8856

STRIP PRINTER

Technical Manual

TM008856 I02

INTRODUCTION

This publication is provided solely as a guide for individuals who have received technical training in servicing METTLER TOLEDO products.

Information regarding technical training may be obtained by writing to:

METTLER TOLEDO Training Center
P.O. Box 1705
Columbus, Ohio 43216
(614) 438-4400

FCC COMPLIANCE STATEMENT

WARNING: This equipment has been tested and found to comply with the limits of the United States of America FCC rules for a Class A digital device, pursuant to Subpart J of Part 15 of the FCC Rules and the Radio Interference Regulations of the Canadian Department of Communications. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna
- Relocate the printer with respect to the receiver
- Plug the printer into a different outlet so that the printer and receiver are on different circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful, it is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00450-7.

"Television Interference Handbook."

WARNING

The connection of a non-shielded printer interface cable to this printer will invalidate the FCC Certification of this device and may cause interference levels which may exceed the limits established by the FCC for this equipment.

IMPORTANT!

The correct part number MUST BE used when ordering parts. Parts orders are machine processed, using only the part number and quantity as shown on the order. Orders are not edited to determine if the part number and description agree.

METTLER TOLEDO RESERVES THE RIGHT TO MAKE REFINEMENTS OR CHANGES WITHOUT NOTICE.

Copyright© 1994 by Mettler-Toledo, Inc.

Worthington, Ohio, USA

TABLE OF CONTENTS

1.

GENERAL DESCRIPTION

The Model 8856 is a compact, 7-pin, dot matrix, impact printer designed to print alphanumeric data on 76 mm (3") wide continuous roll paper. The Model 8856 printer is compatible with the Mettler Toledo Models ID1S, ID2SX, ID5, 1938, 2038, 2138, 3026, 3027, 3036, 8140, M5000 M8141, 8142, 8146, 8510, 8520, 8522, 8525, 8530 Indicators and the Models 8571, 8572, 8581, 8582 Counting Scales and the Model 9360 Scale Terminal. Some of the features of the 8856 include:

1.1. Standard Features

- The 8856 provides an RS-232C serial interface with switch selectable baud rate, 7 or 8 data bits, and even, odd or no parity bit with 1 or 2 stop bits. The serial interface includes hardware handshaking or <XON> <XOFF> for a full buffer.
- The 8856 can print up to 42, 1.3 mm wide by 2.9 mm high, characters per line.
- An ASCII Shift Out <SO> character selects double width characters, 2.6 mm wide by 2.9 mm high. The 8856 can print up to 21 double width characters per line. An ASCII Shift In <SI> or Carriage Return <CR> returns to printing the standard character size.
- The 8856 supplies eight, switch selectable international character fonts.
- Printing speed is approximately 2 lines per second.
- Maximum printed width of 210 dots, 66.3 mm (2.61").
- Line spacing defaults to 4.23 mm (0.06"). Line spacing is set by control code.
- The 8856 accepts escape sequences to select font size and line spacing modes.
- The 8856 provides a 1024 byte print buffer. New data is accepted during printing.
- A low paper stock sensor inhibits printing when the 8856 is low on paper. The Paper Low LED is lit to indicate a low stock condition.
- Error conditions are indicated by a flashing On Line stock light.
- Internal self tests are performed at power up to detect hardware malfunctions.
- A test mode is available to print the programming switch settings and to test operation of the printer.
- The 8856 requires both a <CR> character and <LF> character at the end of a line to indicate a print.
- The 8856 provides a printing signal to indicate the print head is in motion.

1.2. Optional Features

- The optional wall mount KOP, 0901-0325, permits mounting the 8856 to a vertical surface.
- The optional 20 mA current loop interface, 0964-0065, permits the 8856 to be used with active transmit, 20 mA current loop devices.

1.3. Expendable Items

Ink Ribbon Cartridge: The 8856 uses a continuously inked ribbon material in a permanently sealed, plastic, disposable cartridge. Ribbon life is determined by number of prints, type of ticket and environmental conditions.

Print Media: The paper roll size is 76 mm (±0.5 mm) wide, 83 mm outside diameter, 12 mm (±1 mm) core inside diameter. Max paper thickness is 0.2 mm total thickness or less. Refer to Section 2.4. for further paper specifications.

1.4. Technical Manual Reference

MODEL	TECHNICAL MANUAL	MODEL	TECHNICAL MANUAL
1938	TM001938IXX	8520	TM008520IXX
2038	TM002038IXX	8522	TM008522IXX
2138	TM002138IXX	8525	TM008525IXX
3026	TM003026IXX	8530	TM008530IXX
3027	TM003027IXX	8571	TM008571IXX
3036	TM003036IXX	8572	TM008572IXX
8140	TM008140IXX	8581	TM008581IXX
M5000	MV300602	8582	TM008582IXX
M8141	OI00M8141IXX	9360	TM009360IXX
8142	TM008142IXX	ID1S	MP709012
8146	TM008146IXX	ID2SX	ME703620b-T
8510	TMPM8510IXX	ID5	ME702818

Tabel 1.4 Technical Manual Reference

Note: XX denotes revision number

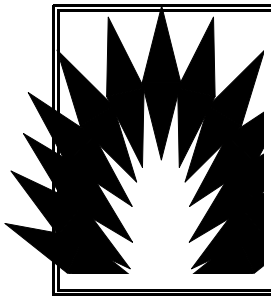
2. SPECIFICATIONS

2.1. Environment

Operating temperature for the 8856 is from 5 to 40 °C (41 to 104 °F) at 30 to 85% relative humidity, noncondensing (excluding paper and ribbon).

Storage temperature for the 8856 is from -20 to 50 °C (-4 to 122 °F) at 30 to 90% relative humidity, noncondensing (excluding paper and ribbon).

The 8856 **MUST NOT** be used in wet or extremely dusty environments.



DANGER

The 8856 Printer IS NOT intrinsically safe! The 8856 Printer MUST NOT be used in areas classified as HAZARDOUS by the National Electric Code (NEC) because of combustible or explosive atmospheres.

2.2. Power Requirements

Factory Number	Operating Voltage	Line Frequency	Power	
			Idle	Active
8856-000X	120 VAC (-15%, +10%)	60 (± 1 Hz)	10 W	30 W
8856-001X	220/240 VAC (-15%, +10%)	50/60 Hz	10 W	30 W

Table 2.2 Power Requirements

2.3. Standards Compliance

The power supply used with the Model 8856-000X is listed with UL to meet specifications 114, Office Appliances and Equipment.

The power supply used with the Model 8856-000X is certified by CSA to meet standard C22.2 No. 143-1975, Office Machines.

The Model 8856 meets or exceed the FCC Class A and Canadian Class A requirements for radiated and conducted emissions.

2.4. Paper Specifications

The paper roll size is: 76 mm (±0.5 mm) wide, 83 mm outside diameter, 12 mm (±1 mm) core inside diameter.

Paper can be of three different types: one-part, 2-part carbonless or 3-part carbonless.

Copy capacity and paper thickness: One-part paper thickness 0.06 to 0.085 mm, weight 52.3 to 64 g/m^2. Multi-part carbonless (maximum 1 original plus 2 copies) thickness 0.05 to 0.08 mm/sheet, 0.2 mm or less total thickness.

CAUTION
Do not use paper rolls that are narrower than 76 mm (3") wide. Do not use multi-part paper with more than one original and two carbonless copies. Damage to the print head may result if these warnings are ignored.

2.5. Appearance and Dimensions

The Model 8856 is housed in a two-piece, molded plastic enclosure with removable front and rear covers. The removable front cover permits access to the ink ribbon, the rear cover permits access to the paper roll. The enclosure is 107 mm (4.21") high, 184 mm (7.24") wide and 229 mm (9.02") deep. Printer weight (excluding paper and ribbon) is 2 kg (4.4 lb), AC power adapter weight is 1.30 kg (2.87 lb). Shipping weight is 3.6 kg (8 lb).

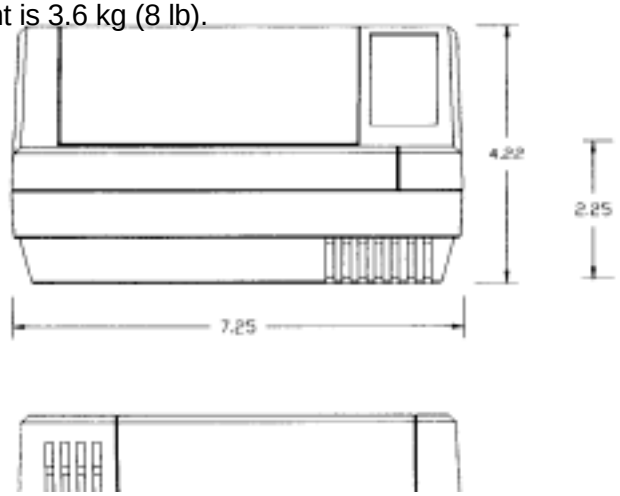


Figure 2.5 -1 Front View

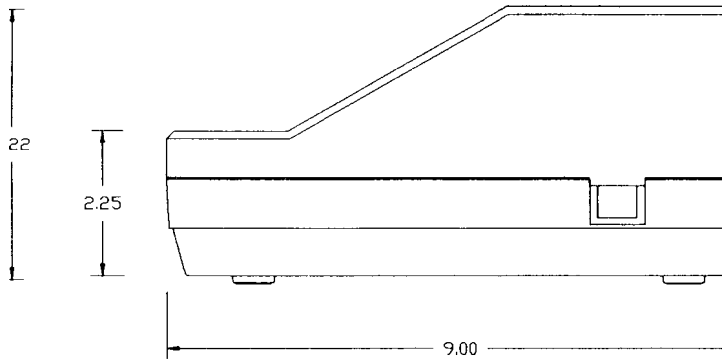
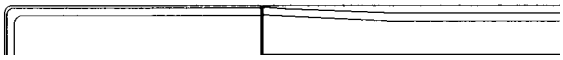


Figure 2.5 -2 Side View



3. INSTALLATION AND OPERATION

Read this section before installing your printer.

3.1. Unpacking

Inspect the shipping container and printer for loose or damaged parts. If any damage is found, immediately notify the freight carrier.

As your unpack the printer, check that you have the parts shown below.

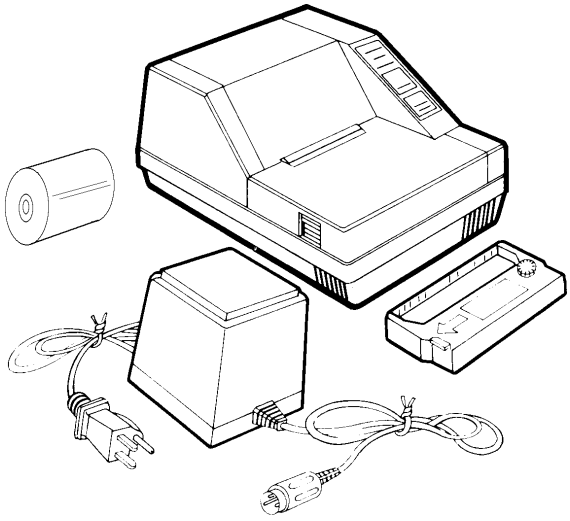


Figure 3.1 Parts Shipped

After unpacking the printer, store the packaging materials for future use.

Note: The power supply for the 8856-001X does not include a power cord.
The paper roll is shipped inside the printer.

To use the printer, you will need to install the ink ribbon cartridge, connect the power supply to the printer, install the roll of paper, and connect the printer to the scale or computer. The following sections explain how this can be done.

WARNING
Do not operate the printer without an ink ribbon cartridge and paper roll installed as damage to the print head may result.

3.2. Install the Ink Ribbon Cartridge

The ink ribbon cartridge is stored separately so that it remains fresh until you are ready to use the printer. Follow these steps to install the ribbon cartridge:

Depress the front printer cover release and lift off the cover.

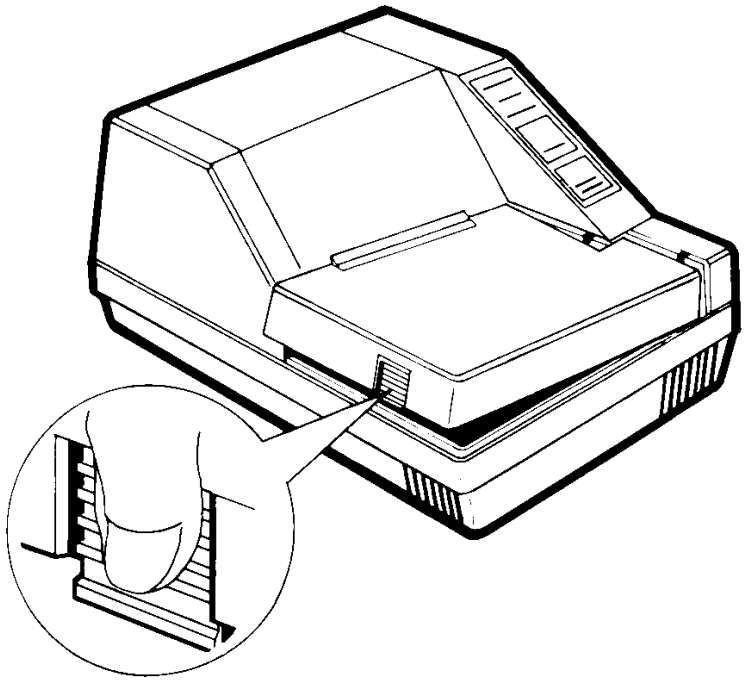


Figure 3.2 - 1 Removing Front Cover

Remove the ribbon cartridge from its box and remove the plastic wrapper.

Turn the ribbon tightening knob in the direction of the arrow. This removes slack in the ribbon and makes it easier to install.

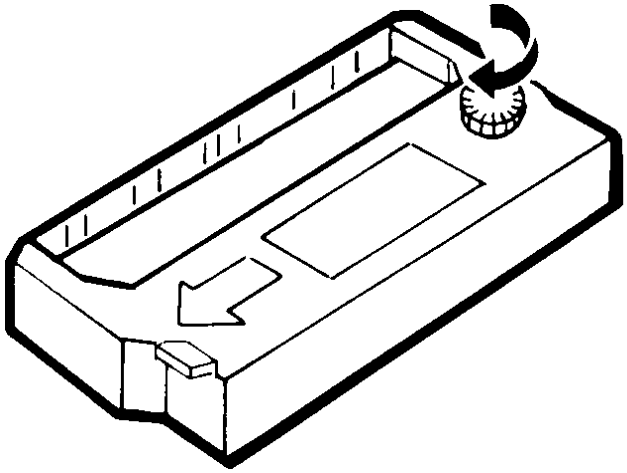


Figure 3.2 - 2 Tensioning Ink Ribbon Cartridge

Grasp the cartridge with thumb and forefinger, and push it firmly down into position making sure that the ribbon enters the slot between the print head and paper. The cartridge should click securely into position with moderate pressure.

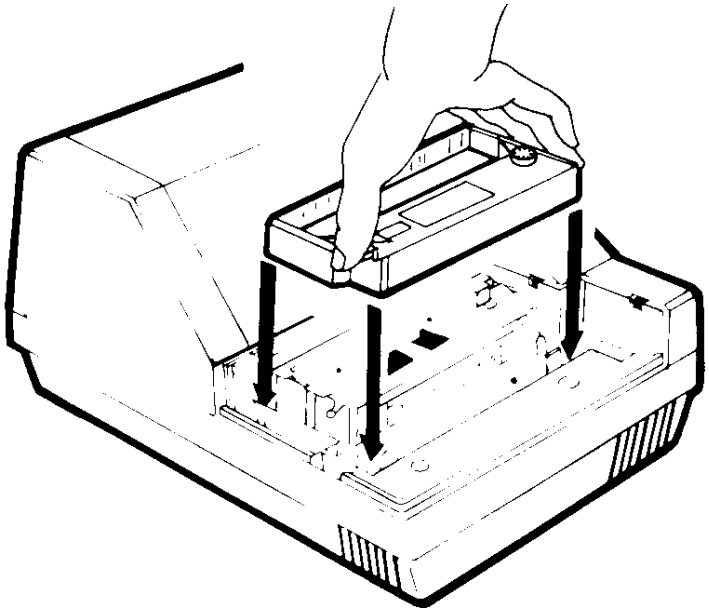


Figure 3.2 - 3 Installing Ink Ribbon Cartridge

Press firmly at the center of the cartridge to ensure that it is engaged.

Replace the cover by inserting the cover tabs into their slots. Then press the release end of the cover firmly down until the cover clicks securely into place.

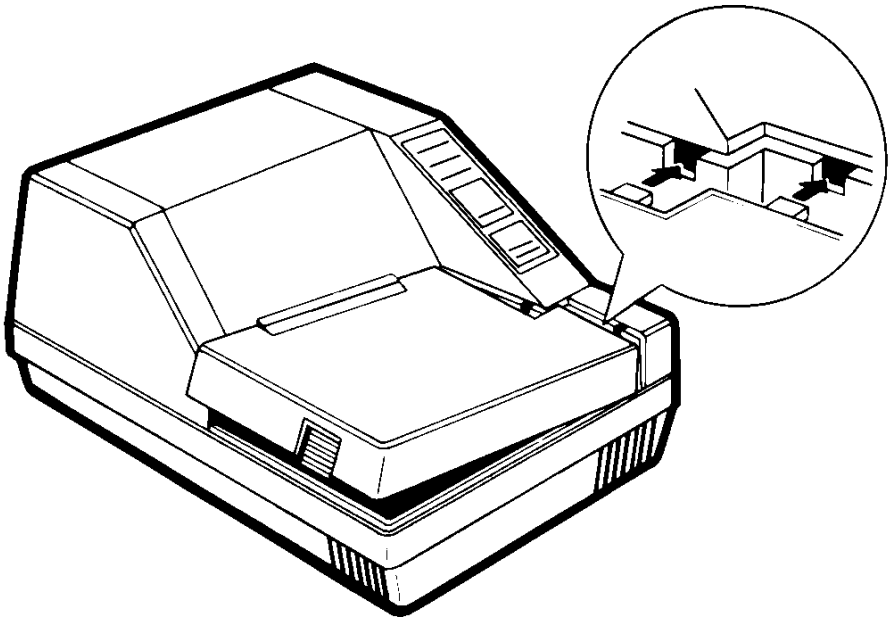


Figure 3.2 - 4 Reinstalling Front Cover

3.3. Connect the AC Power Supply

Place the rocker switch located at the side of the printer in the OFF position.

Remove the twist fasteners from the power supply cable and plug the round DIN connector securely into the round receptacle at the rear of the printer. **DO NOT FORCE the connector!** It can fit only one way, notch up.

Plug the power cable into a properly grounded electrical outlet. See Section 2.2 for power specifications.

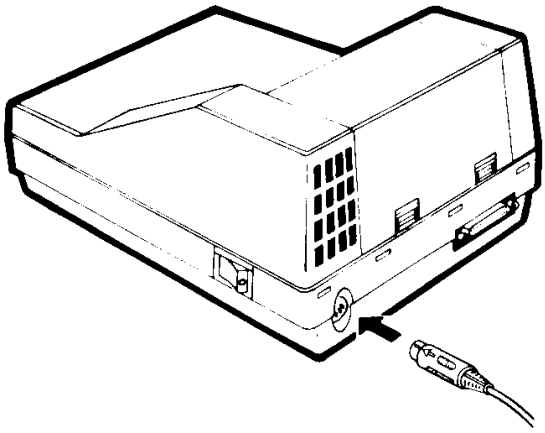


Figure 3.3 Connect Power Cable

3.4. Turn the Power ON

Place the rocker switch located at the side of the printer in the ON position. The **POWER**, **READY**, and **PAPER LOW** lights come on briefly.

3.5. Install the Paper Roll

To install the paper roll it is necessary to remove the paper tray cover, insert the axle through the new roll, place the new roll in the tray, advance the paper through the printer and then replace the paper tray cover.

Note: A roll of paper is supplied with the 8856 printer. Additional rolls may be purchased separately by ordering Mettler Toledo part number 14099200A. Refer to Section 2.4. for paper specifications.

CAUTION
Do not use paper rolls that are narrower than 76 mm (3") wide. Do not use multi-part paper with more than one original and two carbonless copies. Damage to the print head may result if these warnings are ignored.

Remove the tray cover and axle by depressing the two paper tray cover releases at the rear of the printer, and lifting off the cover.

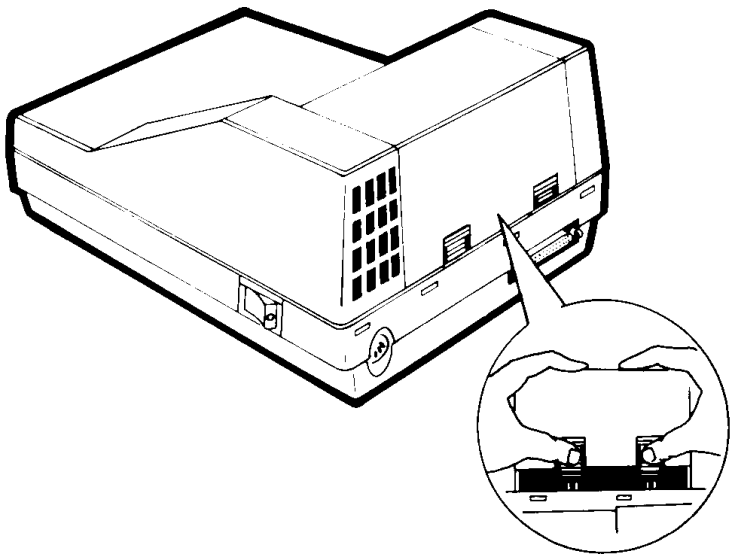


Figure 3.5 - 1 Removing Paper Tray Cover

Remove the paper axle from the printer, if you are replacing an expended paper roll then discard the spent paper roll core.

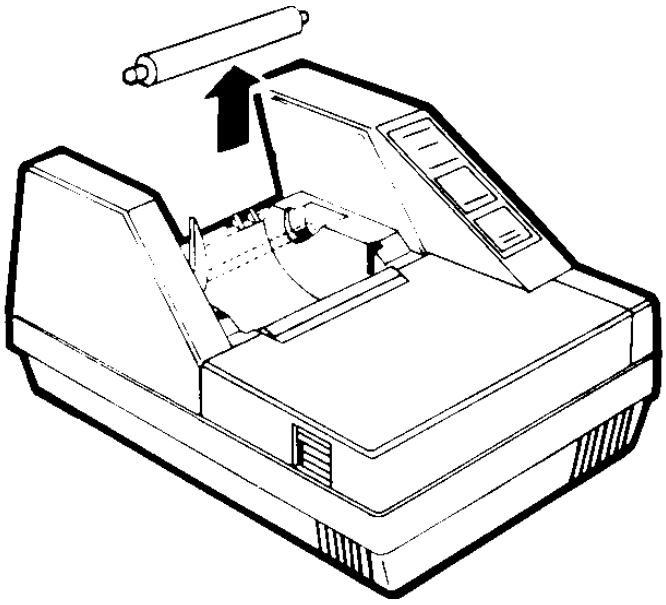


Figure 3.5 - 2 Removing Paper Axle

Insert the axle through the new paper roll core. Make sure the end of the paper is straight, not crumpled or folded. Lower the roll into the paper tray so that the axle ends slide into their retaining slots.

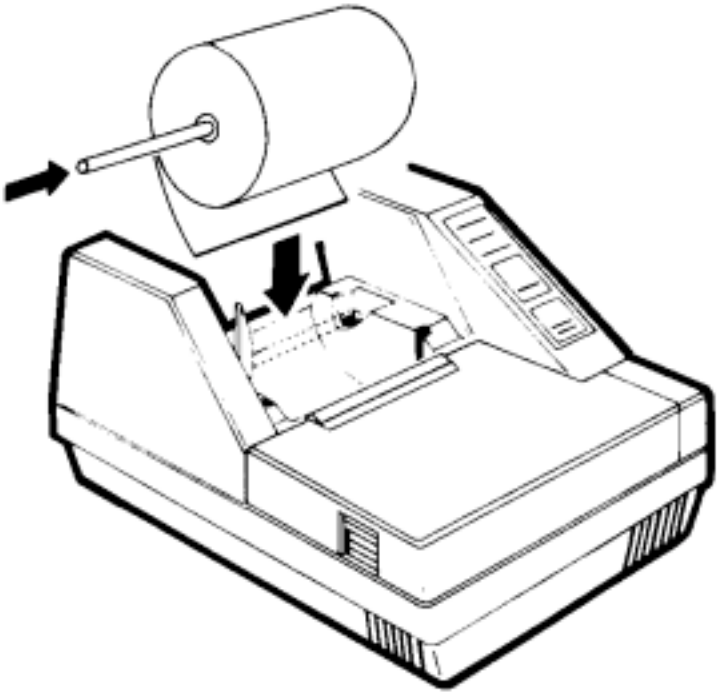


Figure 3.5 - 3 Installing Paper Roll

Note: A sensor arm presses against the left side of the roll. When the roll is loaded, the **PAPER LOW** light goes out.

Manually rotate the roll while feeding the paper under the metal guide about 25.4 mm (1.00"), until it can go no farther.

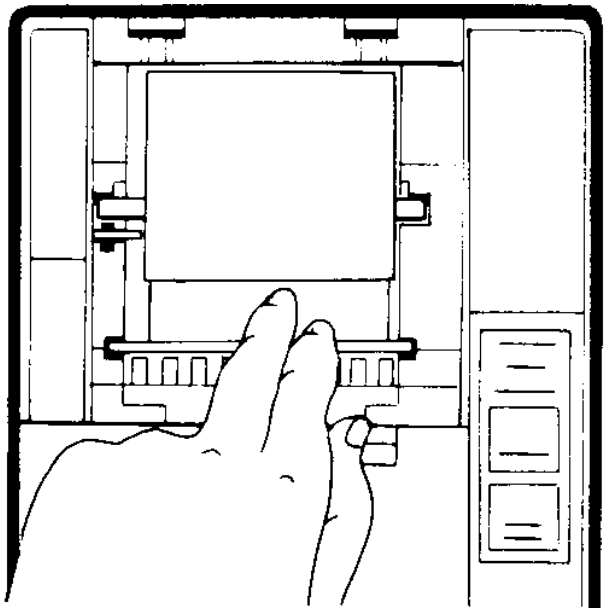


Figure 3.5 - 4 Threading Paper

3.6. Advance the Paper

Press and hold the **LINE FEED** key until about 25 mm (1") of paper advances out of the printer.

The 8856 must be on-line in order to print. Make certain the **READY** light is on indicating the printer is on-line.

Note: Press the **ON LINE** key to toggle the **READY** light.

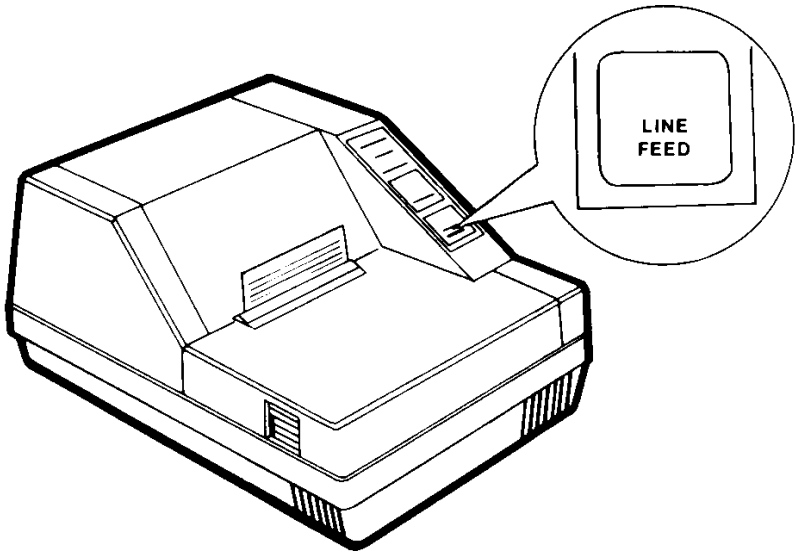


Figure 3.6 - 1 Place Printer On-Line

Replace the rear paper tray cover by inserting the front tab into its retainers near the paper tear-off bar. Press the rear (release end) of the cover firmly down until the cover clicks into place.

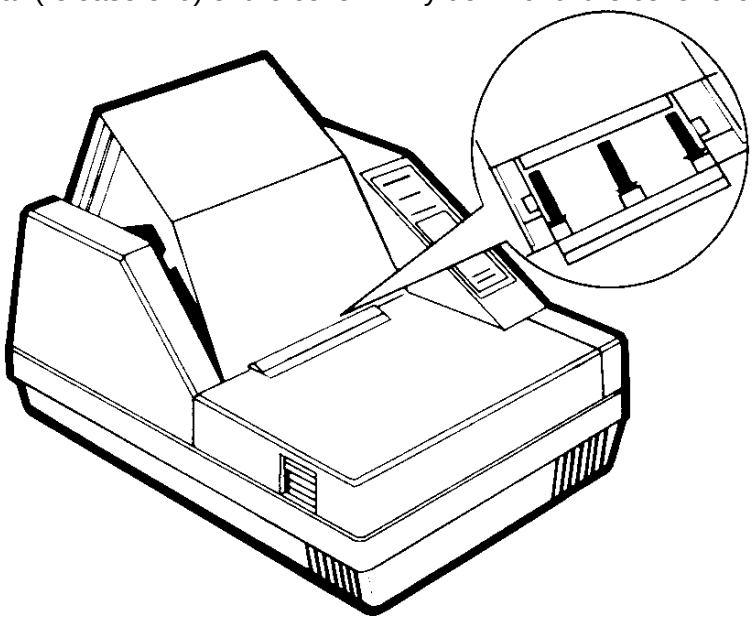


Figure 3.6 - 2 Replacing Rear Paper Cover

3.7. Tearing off the Printed Portion

A clear paper tear bar is built into the printer cover. To tear off a printout, pull one edge against the tear bar.

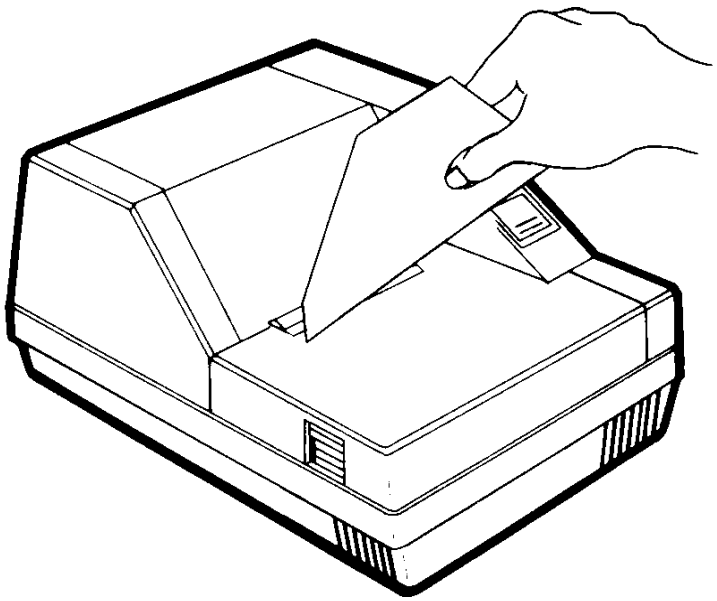


Figure 3.7 Tearing Off the Printed Portion

3.8. Clearing Paper from the Printer

At the end of a roll, if paper is left in the printer mechanism, tear off the paper at the roll and use the **LINE FEED** key to advance it out of the printer.

If the printer jams during use, do the following:

- Turn the printer power off.
- Try to remove the ribbon cartridge. If the ribbon fabric is stuck in the printer mechanism, it should not be forced: put the cartridge back, and contact your authorized Mettler Toledo representative.
- Proceed only if the cartridge was successfully removed. Lift off the paper tray cover and attempt to pull the paper backwards out of the mechanism by rotating the paper roll backwards. This should require only light pressure. Do not use excessive force.

3.9. Using the Control Panel

The control panel consists of a two position, tactile keyboard that let you control the printer and three indicator LEDs that show the current status of the printer.

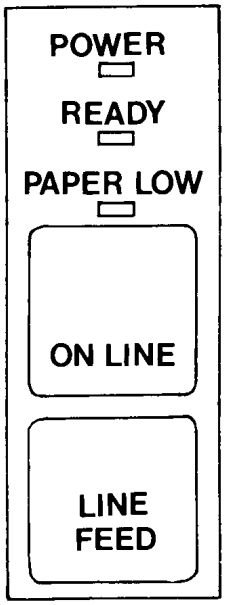


Figure 3.9 Control Panel

3.9.1. LED Displays

POWER: (green) On when the power switch is on and power is supplied.

READY: (green) On when the printer is ready to accept data. This LED may flicker during printing. The printer's built-in protection circuit flashes the **READY** LED and stops the printer if an error is detected. Refer to Section 5.3.2. if the **READY** LED begins to flash.

PAPER LOW: (red) On when the sensor arm at the paper roll detects less than 3 meters (10 feet) of paper left.

3.9.2. Keyboard

ON LINE: This key controls printer communication with the host equipment. When the printer is on-line, the **READY** LED is on or flickering and the printer can receive print data from the host equipment.

LINE FEED: Press this key to advance the paper one line. Hold down this key to continuously advance the paper.

3.9.3. Special Features

The control panel provides access to a self test and hex dump mode.

3.9.3.1. Self Test Mode

The self test mode lets you check the current operating status of the 8856 including the functioning of the printer control circuits, the print head and the paper advance mechanism. To access the printer self test, press and hold the **LINE FEED** key while turning on power to the printer. Make sure the 8856 has a ribbon cartridge and paper installed before performing the self test. Refer to Section 5.3.1 for more information about the self test.

3.9.3.2. Hex Dump Mode

The hex dump mode turns the 8856 printer into a unidirectional, serial data analyzer. In the hex dump mode the 8856 prints the hexadecimal and ASCII value for all characters received into the serial port. This mode permits you to view control codes in the data transmission that normally can not be printed.

To access the hex dump mode, press and hold the **ON LINE** key while turning on power to the 8856. The 8856 prints the **Hex Dump Mode:** heading and then waits for serial data input. When data is received the 8856 prints out the hexadecimal value and the ASCII equivalent character for the data received in the format shown in Table 3.9.3.2 - 1. Note that the location of control characters are marked with a period on the right side of the printout.

Hex Dump Mode:

```
02 41 42 43 44 45 46 47 0D 0A  .ABCDEFG..
31 32 33 34 35 36 37 38 0D 0A  12345678..
61 62 63 64 65 66 67 68 0D 0A  abcdefgh..
21 40 23 24 25 5E 26 sA 0D 0A  !@#$%^&*..
```

Table 3.9.3.2 Hex Dump Mode Print Example

4. INTERFACING

The 8856 provides an RS-232 input standard. The optional 20 ma to RS-232 interface converter, 0964-0065, provides an passive receive, 20 mA current loop input for devices requiring 20 mA current loop.

Item	Default Settings
Baud Rate	9600 Baud
Word Length	7 Data Bits
Parity Bit	Even Parity
Line Spacing	1/6"
Font	Elite (42 characters/line)
International character set	USA
Character right side spacing	0 dots (no space)
Print attributes	Normal size, orientation. No underline.
Horizontal tab position	Every 8 columns

Table 4 Default Parameters

4.1. Programming Switches

By changing the settings of the ten position DIP switch inside the printer case, you can select the default character set and the serial communication parameters. The programming switch settings are read when the printer is powered-up.

Switch	Description	Factory Settings
1-On 2-On 3-On	International character set. Refer to Table 4-2	USA
4-On	Word length	7 Data Bits
5-On 6-On	Parity bit. Refer to Table 4-3	Even Parity
7-Off 8-Off 9-Off	Baud rate. Refer to Table 4-4	9600 Baud
10-Off	Reserved (MUST BE OFF)	OFF

Table 4.1 DIP Switch Settings

4.1.1. Opening the Printer Enclosure

Remove the paper tray cover. Depress the two paper tray cover releases at the rear of the printer, and lift the cover off.

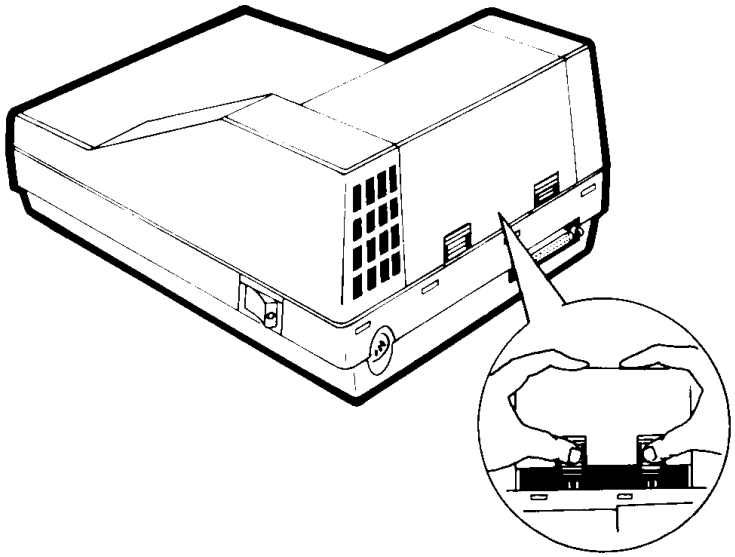


Figure 4.1.1 - 1 Opening the Paper Tray Cover

Clear the paper from the printer mechanism and remove the paper roll. Remember to tear the paper at the roll, then advance the remaining portion out of the printer mechanism using the **LINE FEED** key on the control panel.

Turn the printer power switch off, then unplug the power supply connector from the rear of the printer. Disconnect the serial interface cable if installed.

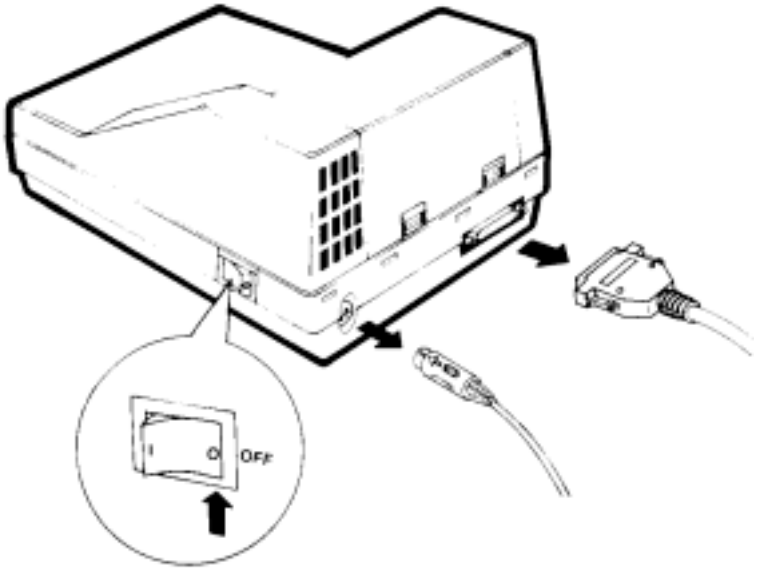


Figure 4.1.1 - 2 Turn Power Off, Disconnect All Cables

Remove the printer cover. Depress the printer cover release and lift the cover off, release-side first.

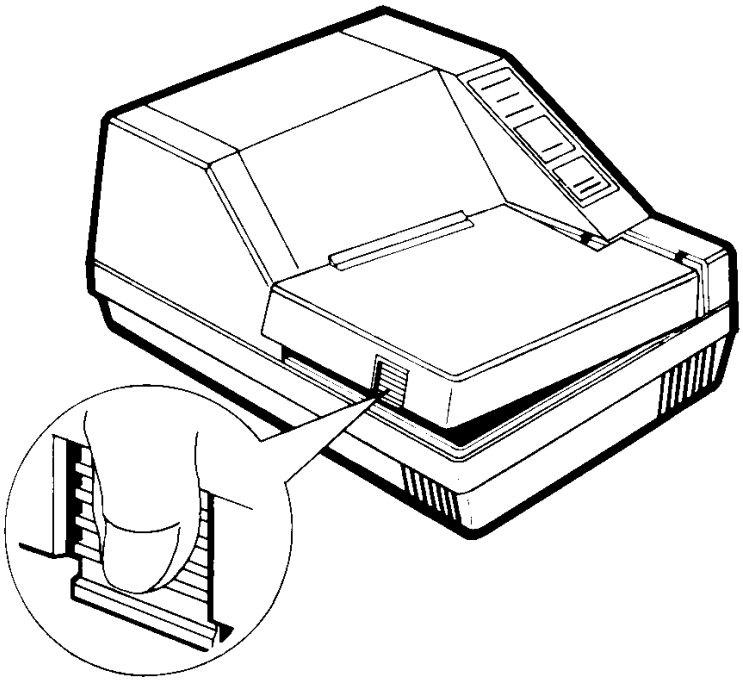


Figure 4.1.1 - 3 Open Front Cover

Fully loosen the two printer case mounting screws at the front of the enclosure, using a Phillips head screwdriver.

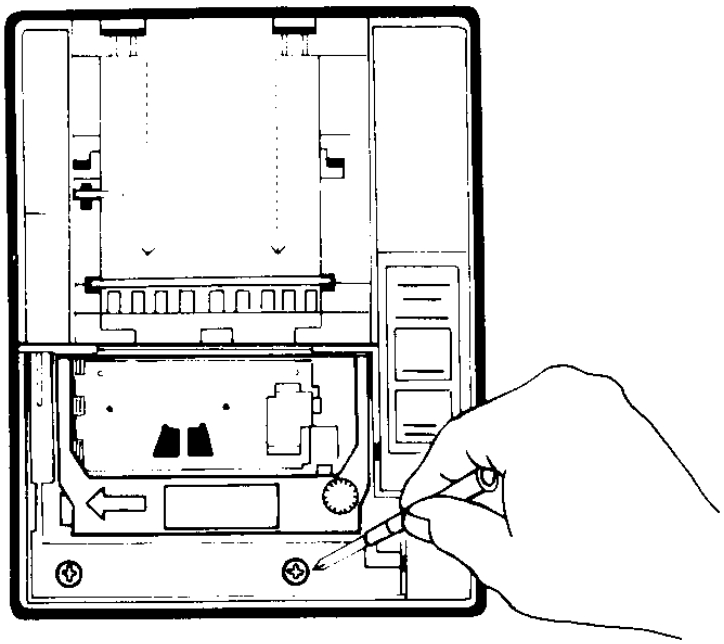


Figure 4.1.1 - 4 Remove Mounting Screws

Rotate the printer case front carefully up, lifting the case out of its retaining slots. Rest the case on its side.

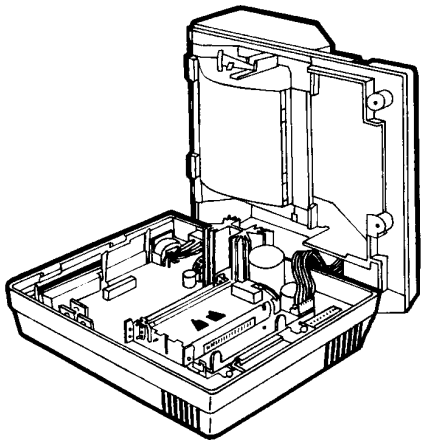


Figure 4.1.1 - 5 Remove Top Case

CAUTION
Be careful not to jerk or strain the ribbon cable connecting the control panel.

4.1.2. Programming Switch Selections

CAUTION
Observe precautions for handling electrostatic sensitive devices.

Use a pointed instrument such as the tip of a pen to move individual switches to either the ON or the OFF position. Refer to Tables 4-3, 4-4, 4-5 and 4-6 for switch setting descriptions. Shaded selections indicate default selection.

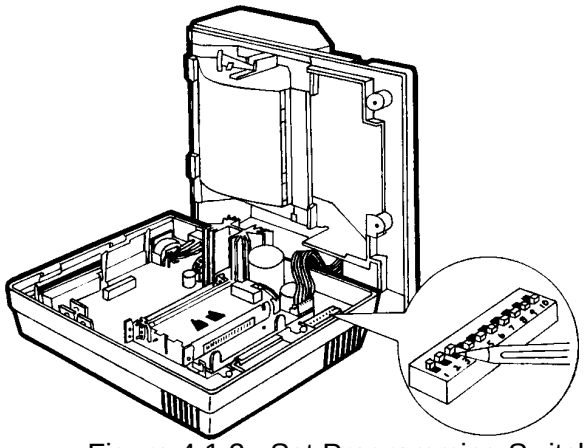


Figure 4.1.2 Set Programming Switches

International Character Set Selection:

The international character sets provides country specific characters and symbols. Refer to Table 4.1.2-1 for international character set selection.

Country	SW1	SW2	SW3
USA	ON	ON	ON
France	OFF	ON	ON
Germany	ON	OFF	ON
Great Britain	OFF	OFF	ON
Denmark	ON	ON	OFF
Sweden	OFF	ON	OFF
Italy	ON	OFF	OFF
Spain	OFF	OFF	OFF

Table 4.1.2 - 1 International Character Set

Communication Parameters:

DIP switches 4 to 9 configure the 8856 serial communication parameters. These selections must be set to match the parameters selected in the scale or computer. Refer to the scale or computer technical manual and specifications to configure these steps correctly.

Word Length	SW4
8 Data Bits	OFF
7 Data Bits	ON

Table 4.1.2 - 2 Word Length (Data Bits)

Parity Bit Setting	SW5	SW6
None	OFF	OFF
Odd	ON	OFF
Even	ON	ON

Table 4.1.2 - 3 Parity Bit Selection

Baud Rate Setting	SW7	SW8	SW9
110	ON	ON	ON
150	OFF	ON	ON
300	ON	OFF	ON
600	OFF	OFF	ON
1200	ON	ON	OFF
2400	OFF	ON	OFF
4800	ON	OFF	OFF
9600	OFF	OFF	OFF

Table 4.1.2 - 4 Baud Rate Selection

Note: Switch SW10 MUST BE SET TO OFF for proper operation of the 8856.

4.1.3. Closing the Printer Enclosure

Close the printer case by lowering the rear of the case until the four lock tabs enter their slots in the printer base. Lower the front of the printer case until it rests normally on the base. Make sure the control panel cable is not jammed.

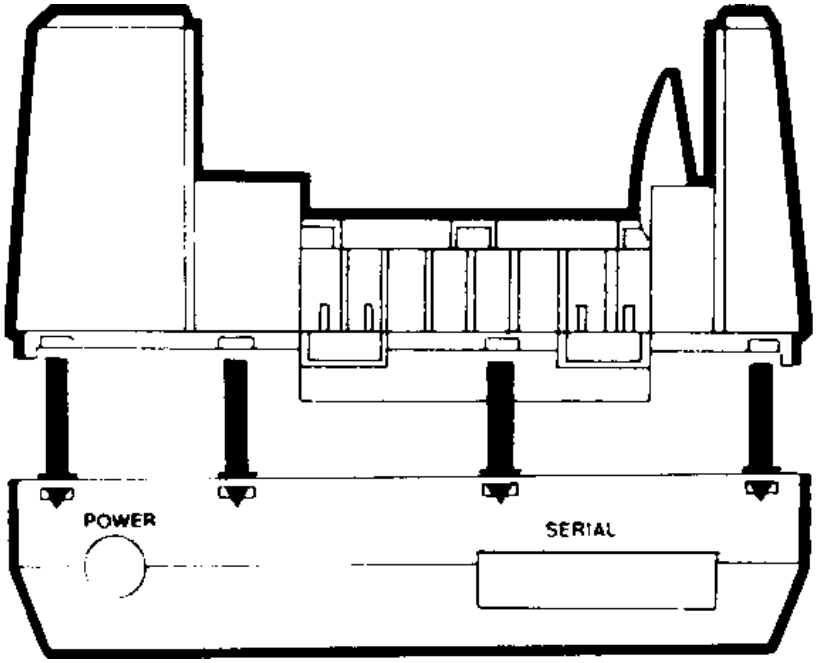


Figure 4.1.3 - 1 Close Printer Enclosure

Verify that the rear tabs are in position, then tighten the two printer case mounting screws.

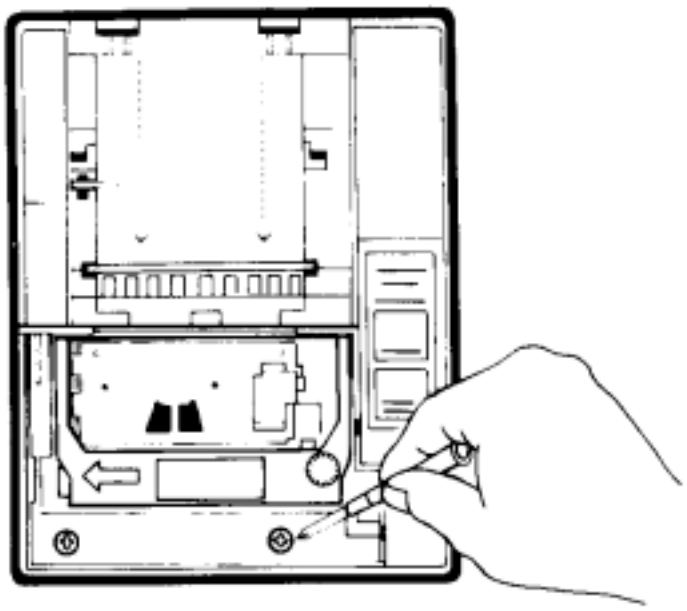


Figure 4.1.3 - 2 Reinstall Mounting Screws

Replace the printer cover by inserting the cover tabs into their slots. Then press the release-end of the cover firmly down until the cover clicks securely into place.

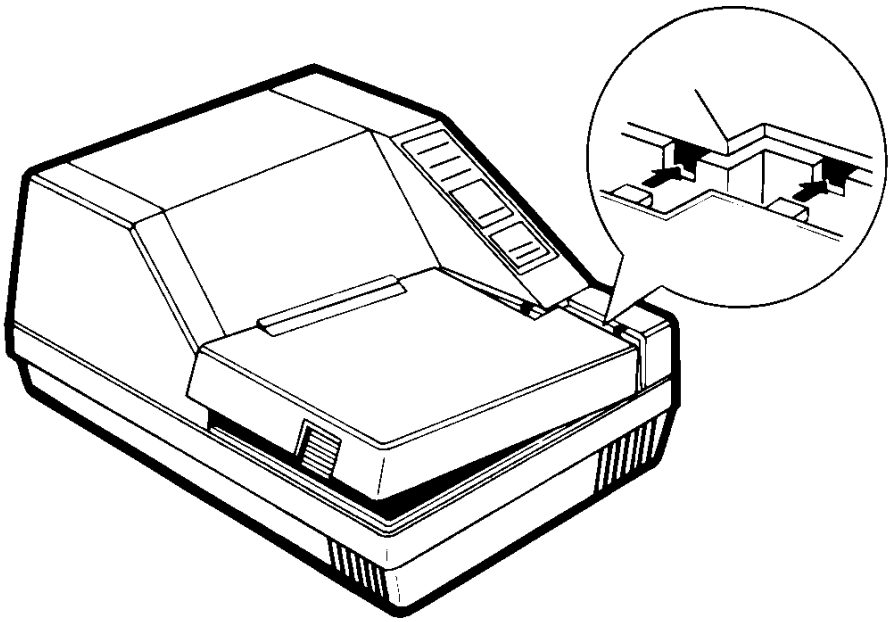


Figure 4.1.3 - 3 Reinstall Print Cover

Plug the power supply connector into the rear of the printer. Reinstall the paper roll.

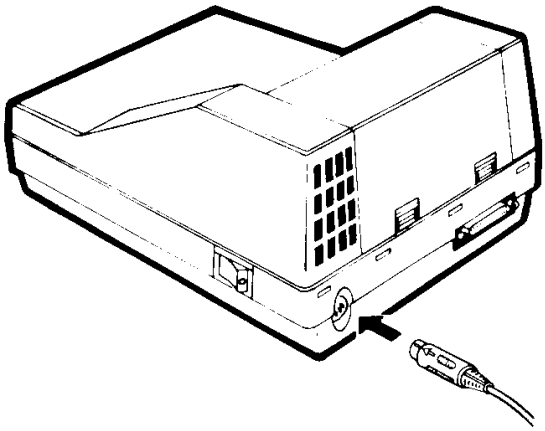


Figure 4.1.3 - 4 Reconnect Power

WARNING

Never power up the printer, even to test the DIP switch setting without fully securing the case.

Replace the paper tray cover by inserting the front tab into its retainers near the paper tear bar. Then press the rear (release end) of the cover firmly down until the cover clicks into place.

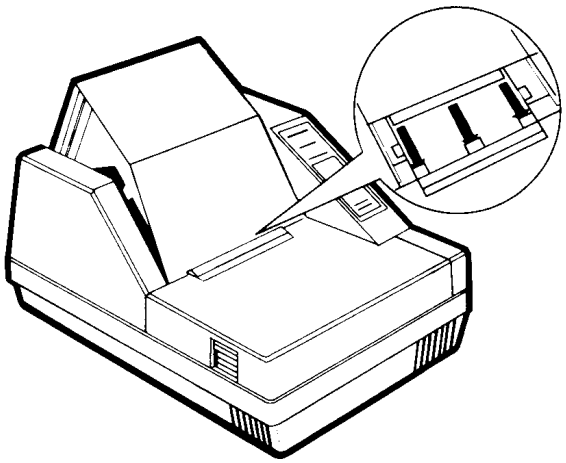


Figure 4.1.3 - 5 Reinstall The Paper Tray Cover

4.2. Serial Interface Cabling

A serial interface cable is not included with the Model 8856 printer, but is usually shipped in a separate box. If an interface cable is not ordered with the 8856 then refer to Table 4.2.1 for cable wiring information. Refer to Section 6.4 for serial interface cable part numbers.

4.2.1. Serial Interface Connector Pinout

8856 DB-25		DE-9[*1]	DB-25[*2]	Washdown[*3]	8572	3026 8510-1001	8520 8522
Function	Pin	Pin	Pin	Pin	Pin	J3/TB2	TB1
Shield	1	N.C.	N.C.	N.C.	N.C.	N.C.	N.C.
TxD	2	N.C.	N.C.	N.C.	3	N.C.	N.C.
RxD	3	3	2	B	2	2	1
DSR	6	N.C.	N.C.	N.C.	N.C.	N.C.	N.C.
Ground	7	5	7	G	7	1	6
DTR	11	N.C.	N.C.	N.C.	N.C.	N.C.	N.C.
DTR	20	N.C.	N.C.	N.C.	N.C.	N.C.	N.C.
Jumpers	None	7 - 8 1 - 4 - 6	4 - 5 6 - 8 - 20	D - E	None	None	None

Table 4.2.1 Serial Interconnect Cable Wiring

NOTES:

(*1): DE-9 refers to Mettler Toledo Models 1938, 2038, 2138, 8510-2001 and also to PC compatible computers with a 9 pin serial port.

(*2): DB-25 refers to desk or rack mount versions of the Mettler Toledo Models 8140 (with data output KOP), M8141 (with fiber optic data output KOP), 8142, 8146, 8525 (with fiber optic data output KOP), 8530, 8571 (with data output KOP), 8581 (with RS-232 option), 8582 and also to PC compatible computers with a 25 pin serial port.

(*3): Washdown refers to wall mount versions of the Mettler Toledo Models 8140 (with data output KOP), 8142, 8146, and 8530.

Jumpers: Jumpers shown are in the scale or computer end of the interface cable.

4.2.2. 20 mA Current Loop Converter

The 0964-0065, 20 mA to RS-232 converter provides the 8856 with a 20 mA current loop interface for compatibility with products that do not support RS-232 or for applications that require cable lengths longer than 50 ft (15 m). The 20 mA current loop interface is usable up to 1000 ft (304.8 m).

The 0964-0065, 20 mA to RS-232 converter plugs directly into the DB-25 connector on the rear

of the 8856 printer. Refer to Table 4.2.2-1 for 20 mA current loop interface cable wiring information for the 0964-0065 converter.

0964-0065 Converter 20 mA Connector		8140[*1], 8141[*2], 8142 8525[*2], 8530, 8581[*3] 8582, 8623, 9360	8140[*1], 8142 8530, 8860WD 9360	8520 8522	8614 8616	M5000	8617 9323 9325
Function	Pin	DB-25[*4]	Washdown[*5]	TB1	TB1	J1	TB2
+RxD -RxD	25 23	9 22	J Y	4 3	5 6	2 3	11 10
Jumpers	None	4 - 5 14 - 15	D - E P - R	None	None	JU9-Active	W1-Data W8-Active

Table 4.2.2 0964-0065 Serial Interconnect Cable Wiring

NOTES:

(*1): 8140 requires data output option.

(*2): 8141 and 8525 require fiber optic data option.

(*3): 8581 20 mA current loop output is not available if RS-232 option or battery option is installed in the 8581.

(*4): DB-25 refers to the desk or rack mount version of the indicators listed and to all versions of the parts counting scale or scale accessories.

(*5): Washdown refers to the stainless steel washdown versions of the products listed.

Jumpers: Jumpers shown are in the scale or accessory end of the interface cable. Jumpers shown for the Model 8617, 9323 and 9325 are located on the Serial Interface Controller PCB, part number 0964-0065, which is located inside the accessory. JU9 shown for the M500 is located on the DPU PCB inside the M5000.

4.2.3. Signal Descriptions

TxD: Transmit Data: Used for <XON> and <XOFF> handshaking.
- The TXD is also used as a 'print head in motion' signal. This signal is held to a space while printing, and returns to a mark state immediately after printing is complete. All normal functions of the TXD line are disabled during this time. DC1 is output from TXD if the 8856 is switched from "OFF Line" to "ON Line". DC3 is output from TXD if the 8856 is switched from "ON Line" to "OFF Line". DC1 then DC3 is output from TXD if the 8856 is out of paper and the "OFF/ON Line" status is changed.

RxD: Receive Data: RS-232 data into the printer.

DSR: Data Set Ready: Not Used, do not connect.

DTR: Data Terminal Ready: Pins 11 and 20 are jumpered together and used for a input buffer full handshaking output. A low output (-3 VDC or below) means the buffer is full and no further data is accepted by the 8856. A high output (+3 VDC or higher) means the buffer is not full and data is accepted.

4.2.4. Serial Interface Cable Installation

Turn the printer off and remove the power supply plug from the printer.

Figure 4.2.4 - 1 Disconnect Power

Plug the correct serial interface cable securely into the printer. It can fit only one way.

Figure 4.2.4 - 2 Connect Printer Cable

Tighten the lock screws at either side of the connector.

Figure 4.2.4 - 3 Tighten Printer Cable Locking Screws

Plug the other end of the serial interface cable into the scale or computer.

Plug the power supply connector into the rear of the printer. Turn on the printer power switch.

Figure 4.2.4 - 4 Connect Power

4.3. Control Codes and Escape Sequences

The 8856 will respond to certain control codes and EPSON® compatible escape sequences sent into the serial port. The format of the control code definition is as follows:

HT, **LF**, **CR**, **SO**, **SI**, **ESC**, **FS**	ASCII standard control code mnemonic, whose equivalent numeric code is sent in binary form to the printer.
$^{S}_{P}$, !, %, a, b, ... 1, 2, 3, A, B, C ...	Standard ASCII characters, whose equivalent numeric code is sent in binary form to the printer.
n	A numeric value sent in binary form to the printer. 8 data bit serial interface (SW4-ON, SW5-OFF) selection required for n > 127.

Control Codes

HT	Horizontal Tab (Decimal value 9)
LF	Line Feed (Decimal value 10)
CR	Carriage Return (Decimal value 13)
SO	Shift Out: Selects double width printing (Decimal value 14)
SI	Shift In: Cancels double width printing (Decimal value 15)
ESC	Escape (Decimal value 27)
FS	Field Separator (Decimal value 28)
$^{S}_{P}$	Space (Decimal value 32)

Escape Sequences

ESC $^{S}_{P}$ n	Set spacing between characters ($0 \leq n \leq n/120$)
ESC 2	Select default 1/6 inch line spacing
ESC 3 n	Select n/60 inch line spacing ($1 \leq n \leq 255$)
ESC @	Initialize printer
ESC { n	Enable/disable inverted printing (n = 0: disable, n = 1: enable)
ESC M	Select elite font (42 characters per line)
ESC P	Select pica font (35 characters per line)
ESC c 5 n	Enable/disable control panel (n = 0: enable, n = 1: disable)
ESC d n	Print and fast feed n lines ($1 \leq n \leq 255$)
ESC j n	Select vertical character width (n = 0: 16 dots high, n = 1: 24 dots high)
ESC ! n	Select Character Attributes. (font, width, underline)

n = 0: Selects Pica, normal width, underline off
n = 1: Selects Elite, normal width, underline off
n = 32: Selects Pica, double width, underline off
n = 33: Selects Elite, normal width, underline off
n = 128: Selects Pica, normal width, underline on
n = 129: Selects Elite, normal width, underline on
n = 160: Selects Pica, double width, underline on
n = 161: Selects Elite, double width, underline on

FS J	Enable vertical print mode
FS K	Disable vertical print mode
FS W n	Enable/disable double height, double width printing (n = 0: disable, n = 1 enable)

5. PREVENTIVE MAINTENANCE

This section provides instructions and procedures for maintenance of the 8856, as well as a troubleshooting guide to aid correction of malfunctions

5.1. Required Tools and Supplies

The following items are recommended for proper maintenance and repairs.

Volt-Ohm Meter
RS-232 Breakout Box or Mini-Tester
+2 Phillips Screw Driver
Soft, Lint Free, Cleaning Cloth
Isopropyl Rubbing Alcohol
Small Vacuum Cleaner
Antistatic Wrist Strap

5.2. Cleaning

Wipe off any soiled sections using alcohol.

CAUTION
Never use thinner, trichlorethylene or ketone solvents, as these may deteriorate or damage the plastic or rubber components.

Use a vacuum cleaner with a small nozzle to carefully draw out all foreign particles from all parts of the printer.

5.3. Troubleshooting

If problems occur, record as much information as possible about the symptoms the 8856 is displaying before attempting a repair. If the **READY** LED is flashing then refer to Section 5.3.2. for error code descriptions. If the Printer won't print or if the print is illegible then perform the printer self test.

5.3.1. Printer Self Test

The self test checks the printer control circuits, print head, paper advance, and print quality. This test is carried out with the serial interface cable disconnected.

Verify that the ribbon cartridge and the paper roll are properly installed with at least 25 mm (1 inch) of paper exposed above the tear bar.

Turn the printer power off.

While holding down the **LINE FEED** key on the control panel, turn on the printer. After printing starts, release the **LINE FEED** key. Refer to Figure 5.3.1-1 for sample self test printout. **Note:** Press the **ON LINE** key to abort the self test.
The Mettler Toledo software part number and revision level is printed first followed by a list of the 8856 programming switch settings. The 8856 configuration is then printed followed by a series of characters. The self test continues until the paper runs out or you press the **ON LINE** key at the control panel. If all the symbols, numbers and letters have printed clearly and fully, the test is satisfactory. Turn off the printer.

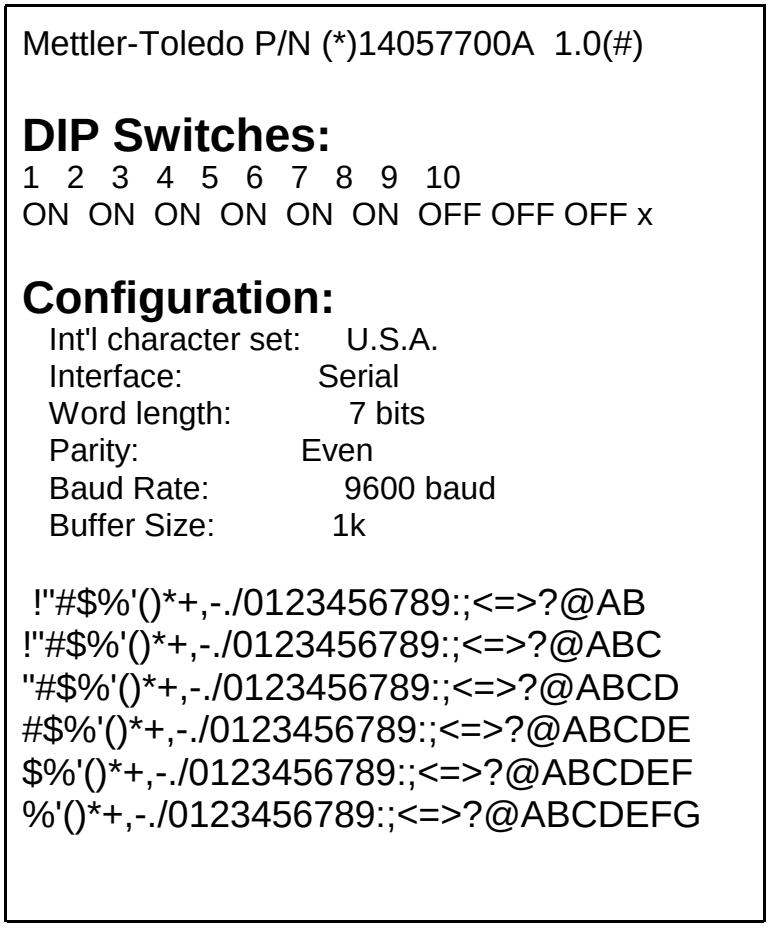


Figure 5.3.1 Sample Self Test Printout

5.3.1.1. Printer Passes Self Tests

If the 8856 won't print from the scale or computer, but self tests ok, first verify that the serial communication parameters are set correctly for the device interfaced to the printer. Mettler Toledo products normally use 7 data bits with an even parity bit. Refer to Section 4.1. for serial parameter programming.

If the communication parameters match, then check the serial interface cable. Inspect the interface cable for damage and verify that the interface cable is wired correctly. Refer to

Section 4.2 for interface cable wiring.

If the serial interface cable checks out ok, then verify that the scale or computer is transmitting data. Connect your RS-232 breakout box or Mini-Tester to the printer end of the serial interface cable. Press the PRINT key on the scale or cause a transmission from the computer. The receive data (RxD) LED should flash to indicate data is transmitted. If the receive data LED does not flash when data is transmitted then the scale or computer is the cause of the problem.

If the RS-232 Breakout Box or Mini Tester indicates that the scale or computer is transmitting data, then there is a malfunction in the printer. Contact your authorized Mettler Toledo representative for an exchange printer.

5.3.1.2. Printer Fails Self Tests

If the 8856 fails the self test then verify the AC output voltage from the Power Supply.

Turn the printer off and remove the power supply plug from the printer.

Figure 5.3.1.2 - 1 Disconnect Power

Measure AC voltage between the outside pair of pins on the round DIN plug on the power supply. This voltage should measure between 23 to 30 VAC. Measure AC voltage between the center pin and each of the outside pins round DIN plug on the power supply. This voltage should be 1/2 of the voltage measured between the outside pins. If these voltages are incorrect or absent then contact your authorized Mettler Toledo distributor for a new power supply.

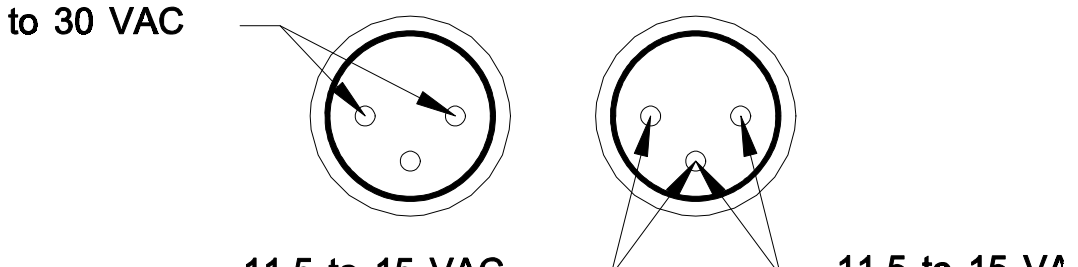


Figure 5.3.1.2 - 2 Power Plug Voltage Tests

	WARNING
	Turn off the power switch and disconnect power to the printer before opening the printer enclosure.

If these voltages are correct then check fuses F1 and F2 inside the printer enclosure. Fuses F1 and F2 are located on the rear right of the Control PCB. Fuses F1 and F2 are rated at 4A, 32 V. If these fuses are ok or blow repeatedly then there is a malfunction in the 8856. Contact your authorized Mettler Toledo representative for an exchange printer.

5.3.2. Error Handling

The 8856 checks the buffer memory on power up. The print mechanism is checked constantly during printing for faults. If a fault is detected, printing stops immediately, the printer goes off line, the DTR output goes low (-3 VDC or below), and the error condition is indicated by flashing the **READY** LED as described in Table 5.3.2 - 1.

Error	Explanation	Indicator State
Home Position Error	No home position signal detected when motor started.	Constant pulsing
Carriage Motor Error	No timing signal from the carriage motor.	Triple pulses
Voltage Error	Unacceptable drive voltage.	Double pulses
Ram Error	Defective or missing RAM	Single pulse

Table 5.3.2 Error Codes

6. ACCESSORIES

6.1. Replacement Parts

	8856-0001	8856-0002	8856-0003
DESCRIPTION	8856-0011	8856-0012	8856-0013
Power Supply (8856-000X)	14072600A (RAM 1)	14072600A (RAM 2)	14072600A (RAM 3)
Power Supply (8856-001X)	14149700A (RAM 11)	14149700A (RAM 12)	14149700A (RAM 13)
Fuse (4A, 32V)	14072700A	14072700A	14072700A
Paper Roll Axle	14072800A	14107300A	14107300A
Front Ribbon Cover	14072900A	14107400A	14107400A
Rear Paper Cover	14073000A	14107500A	14107500A
PCB Main Assembly	N/A	14360100A	14374600A (w/ encl.)
Power Switch Harness	N/A	14360200A	14360200A
Printhead Mechanism	N/A	14360300A	14360300A
Keyboard Overlay	14360400A	14360400A	14360400A
Keypad Harness	14360500A	14360500A	14374700A
Paper Sensor Arm	N/A	14360600A	14360600A
Paper Sensor Spring	N/A	14360700A	14360700A
Metal Paper Guide	N/A	14360800A	14360800A
Paper Guide Retainer	N/A	14374500A	14374500A
Upper Cover	N/A	14360900A	14374500A
Remanufactured Printer	N/A	8856-0002-REM 8856-0012-REM	8856-0003-REM 8856-0013-REM

Table 6.1 - 1 Replacement Parts

6.2. Optional Accessories

Description	Factory Number
Wall Mount KOP	0901-0325
20 mA to RS-232 Interface Converter	0964-0065

Table 6.2 - 1 Optional Accessories

6.3. Expendables

Description	Part Number
Purple Ink Ribbon Cartridge	14043600A
Black Ink Ribbon Cartridge	14055600A
Roll of Paper (3")	14099200A

Table 6.3 - 1 Expendables

6.4. Serial Interface Cables

Scale Model	Length	Part Number	Factory Number
Desk and rack versions: 8140[*1], 8142, 8146, 8530 Desk and wall versions: 8141[*2], 8525[*3], 8582 All versions: 8571, 8581[*4]	6'	B128220 00A	0900-0214
Wall enclosure versions: 8140[*1], 8142, 8146, 8530	20'	128221 00A	0900-0215
3026, 8510-1001 and 8510-1101	6'	129051 00A	0900-0236
8572	6'	129609 00A	0900-0243
1938, 2038, 2138 and 8510-2001	6'	131911 00A	0900-0255
8520 and 8522	15'	A133218 00A	0900-0258
8505	15'	134639 00A	0900-0264
SM and SMx[*5]	10'	33640	33640
ID1s, ID2sx[*6], ID5[*7]	10'	503755	503755

Notes:

*1 - Model 8140 requires Data Output option be installed.
*2 - Model 8141 requires Fiber Optic Data Output option be installed.
*3 - Model 8525 requires Fiber Optic Data Output option be installed.
*4 - Model 8581 requires 0901-0213 RS-232 Data Output option be installed.
*5 - Model SMx requires #217059 interface adapter.
*6 - ID2sx requires GD15x interface adapter.

*7 - ID5 requires 082 or 089 option.

Table 6.4 - 1 Serial Interface Cables

Mettler-Toledo, Inc.
Scales & Systems
350 W. Wilson Bridge Road
Worthington, Ohio 43085
(614) 438-4511

P/N B14032400A

Printed in U.S.A. 3/94

© 1994 Mettler-Toledo, Inc.