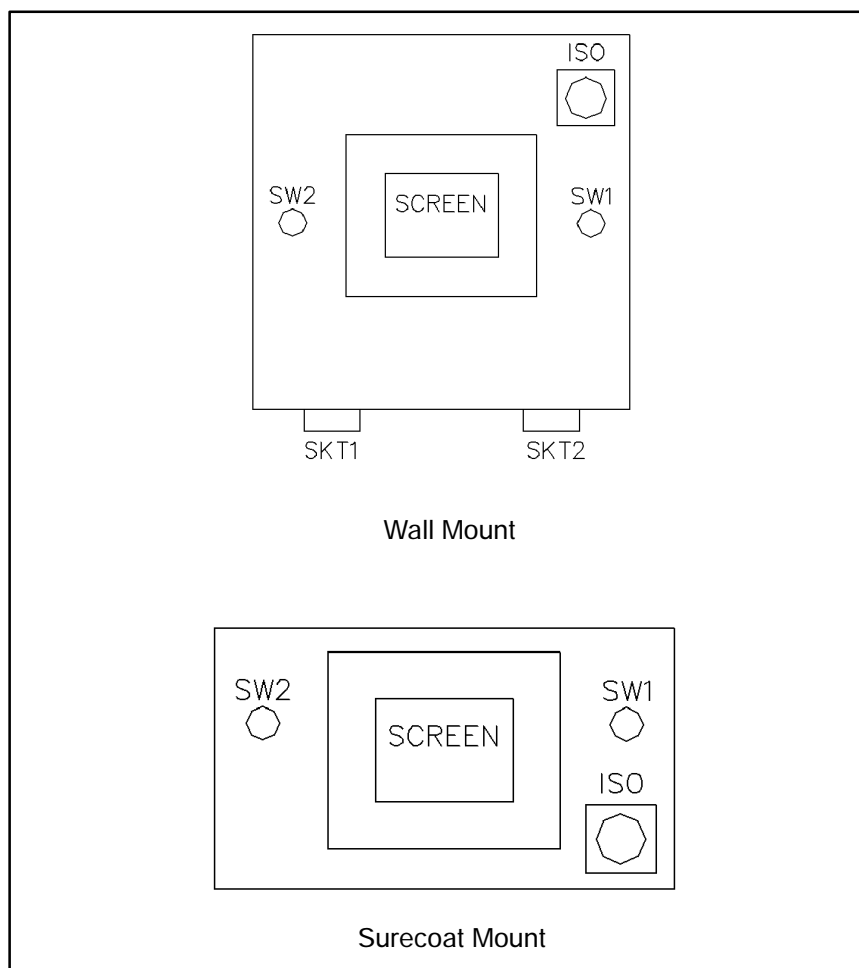


Fig. 2-1 Wall Mount & Surecoat Mount

1. *Intended Use*

The Nordson 2002 AC Gunmover Controller is intended for use in the control of Nordson 2002 AC Reciprocator Columns.

The columns cover a range of standard heights,
1.0 meters stroke length – 736300,
1.5 meters stroke length – 736301,
2.0 meters stroke length – 736302,
2.5 meters stroke length – 736303.

The controller is designed for the use in powder coating installations.

2. Features

The controller features are listed below.

- S Graphical Touch Screen operator interface.
- S Operator control of top/bottom turnaround position and speed for working stroke.
- S Up to 100 programs available for 2 Reciprocators.
- S Maximum speed of travel of 0.5 meters per second.
- S Position of turnaround point does not vary with speed of travel.
- S Easy Synchronization of Reciprocators.
- S Reciprocator carriage park facility.
- S Password protected user limits.
- S Manual control.
- S Choice of mounting cases, wall mount or for Surecoat Stack mounting. (These must be ordered separately)

3. Operation Controls

The front panel control are as follows.

ISO: Power On/Off (1)

Isolates the main supply to the controller.

SW1: Emergency Stop (2)

Used in Emergency to stop the Reciprocator.

SW2: Control Reset (3)

Engages the controller and makes the Reciprocator available for operation.

SCREEN: Operator Interface (4)

125mm Touch Screen graphical interface between the operator and the control system.

SKT 1: Connection

Reciprocator 1 connection point

SKT 2: Connection

Reciprocator 2 connection point

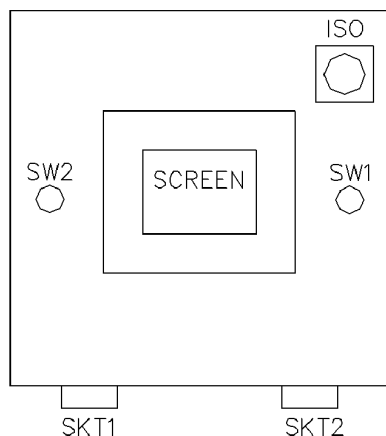


Fig. 2-2

Section 3

Installation

Section 3 Installation



WARNING: Allow only qualified personnel to perform the following tasks. Observe and follow the safety instructions in this document and all other related documentation.

1. *Transport*

Transport the unit so as to avoid damage. Do not throw the unit. Use suitable packaging materials and sturdy cartons. See section *Specifications* for dimensions and weight. Protect the unit from exposure to humidity, dust and vibrations.

2. *Unpacking*

Carefully unpack the unit to avoid damaging it. Check for damage caused during transport. Save packing materials for possible later use. Otherwise recycle or dispose of properly according to local regulations.

3. *Removing*

Switch off the mains supply, then disconnect all services from the unit.

4. *Storage*

Pack the unit in suitable packing materials and sturdy cartons. Protect from humidity, dust and large temperature fluctuations (condensation).

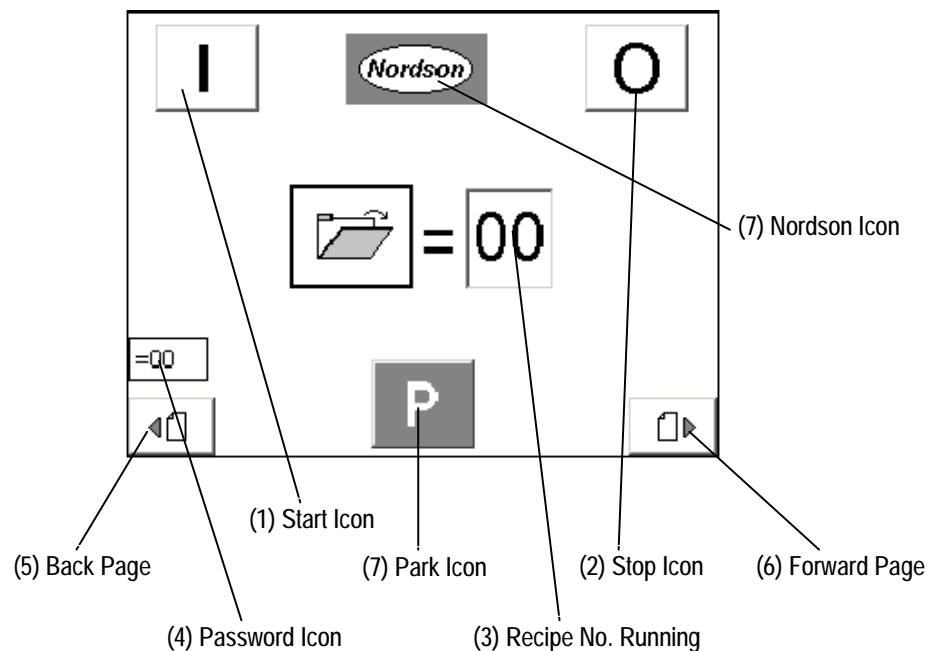
5. *Disposal*

Dispose of properly according to local regulations.

6. Set up procedure

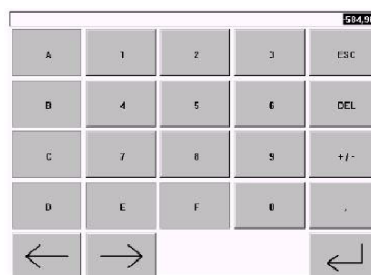
NOTE: The drive unit (which is located inside the Reciprocator baseframe) has been factory set by Nordson and tested and does not require further adjustment. It should be noted that the internal configuration has been modified from the default as supplied.

Main Screen



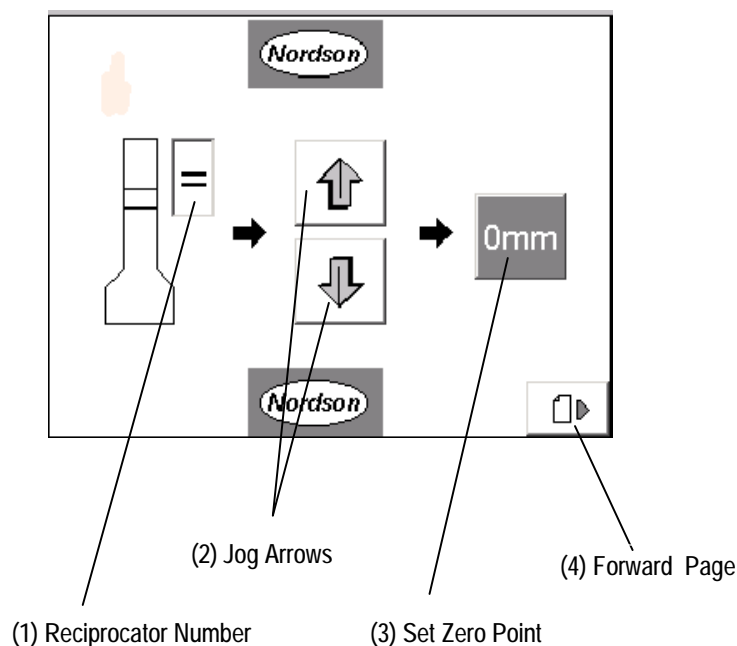
1. Connect all cables and turn on the Reciprocator isolator.
2. Turn on the isolator on the control panel and press the "control reset" push button. Do not touch until the Nordson Main Page has loaded.
3. When the "Main Screen" is loaded, DO NOT start the machine. Firstly touch the "(4) Password Icon" and enter the password "108" then enter this is achieved through the Data Entry Screen.

Data Entry Screen



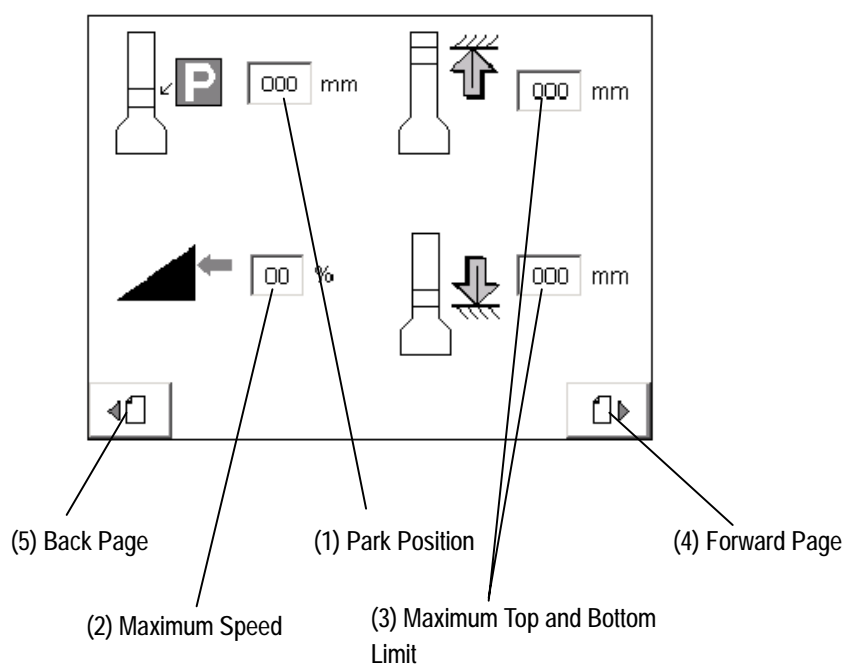
Upon completion of any data entry , press this enter  key.

4. Touch the top "(7) Nordson icon" and then touch the "(5) Back Page" icon TWICE until "Configuration Screen 1" appears as illustrated on the next page.

Configuration Screen 1

5. Touch the "(1) Reciprocator Number" entry box, and enter Number "1" and touch enter.
6. Using "(2) Jog Arrows" move Reciprocator 1 until it is 10mm short of the bottom of the booth auto slot.
7. Touch "(3) Set Zero Point" key.
8. If you have two Reciprocators fitted, repeat the above procedure for Reciprocator number 2, by touching the "(1) Reciprocator Number" entry box again, but this time enter Number "2" and touch enter.
9. You have now set the zero limit point on both machines. It is good practice to mark this position on the reciprocator column.
10. Touch "(4) Forward Page" to take you to Configuration screen 2

Configuration Screen 2



11. Touch "(1) Park Position" and enter the desired park position through the data entry screen. This is entered in mm's from the Zero Position previously set.
12. Touch "(2) Maximum Speed" this is the set point for the maximum speed in percentage of the machines capability. (normally set at 90% through the data entry screen)
13. Touch "(3) Maximum Top Limit" and by measuring the distance from the Zero point set the top limit in mm's through the data entry screen. This should normally be set 50mm short of the top of the auto slot.
14. Repeat this procedure for the maximum bottom limit, which is also normally set 50mm short of the bottom of the auto slot.
15. Touch "(4) Forward Page" which takes you back to the "Main Screen"
16. The Reciprocators are now configured.

Section 4

Operation

Section 4 Operation

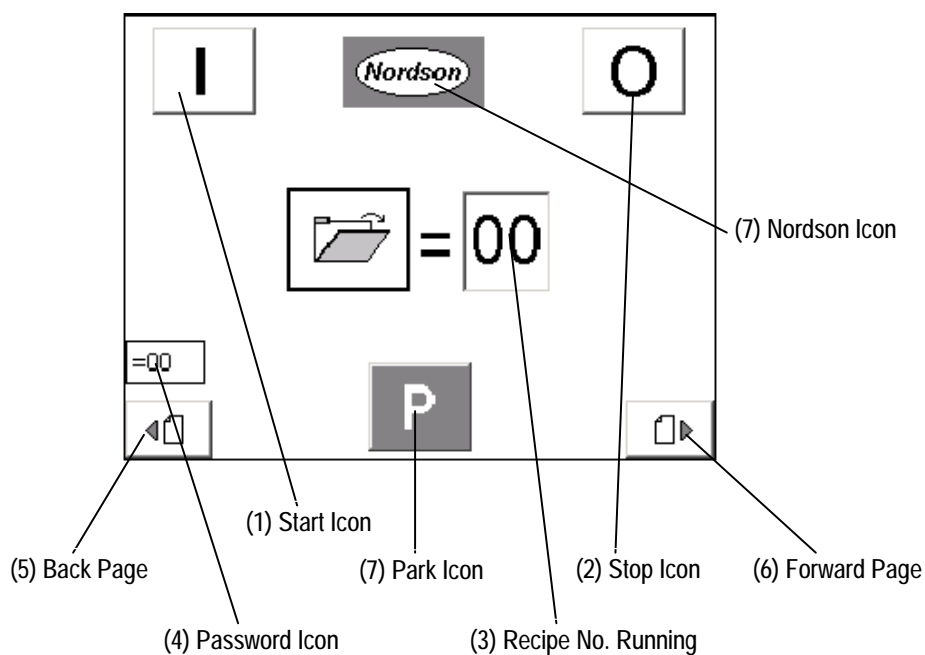


WARNING: Allow only qualified personnel to perform the following tasks. Observe and follow the safety instructions in this document and all other related documentation.

1. *Daily Startup and Shutdown*

1. Turn On the main isolator.
2. Check and ensure the Emergency Stop button is fully retracted.
3. Press Control Reset button and allow the system to fully boot up, until the main screen is displayed.

Main Screen

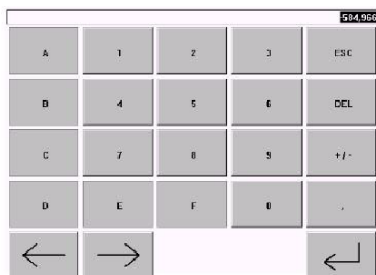


4. Select the recipe to run by touching "(3) Recipe No. Running" and enter the number required on the data entry screen, as shown overleaf.

Daily Startup and Shutdown

(contd.)

Data Entry Screen



Upon completion of any data entry , press this enter  key.

5. Touch "(1) Start Icon" and the machine(s) will run.

NOTE: The unit will stop if the limits are brought closer than approx 300 mm.

6. Touch "(7) Park Icon" to terminate the program running and the machines will slowly drive to the preset park position. See Installation Section for park position set up.

NOTE: If the Emergency Stop is pressed, or the "(2) Stop Icon" is touched, the machines will stop immediately where ever they may be positioned at the time. To Park, restart the machines and touch "(7) Park Icon" immediately.

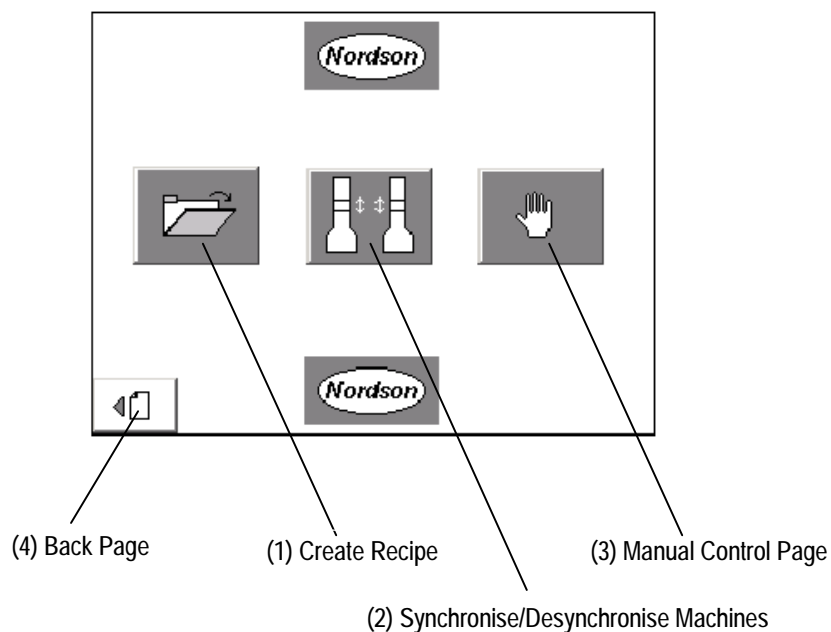
7. Switch off the main isolator.

2. *Recipe Creating and Editing*

To create and modify a recipe, follow the following procedure

1. Touching "(6) Forward Page" on the Main Screen will then take you to the screen illustrated below.

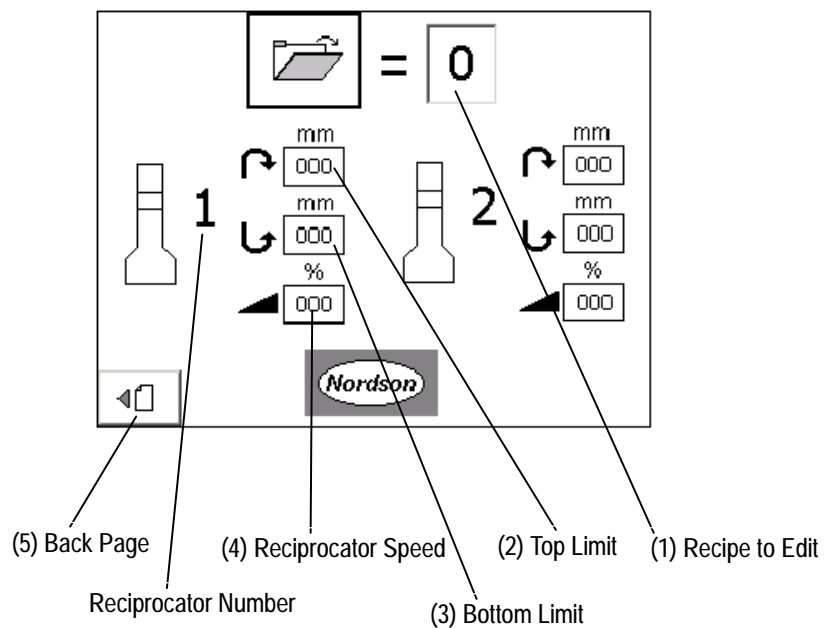
Machine Operation Screen



2. Touch "(1) Create Recipe" . This will take you to the screen illustrated Overleaf.

Recipe Creating and Editing (contd.)

Recipe Creation and Edit Screen

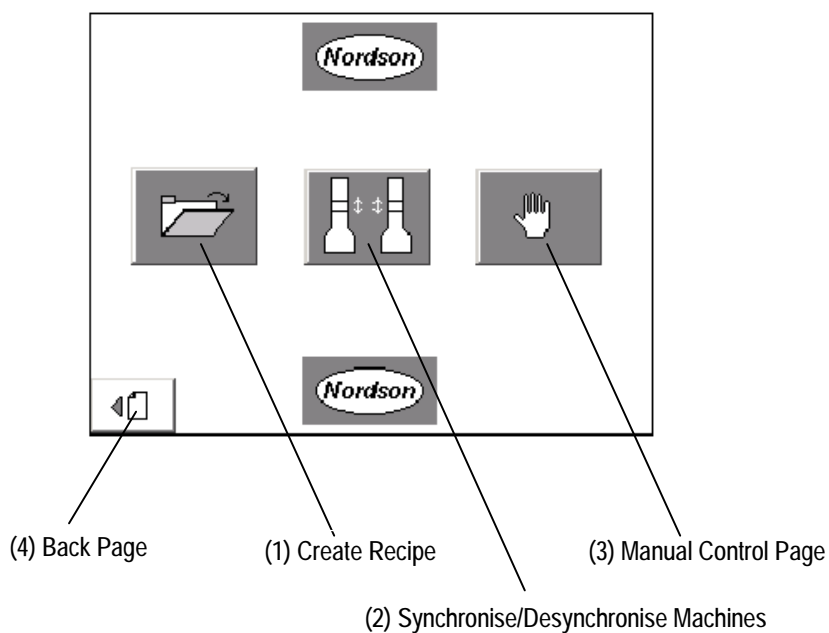


3. Touch "(1) Recipe to Edit" and enter the recipe number you wish to edit or create through the Data Entry Screen.
 4. The parameters currently stored for that recipe, will now be displayed in the appropriate boxes.
 5. To alter the top limit, touch "(2) Top Limit" on either machine 1 or 2 of which you wish to alter, and enter the new top limit position through the Data Entry Screen.
- NOTE:** This position is based from the Zero Position, which should be clearly marked on the Machine carriage, as explained in the installation section of this manual.
6. Repeat the same process for all the limits for both machines.
 7. Touch "(4) Reciprocator Speed" will allow you to set the speed, as a percentage of the maximum achievable speed. This is entered through the Data Entry Screen.
- NOTE:** Different speeds can be entered for each machine if required.
8. Touch "(5) Back Page" twice to return to the Main Screen.

3. Synchronisation Set Up

Machine Operation Screen

1. Touch "(6) Forward Page" on Main Screen to display the Machine Operation Screen.

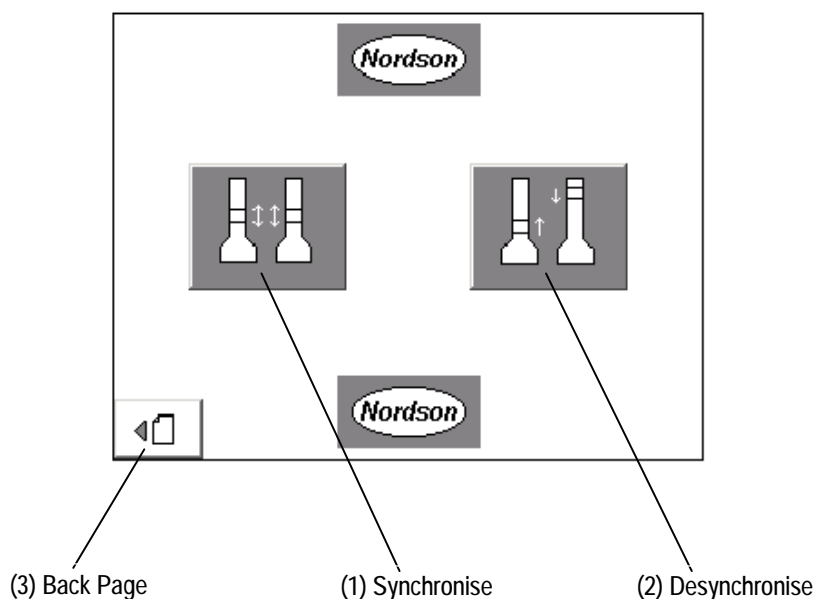


2. Touch "(2) " Synchronise/Desynchronise Machines". This will take you to the Synchronise/Desynchronise Screen.

Synchronisation Set Up

(contd.)

Synchronise/Desynchronise Screen



3. Touch "(1) Synchronise" to make the machines synchronise their strokes.

NOTE: The machines may take several minutes to complete the synchronisation.

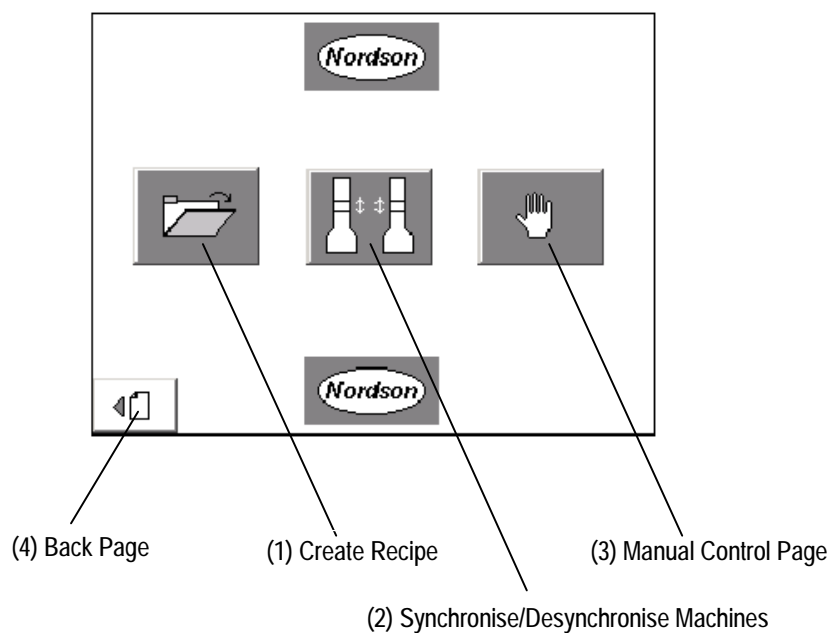
NOTE: Reciprocator number 1 now becomes the master and Reciprocator number 2 follows as the slave, therefore when synchronisation is enabled, both machines will run to the parameters entered for Reciprocator number 1.

4. Touch "(2) Desynchronise" to allow the machines to run independently and to their own parameters.
5. Touch "(3) Back Page" twice to return to the Main Screen.

4. Manual Control

Machine Operation Screen

1. Touch "(6) Forward Page" on Main Screen to display the Machine Operation Screen.

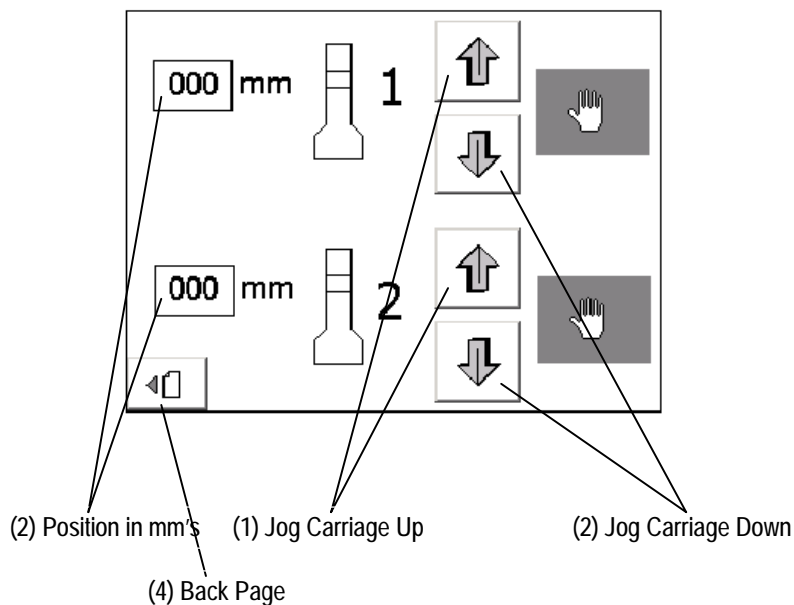


2. Touch "(3) Manual Control Page". This will take you to the Manual Control Screen.

Manual Control

(contd.)

Manual Control Screen



3. "(2)Position in mm's" displays each Reciprocator position in millimeters, in relationship to the Zero Set point of each machine.
4. Touch and hold "(1) Jog Carriage Up" to slowly move the carriage up. Release to stop.
5. Touch and hold "(2) Jog Carriage Down" to slowly move the carriage up. Release to stop
6. Touch"(3) Back Page" twice to return to the Main Screen.

Section 5

Maintenance

Section 5 Maintenance



WARNING: Allow only qualified personnel to perform the following tasks. Observe and follow the safety instructions in this document and all other related documentation.

1. Daily Maintenance

1. Visually check the complete system for correct operation.
2. Ensure all controls are operating correctly.

2. Maintenance – Routine

1. Check cables for damage replace as necessary.
2. Clean to avoid build up of dust or other materials that may affect the operation of the unit

3. Electrical Safety

1. The unit should be tested for electrical safety, at intervals of not more than 12 months, according to the Electricity at Work regulations 1989 (as revised) or similar for non-UK installations.

4. Internal Maintenance

There are no user servicable components within the control panel.
Please report any faults to your local Nordson Representative.

Section 6

Troubleshooting

Section 6

Troubleshooting



WARNING: Allow only qualified personnel to perform the following tasks. Observe and follow the safety instructions in this document and all other related documentation.

1. Introduction

The following tables provide general information for the troubleshooting of basic problems. Sometimes more detailed information, circuit diagrams or measuring devices are also needed for troubleshooting. It must be noted that a fault can occur for several reasons. It is advisable to check all possible causes for a given fault. Obvious causes of malfunction such as broken wires, missing fasteners etc., should be noted during visual inspections and corrected immediately.

Any parts that fail must be replaced by approved parts available from Nordson.

NOTE: It should be noted that the inverter internal configuration has been modified from the default as supplied.

2. Troubleshooting

Problem	Possible Cause	Corrective Action
Controller fails to operate	Supply not switched on	Check Supply
	Fuse in supply failed	Check Fuse
	Reciprocator Emergency Stop button is not fully released	Twist and release the button
	Control Reset button not pressed	Press Control Reset button
	Limits crossed	Ensure program selected has a greater stroke length than 300mm
	Incorrect start/shut down procedure	Observe and follow correct procedure. Instructions can be found on page 4-1 of this manual

2. Troubleshooting (contd.)

Problem	Possible Cause	Corrective Action
Carriage fails to move	Interconnecting cable not fitted Carriage Jammed Chain broken or off sprockets Speed set to zero Controller has failed	Fit Cable Switch off and check for free operation Check chain Adjust speed control Contact your Nordson Representative
Gun Bounce	Gun bars too long Reversal too fierce	Shorten or brace gun bars Consult Nordson
No movement or drives in only one direction	Column encoder faulty Encoder drive coupling broken or loose	Check reset or replace as necessary Repair or replace
Erratic Motion	Loose Carriage Loose drive sprocket Slack chain Worn gearbox Drive incorrectly set	Check, replace or adjust carriage wheels Check, replace or adjust sprocket Adjust chain tension Check, replace gearbox Refer to Nordson

NOTE: Other controls and adjustments within the controller must not be adjusted by the customer. The configuration of the drive has been set at the factory for optimum operation and adjustments may only be made by qualified personnel under the supervision of Nordson. Controllers with settings not in line with factory settings may be subjected to operating conditions outside those tested by Nordson and therefore may not be the subject of warranty claims.

Section 7

Parts

Section 7

Parts

1. Introduction

To order parts, call the Nordson Customer Service Center or your local Nordson representative. Use the parts list, and the accompanying illustration, to describe and locate parts correctly.

Using the Illustrated Parts List

Numbers in the Item column correspond to numbers that identify parts in illustrations following each parts list. The code NS (not shown) indicates that a listed part is not illustrated. A dash (—) is used when the part number applies to all parts in the illustration.

The number in the Part column is the Nordson Corporation part number. A series of dashes in this column (- - - - -) means the part cannot be ordered separately.

The Description column gives the part name, as well as its dimensions and other characteristics when appropriate. Indentions show the relationships between assemblies, subassemblies, and parts.

Item	Part	Description	Quantity	Note
—	000 0000	Assembly	1	A
1	000 000	S Subassembly	2	
2	000 000	S S Part	1	

- S If you order the assembly, items 1 and 2 will be included.
- S If you order item 1, item 2 will be included.
- S If you order item 2, you will receive item 2 only.

The number in the Quantity column is the quantity required per unit, assembly, or subassembly. The code AR (As Required) is used if the part number is a bulk item ordered in quantities or if the quantity per assembly depends on the product version or model.

Letters in the Note column refer to notes at the end of each parts list. Notes contain important information about usage and ordering. Special attention should be given to notes.

2. *Parts List*

Item	Part	Description	Quantity	Note
–	736 332	Controller, AC 2002, Reciprocator, Wall Mount	1	
–	736 333	Controller, AC 2002, Reciprocator, Surecoat Mount	1	
1	769 026	S Connector, Insert, 10 Way, Female	2	
2	769 025	S Connector, Housing, 10 Way, Rear Entry	2	
3		S Screen, Touch, Reciprocator 2002	1	
AR: As Required				
NS: Not Shown				

Section 8

Specifications

Section 8

Specifications

1. *Electrical*

Voltage	380–415VAC 3 Phase + N + PE
Frequency	45–65 Hz
Current	8 A per phase

2. *Mechanical*

Part No.	Description	Dimensions mm (H x W x D)	Weight (Kgs)
736 332	Wall Mount Controller	460 x 440 x 220	16
736 333	Suecoat Mount Controller	250 x 440 x 220	15

3. *Noise*

Less than 70 dbA measured at a distance of 1m from the surface of the unit and at a height of 1.6 m.

4. Circuit Schematic

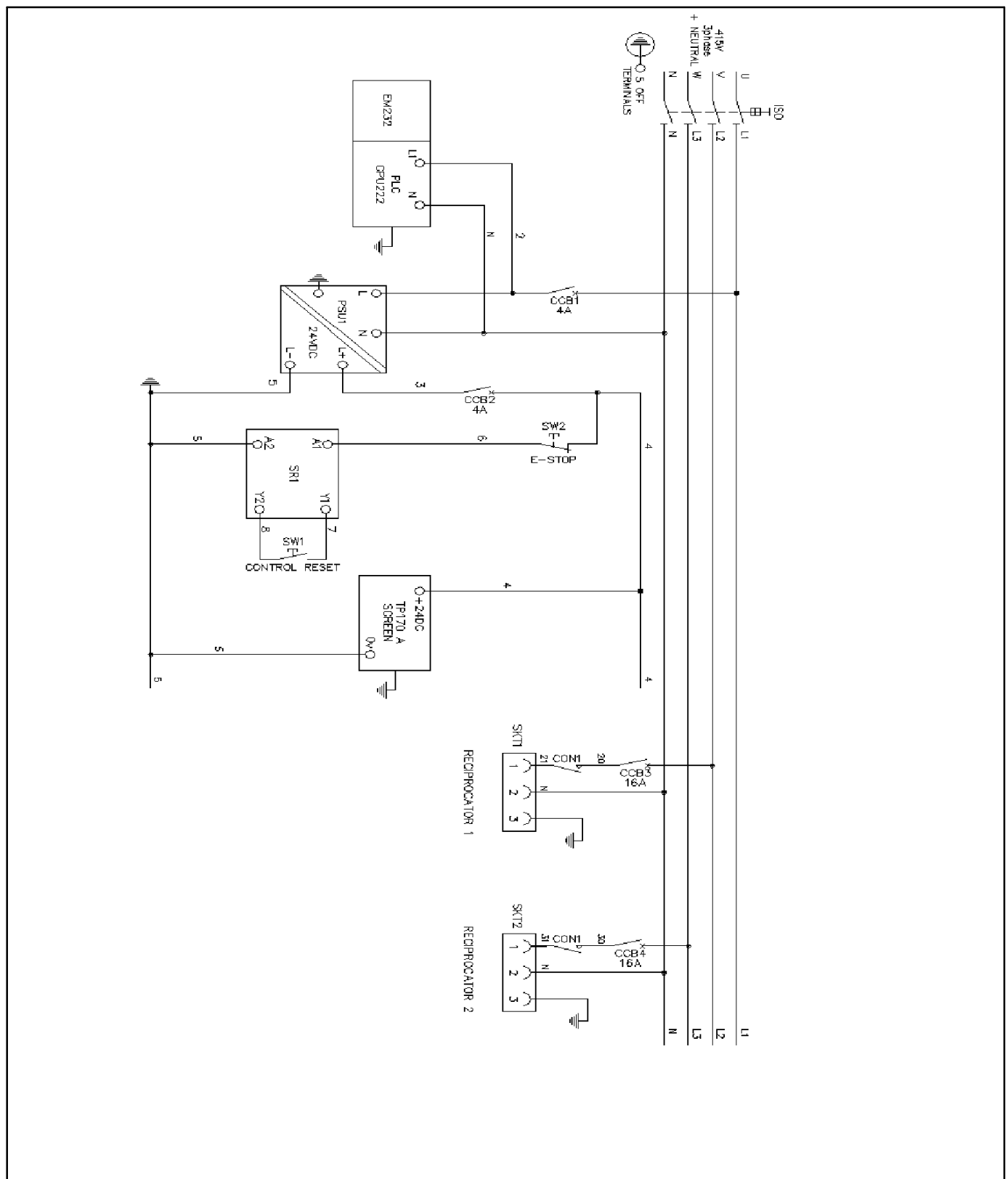


Fig. 8-1 Page 1

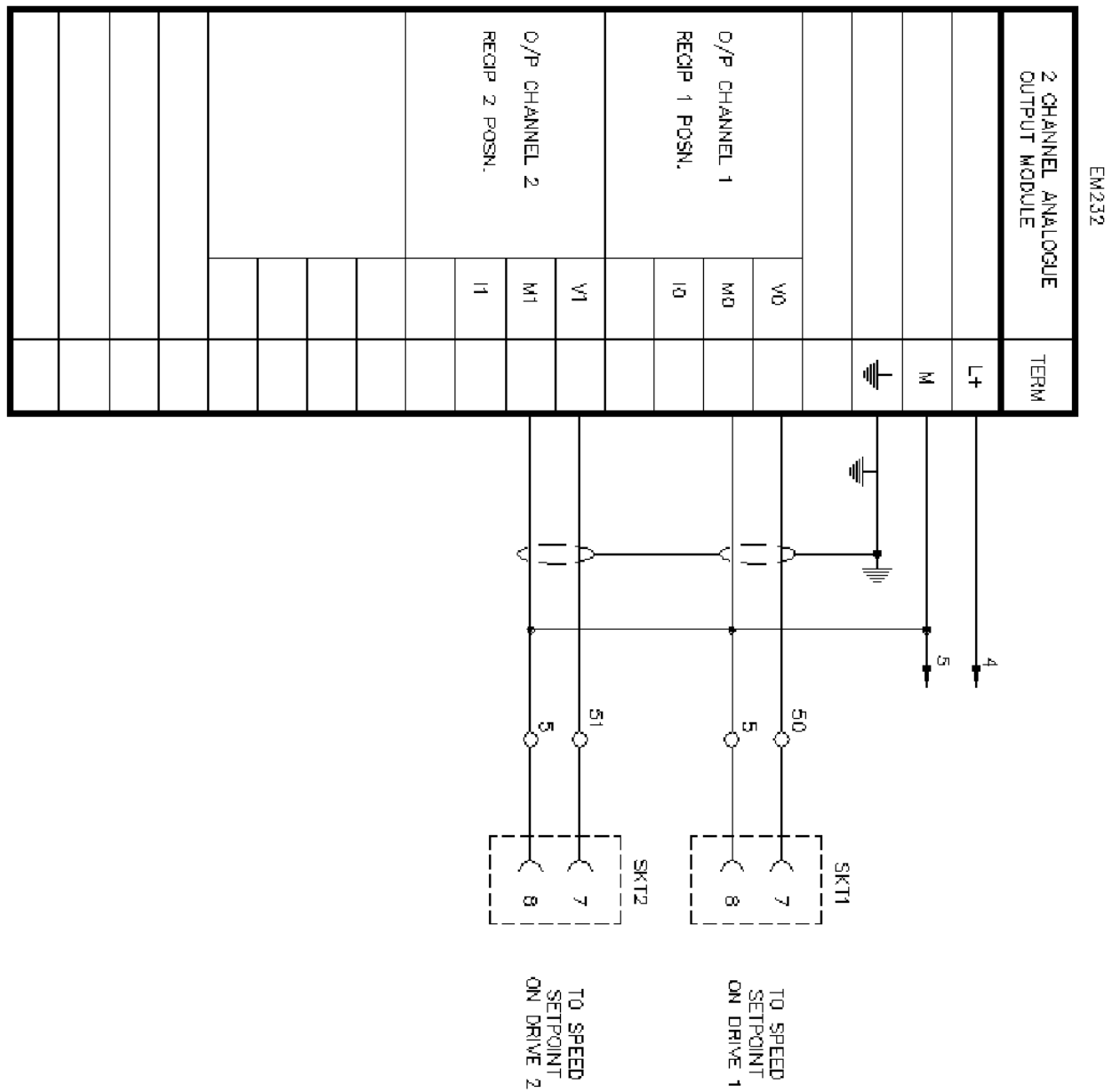


Fig. 8-2 Page 2

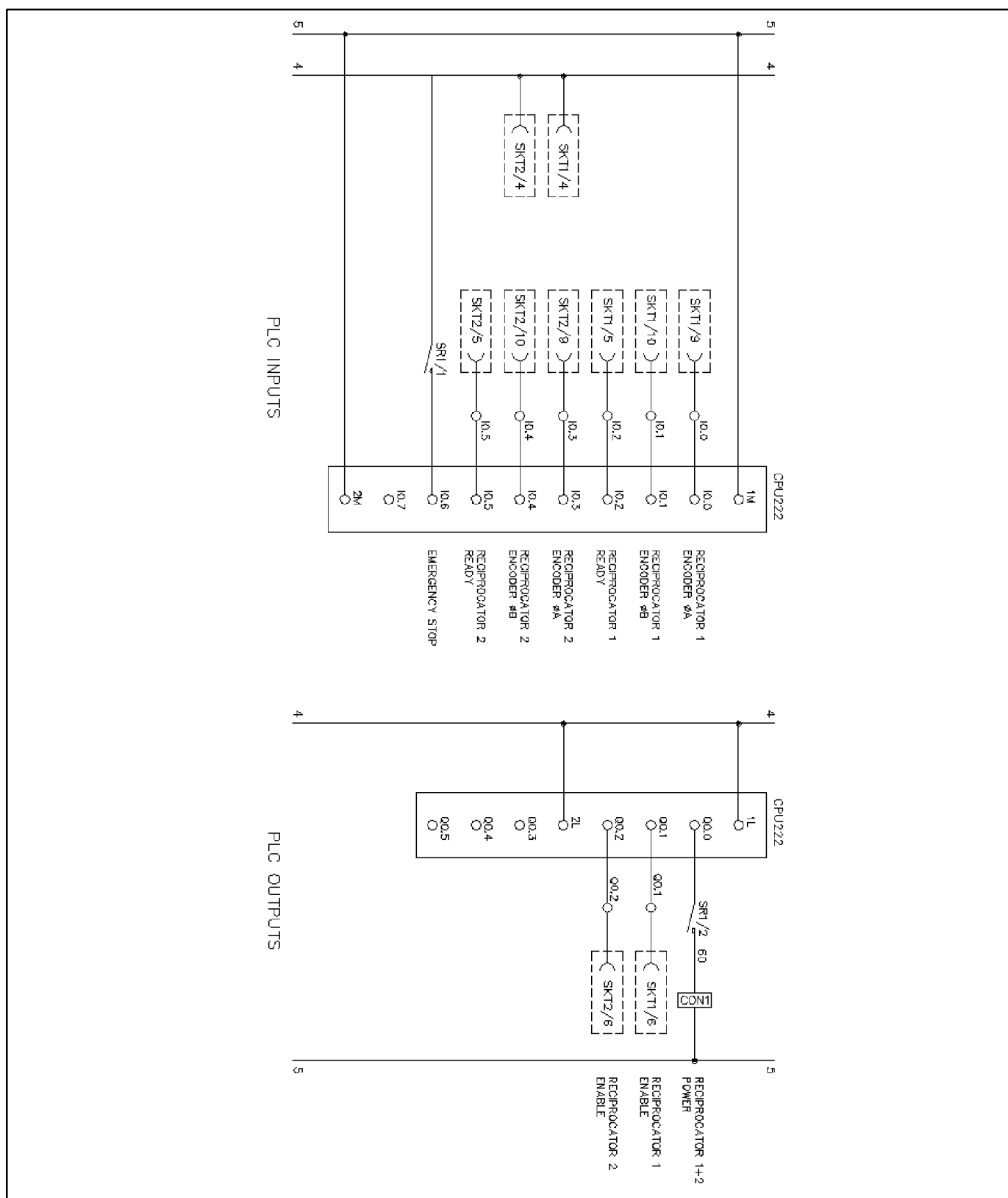


Fig. 8-3 Page 3

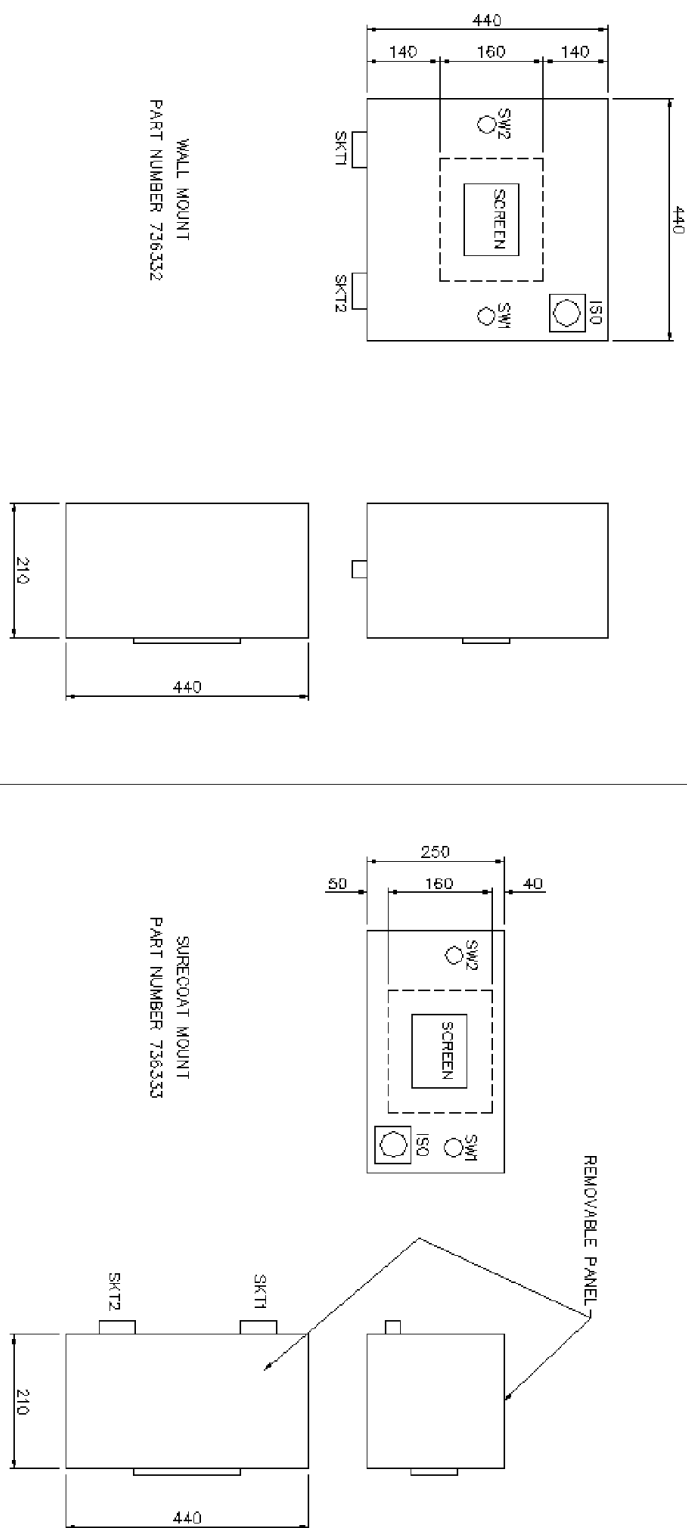


Fig. 8-4 Page 4

ITEM	DESCRIPTION	SUPPLIER	REFERENCE
COB1,2	CIRCUIT BREAKER – 4A		
COB3,4	CIRCUIT BREAKER – 16A		
PSU1	POWER SUPPLY UNIT – 24VDC, 4 AMP		
SRT	SAFETY RELAY	PLTZ	PN02 X1
CON1	CONTACTOR	KLOCKNER	DIL-EM10
ISO	4 POLE ISOLATOR		
SW1	SWITCH – PUSHBUTTON, N/O		
SW2	SWITCH – PUSHBUTTON, E–STOP		
PLC	PROGRAMMABLE LOGIC CONTROLLER – CPU222	SIEMENS	6ES7212-1BB21-0XB0
PLC	PROGRAMMABLE LOGIC CONTROLLER – EM232	SIEMENS	6ES7232-0BH21-0XA0
SCREEN	PLC SCREEN – TP170A	SIEMENS	6AV545-0BA5-2AX0
D1	DIODE, ZENER, 10V		IN5347B
C1,2	CAPACITOR, ELECTROLYTIC, 63V DC, 1uF		
R1	RESISTOR, 2200 OHMS, 0.5W		
R2,3	RESISTOR, 8200 OHMS, 0.5W		
SKT1,2	SOCKET, HARTING, 10 PIN		

HARTING SOCKET 1 PINOUT				HARTING SOCKET 2 PINOUT			
PIN		CABLE		PIN		CABLE	
1	–	21		1	–	31	
2	–	N1		2	–	N2	
3	–	PE		3	–	PE	
4	–	4		4	–	4	
5	–	10,2		5	–	10,5	
6	–	00,1		6	–	00,2	
7	–	50		7	–	51	
8	–	5		8	–	5	
9	–	10,0		9	–	10,3	
10	–	10,1		10	–	10,4	

SET ±10VDC I/P

SET ±10VDC I/P

Fig. 8-5 Page 5