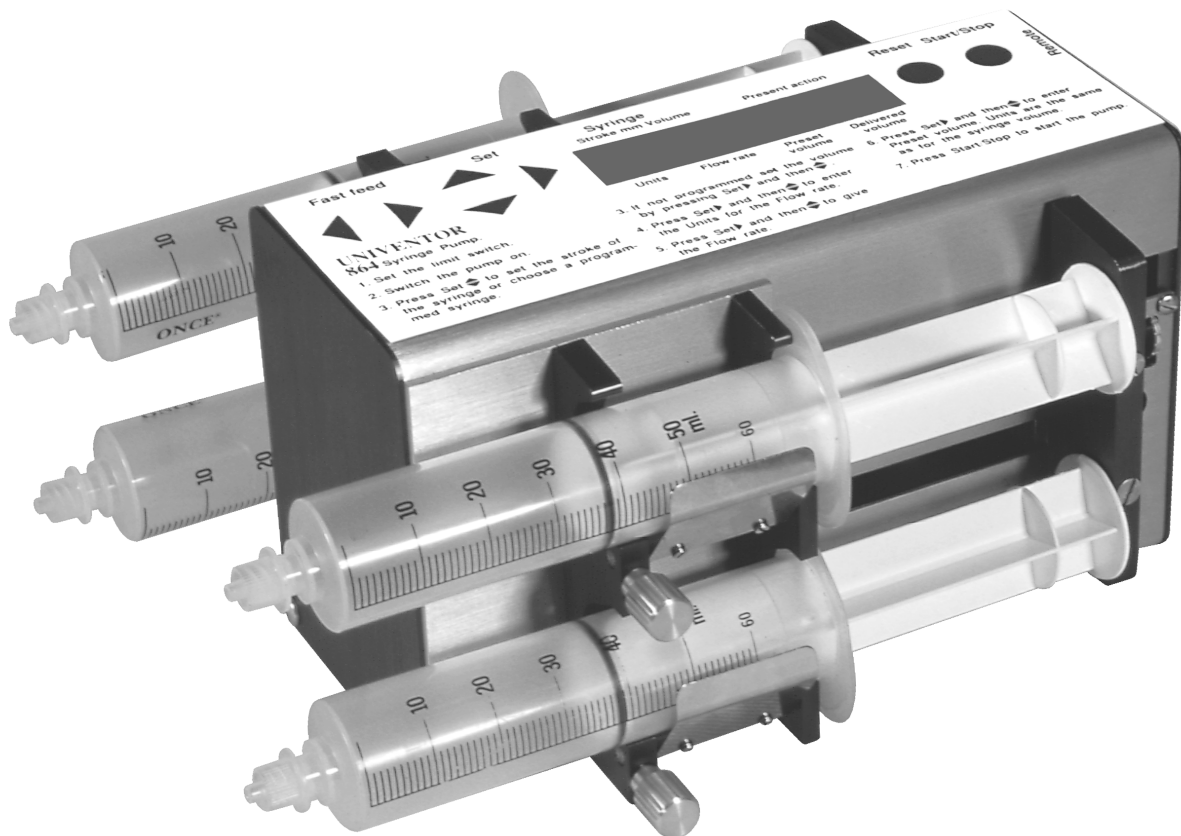


# THE UNIVENTOR 864 SYRINGE PUMP



# TABLE OF CONTENTS

## EDITION 5

### Section 1 - WARRANTY & SERVICE

1.1. WARRANTY	2
1.2. DAMAGED SHIPMENTS	2
1.3. SERVICE	2

### Section 2 - INTRODUCTION

2.1. INTRODUCTION	3
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### Section 3 - GENERAL

3.1. UNPACKING & INSTALLATION	4
3.2. POWER SUPPLY	4
3.3. CONTROL PANEL	4

### Section 4 - OPERATION

4.1. INSTRUCTIONS	5
4.2. REMOTE CONTROL CONNECTIONS	6
4.3. RS - 232 COMMANDS	7

### Section 5 - ROUTINE MAINTENANCE

5.1. CLEANING	8
5.2. STORAGE	8

Section 6 - SPECIFICATIONS	8
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Section 7 - ACCESSORIES & REPLACEMENT PARTS	9
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INDEX	10
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# **Section 1 - WARRANTY & SERVICE**

## **1.1. WARRANTY**

Univentor Ltd guarantees all components of the 864 Syringe Pump to be free from defects of material and workmanship for a period of two years after initial purchase. Univentor will repair or replace, at its discretion, all defective components during the aforementioned warranty period.

For warranty service or repair, all Univentor's products must be returned to Univentor or to an authorised Univentor representative. The client is responsible for shipping charges to Univentor.

The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by the client, unauthorised modification or misuse, operation outside of the environmental specifications for the product, or improper site preparation or maintenance.

For any product expressly covered under this warranty, Univentor is liable only to the extent of replacement or repair of the defective items. Univentor shall not be liable for any personal injury, property damage, or consequential damages of any kind whatsoever. The foregoing warranty is in lieu of all other warranties of merchant ability and fitness for a particular purpose.

## **1.2. DAMAGED SHIPMENTS**

Damage to any part of this instrument during shipping should be reported immediately to Univentor or an authorised representative. You must retain the original packing box and contents for inspection by the freight handler. Univentor will replace any new instrument damaged in shipping with an identical product as soon as possible after the claim filing date. Claims not filed within 30 days after the shipping date will be invalid. Do not return damaged goods to Univentor without first contacting Customer Service for a Return Authorisation Number (RA#). When a defective part is returned to Univentor, the RA# immediately identifies you as the sender, and describes the item being returned. Univentor refuses all unauthorised return shipments.

## **1.3. SERVICE**

Univentor has a skilled service staff available to solve any technical problem. For further details contact Univentor or Univentor's representative. Following discussion of your specific difficulties, an appropriate course of action will be described and the problem resolved accordingly. Do not return any products for service until a RETURN AUTHORISATION NUMBER (RA#) has been obtained. The RA# identifies you as the sender and describes in full detail the problems you have. Turnaround time for service can be quoted to you at the time your RA# is issued, although we can not determine the actual amount of service required until we have received your unit and diagnosed the problem. All correspondence and shipments should be sent to Univentor Ltd. or your Univentor representative.

## Section 2 - INTRODUCTION

### 2.1. INTRODUCTION

The Univentor 864 Syringe Pump is designed to be precise and reliable and offers a wide range of possibilities.

Flow rates are constant and pulse free from as low as 0.001  $\mu\text{l}/\text{min}$  up to 5 ml/min and any syringe within the clamping range of the chosen syringe holders may be used.

Should you have syringe holders for a total of 4 syringes of up to 50 ml, the Univentor Withdrawal Adaptor can be fitted to enable withdrawals as well as simultaneous infusions and withdrawals. With the Univentor Operational Software, the Syringe Pump can be programmed to start, stop, wait, change flow rate and to start or stop external instruments such as the Univentor Microsampler or valves.

A built-in computer makes the unit self-calibrating and takes care of all the calculations required to control flow rates and delivered volumes for different sizes and types of syringes.

For your convenience, the setting for the most common syringes are pre-programmed and readily available. You must, however, at all times set the limit switch to protect the syringes and the pump.

Operation requirements are abbreviated on the control panel, however, we recommend that you read this user's manual before starting the instrument.

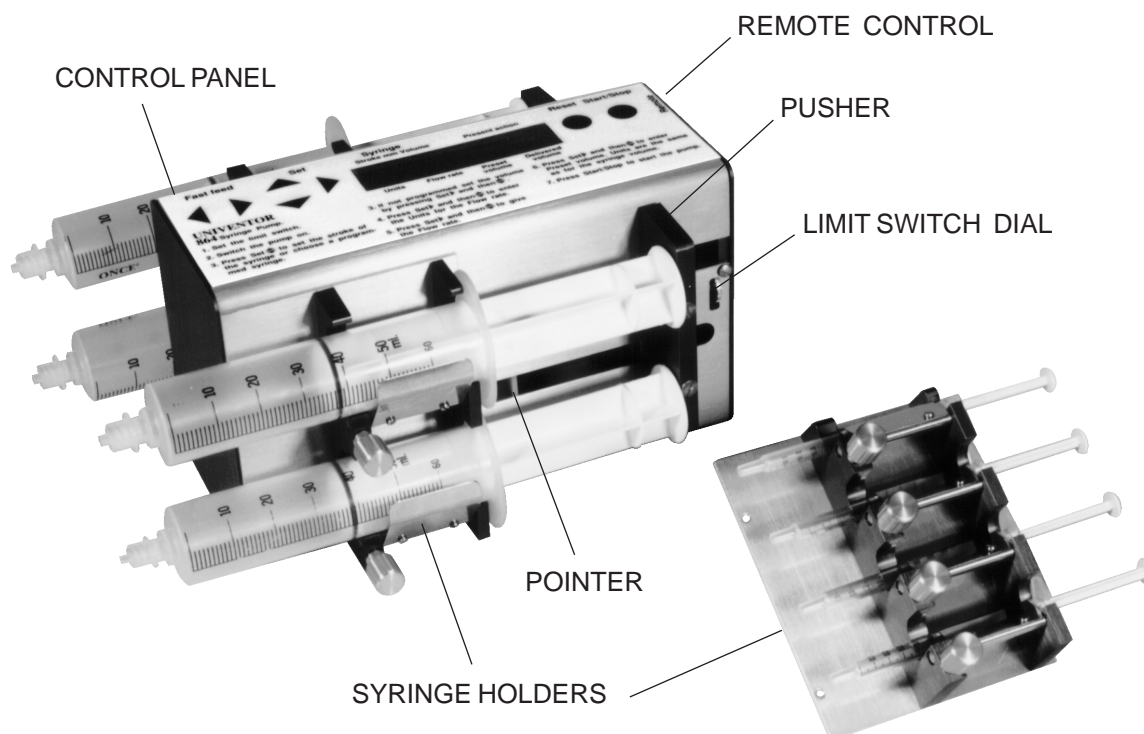


FIGURE 2.1. - The Univentor 864 Syringe Pump with Syringe Holders.

## Section 3 - GENERAL

### 3.1. UNPACKING AND INSTALLATION

Remove the instrument from the shipping container and inspect both the instrument and the package for any signs of damage. If any damage is noted, contact the freight handler immediately, see section 1.2.

Missing Items?

Carefully check the packing list against the contents of the shipping package. If anything appears to be missing, check the packing material very carefully for any overlooked items. If any items are missing, contact your Univentor representative immediately.

### 3.2. POWER SUPPLY

**MAINS** - Use an earthed wall plug and the adapter 2401100 supplied with the 864 Syringe Pump. The adapter can automatically handle input voltage in the range from 100 V AC to 240 V AC 50 to 60 Hz. The mains cable has an ON/OFF switch and a permanently fixed mains plug.

**BATTERY** - 12 V. Consumption: 400 mA.

### 3.3. CONTROL PANEL

The following functions, together with brief instructions, are located on the panel of the Univentor 864 Syringe Pump. (See Figure 4.1)

TEXT	FUNCTION
<b>Fast feed</b>	Switch for forward/reverse fast feed. The carriage moves to the desired position quickly.
<b>Set</b>	Press the right hand arrow to move the cursor for different settings. Press the up and down arrow to change the value where the cursor is.
<b>Syringe</b>	Stroke mm: Set the length of the stroke in mm. By pressing the up arrow, passing 90 mm, you can choose from the programmed syringes.  Volume: If you have chosen a programmed syringe the volume is set. If not, set the volume of the syringe in use.
<b>Units</b>	Select either µl/min or ml/hour as units for the flow rate.
<b>Flow rate</b>	The flow rate in µl/min or ml/hour.
<b>Preset</b>	Is used when a fixed volume should be delivered. When this function is used the pump will deliver the preset volume and then stop. The volume is displayed in the same units as used for the syringe volume.
<b>Delivered</b>	The volume delivered is continuously displayed in the same units as the syringe volume.
<b>Reset</b>	To reset the volume.
<b>Start/Stop</b>	Start/stop button.

## Section 4 - OPERATION

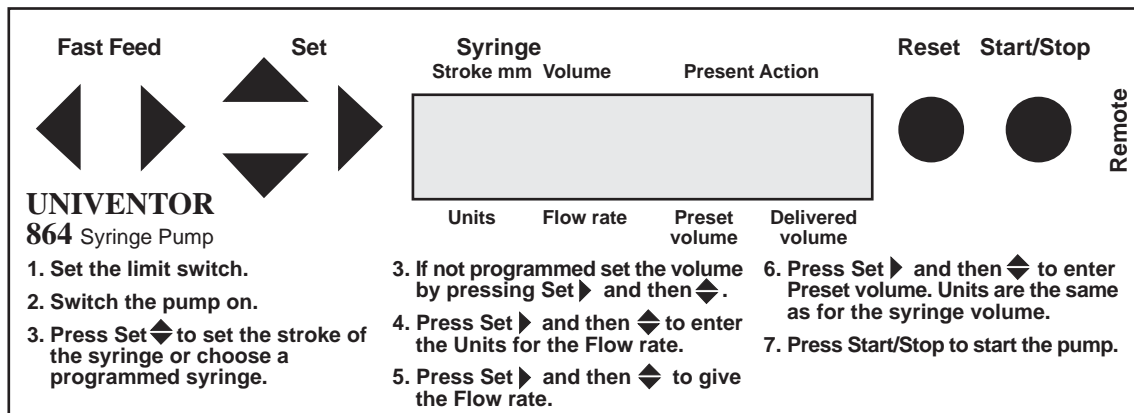


FIGURE 4.1. - The control panel of the Univentor 864 Syringe Pump.

### 4.1. INSTRUCTIONS

1. Connect the instrument to the mains using the AC adapter and switch it on.
2. Insert the syringes. Set the limit switch by turning the limit switch dial until the pointer is in the required stopping position.
3. Set the pusher to the start position by pressing the arrow buttons Fast feed on the control panel. For continuous movement of the pusher hold the required button down for a few seconds. Press the opposite button to stop the movement or the pusher will stop automatically when it reaches the rear end position or the front limit switch.
4. By using the Set arrows you move the cursor in the display window. Up, down or to the next setting.

5. Set the desired syringe or mm length of the syringe stroke. The most common syringes are programmed and will be shown after passing 90 mm in stroke length. Press Set to scroll through the syringe menu. Press Set to enter the required setting. If not using a programmed syringe set the stroke length in mm and the volume.

Syringe		Present Action	
Stroke mm	Volume		
85.5	500 ul	STANDBY	
ul/m	2.50	300	200
Units	Flow rate	Preset volume	Delivered volume

6. Move to Units by pressing Set . Select  $\mu\text{l}/\text{min}$  or  $\text{ml}/\text{hour}$  by pressing Set .
7. Press Set to move to Flow rate. Set the flow rate. Refer to Section 6.
8. Press Set to move to Preset volume. The volume to be injected is set by up/down arrows. The injected volume is shown on the display window continuously. The pump stops when it has reached the preset volume. The units will be the same as the syringe volume. For continuous injection leave the preset volume in the -SET- mode.
9. Press Start/Stop button to start the pump. Present action indicates the mode of the pump. The pusher moves forward forcing the plunger into the syringe at the preset flow rate. The delivered volume is continuously displayed in the window. For repeated injection press Reset and restart by pressing Start/stop button. This can be repeated until the entire syringe contents have been utilised.

10. OOR appears on the display to indicate that certain combinations of syringe size and flow rate are Out Of Range for the pump. E.g. 1000 ml/min with a 1.0 ml syringe. The pump will reject faulty values and OOR will be displayed until a different combination of syringe size or rate that is within the range is set.
11. SPIN - ERR appears on the display if the force of the pusher exceeds 200 N.
12. SELFTEST IN PROGRESS appears on the display when the calibration settings are being refreshed. If so, wait until completed.
12. The last settings are stored in the pump's memory. When the pump is switched on it will display the values last set.

## 4.2. REMOTE CONTROL CONNECTIONS

The Univentor 864 Syringe Pump can be controlled by a computer or terminal connected to the serial port on the pump. The pump is equipped with TTL logic and a built in RS-232 interface via the 15 pin connector at the rear. There is also a relay that can be operated through RS-232 to control equipment outside the pump e.g switches for light.

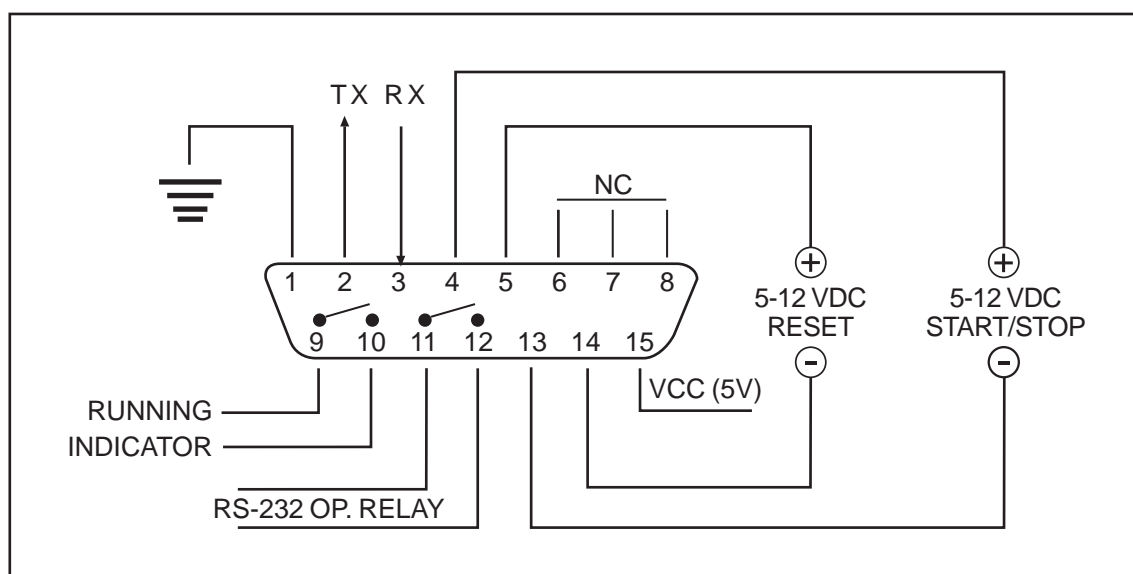


FIGURE 4.2. - DSUB Connector

PIN	FUNCTION
1, 2, 3	Used for RS-232 Computer Control.
4 - 13	START/STOP. Momentarily applying 5 -12 V DC between Pin 4 and Pin 13 will stop the pump if it is running or start the pump if stopped.
5 - 14	Momentarily applying 5 -12 V DC between Pin 5 and Pin 14 resets the volume.
6,7,8	NC.
9 - 10	RUNNING INDICATOR. Relay closed when the pump is running.
11 - 12	AUX. Relay operated via RS-232. These relays can handle maximum 12 V DC 300 mA
15	5 V DC supply current not more than 50 mA. Can be used as supply to Pin 4 and Pin 5 as well as supply for a LEED connected via the running indicator relay.

### 4.3. RS - 232 COMMANDS

When the 864 Syringe Pump is controlled from a computer 'remote' will be displayed as action in the display window.

COMMAND	FUNCTION	RESPONSE
KEY ↵	return to keyboard control.	
	The display will show the actual settings.	OK
SSM nn.n ↵	Set syringe stroke in mm.	OK, OR
SVU nnnnn, nnnn, nnn, nn ↵	Set syringe volume in µl.	OK, OR
SVM nn.n, n.n, n.nn ↵	Set syringe volume in ml.	OK, OR
ULM n, n.n, n.nn, n.nnn ↵	Set flow rate in µl/min.	OK, OR
MLH n.n, n.nn, n.nnnn, n.nnnn ↵	Set flow rate in ml/hour.	OK, OR
PRV n.nnn, nn.nn, nnn.n ↵	Set preset volume.	OK, OR
	When stopped by PRV	OK
CLP ↵	Clear preset volume accumulator.	
CLV ↵	Clear volume accumulator.	OK
RUN ↵ (STP to stop)	Start forward.	EP, ES
RUM ↵ (STP to stop)	Start forward.	OK, EP, ES
REV ↵ (STP to stop)	Start reverse.	EP, ES
REW ↵ (STP to stop)	Start reverse.	OK, EP, ES
FFF ↵ (STP to stop)	Fast feed forward.	EP
FRF ↵ (STP to stop)	Fast run forward.	OK, EP
FFB ↵ (STP to stop)	Fast feed backward.	EP
FRB ↵ (STP to stop)	Fast run backward.	OK, EP
RBC ↵	Relay closed.	OK
RBO ↵	Relay open.	OK
STP ↵	Stop.	OK
SSS ↵	Send syringe stroke mm.	nn.n
SSV ↵	Send syringe volume in µl.	nnnnn
SFU ↵	Send flow rate units.	µl/m, ml/h
SFR ↵	Send flow rate.	nnnn, n.nnn, nn.nn, nnn.n
SAV ↵	Send accumulated volume.	n.nnn, nn, nn, nnn.n
SPV ↵	Send preset volume.	nn.nn µl, nnn.n µl n.nnn ml, nn.nn ml
	continuous (not set)	CON
RBQ ↵	Send relay status.	OP. CL
VER ↵	Send version number.	RS-232 Shell ver. number
DBM ↵	Toggle debug mode on/off (Def. OFF).	ON/OFF
ECH ↵	Toggle echo on/off (Def. OFF).	OK

## Section 5 - ROUTINE MAINTENANCE

### 5.1. CLEANING THE INSTRUMENT

Keep your Univentor 864 Syringe pump clean. Wipe off any spillage using a soft cloth with mild detergent. Do not use alcohol or any other solvent.

### 5.2. STORAGE

If the Univentor 864 Syringe Pump is not to be used for a significant length of time, it is recommended to clean the instrument and store it safely in the shipping carton.

## Section 6 - SPECIFICATIONS

Power	ADAPTER: 100 - 240 V AC 50 - 60 Hz.  BATTERY: 12 V 400 mA.
Dimensions	270(W) x 150(D) x 130(H) mm.
Weight	3 kg.
Shipping weight	4 kg.
Drive motor	DC motor with variable speed setting. Preset speed is controlled via an automatic closed loop speed control.
Fast feed	Pusher movement of 70 mm/min both forwards and backwards.
Syringes	1 - 8 syringes with stroke length from 40 mm to 90 mm and O.D. from 6 mm to 32 mm.
Preset volume	1/1000 of syringe volume.
Min. pusher travel rate	0.006 mm/min.
Max. pusher travel rate	6 mm/min.
Max. pusher force	200 N.
Pusher movement accuracy	+ / - 0.01 mm or + / - 1% of total distance.
Min. flow rate	$\mu\text{L}/\text{min} = \frac{0.006 \times \text{syringe volume in } \mu\text{L}}{\text{syringe stroke in mm}}$ $\text{mL}/\text{hr} = \frac{0.36 \times \text{syringe volume in mL}}{\text{syringe stroke in mm}}$
Max. flow rate	$\mu\text{L}/\text{min} = \frac{6 \times \text{syringe volume in } \mu\text{L}}{\text{syringe stroke in mm}}$ $\text{mL}/\text{hr} = \frac{360 \times \text{syringe volume in mL}}{\text{syringe stroke in mm}}$
Display	2 x 20 characters.

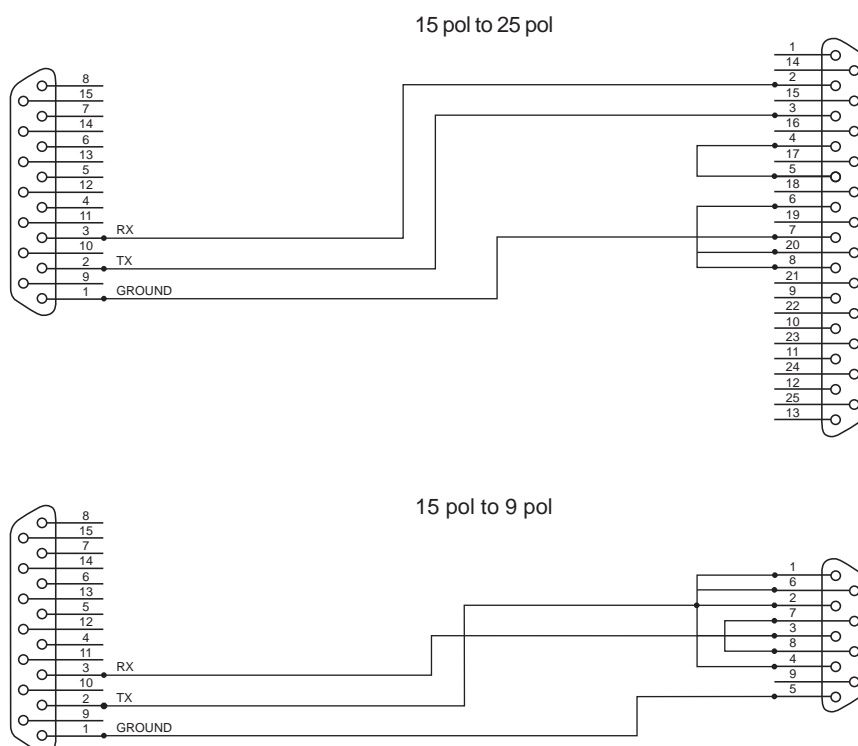
## Section 7

# ACCESSORIES & REPLACEMENT PARTS

### ORDERING INFORMATION

CAT. No.	DESCRIPTION
8301001	Univentor 864 with syringe holders for 4 syringes up to 50 ml.
8301002	Univentor 864 with syringe holders for 6 syringes up to 10 ml.
8301003	Univentor 864 with syringe holders for 8 syringes up to 2.5 ml.
8301864	Univentor 864 Operational Software
8401205	Univentor Withdrawal Adaptor
8401420	Univentor Foot Pedal
2401020	Syringe holders for 2 syringes up to 50 ml. - Front
2401021	Syringe holders for 2 syringes up to 50 ml. - Back
2401027	Syringe holders for 3 syringes up to 10 ml. - Front
2401028	Syringe holders for 3 syringes up to 10 ml. - Back
2401025	Syringe holders for 4 syringes up to 2.5 ml. - Front
2401026	Syringe holders for 4 syringes up to 2.5 ml. - Back
2401090	Communication cable for RS-232 control of the 802/864 Syringe Pump with 15 to 25 pol.
2401091	Communication cable for RS-232 control of the 802/864 Syringe Pump with 15 to 9 pol.
2401092	Communication cable for RS-232 control of the 810/820 Microsampler and the 802/864 Syringe Pump with 15+15 to 9 pol.
7251001	Power Supply adaptor

FIGURE 7.1. - RS - 232 Communication Cable



# INDEX

ACCESSORIES.....	9
CLEANING THE INSTRUMENT.....	8
COMPUTER CONTROLLED.....	7
CONTROL PANEL.....	5
DAMAGED SHIPMENTS.....	2
DISPLAY WINDOW.....	5
FLOW RATE SETTING.....	5
INSERTING SYRINGES.....	4
LIMIT SWITCH.....	5
MAINTENANCE AND STORAGE.....	8
OPTIONAL ACCESSORIES.....	9
OPERATING INSTRUCTIONS.....	5
OUT OF RANGE, OOR.....	6
PACKING LIST.....	4
POWER SUPPLY.....	4
REMOTE CONTROL CONNECTIONS.....	6
RESET.....	6
RS - 232 CABLE.....	9
RS - 232 COMMANDS.....	7
SERVICE.....	2
SETTING SYRINGE SIZE.....	5
SPIN ERR.....	6
START/STOP.....	5
SYRINGE SIZES.....	3
SPECIFICATIONS.....	8
UNPACKING AND INSTALLATION.....	4
WARRANTY.....	2



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