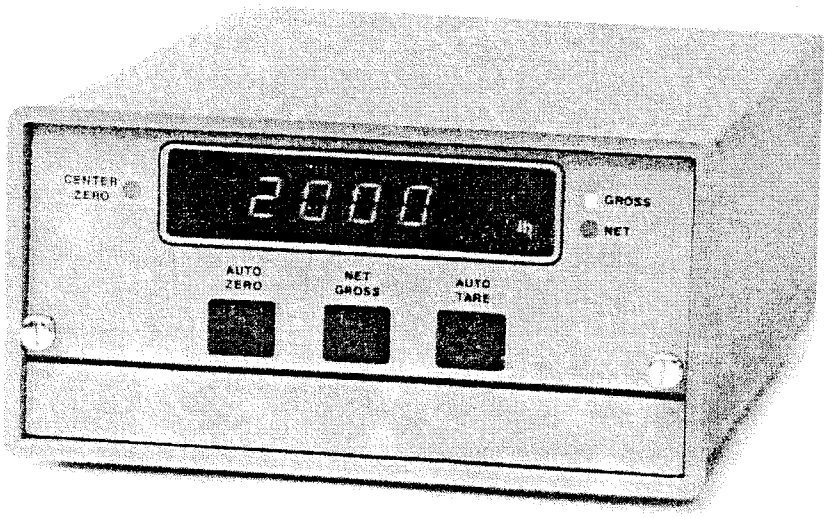
UMC2000, 2002, 2004

Digital Weight Indicator

Installation Manual



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UMC2000/UMC2002/UMC2004

DIGITAL WEIGHT INDICATOR

INSTALLATION/CALIBRATION/OPERATION MANUAL

TABLE OF CONTENTS

Revised 10/91

SECTION 1
GENERAL INFORMATION

1.1 INTRODUCTION

This installation, calibration, and operation manual include the following units:

- UMC2000 Digital Weight Indicator
- UMC2002 Digital Weight Indicator
- UMC2004 Digital Weight Indicator

Enclosed in the manual are complete instructions on initial installation, preliminary wiring, digital and analog calibration and use and the interfacing of options.

Following the step-by-step guidelines will help insure successful, trouble-free scale installation. Remember that the unit is a precision electronic instrument, and should be operated as such. If the unit does not function properly, contact the installer or service organization listed on the next page. The unit is not designed to be user-serviceable; any attempt to repair or replace any part or circuit will void all warranties and service contracts.

The scale installer should open and inspect the package a soon as it arrives. If there is any evidence of shipping damage, the package should be opened and inspected while the shipping agent is still on the premises. Any exterior or interior shipping damage claims must be filed immediately with the carrier. Remember that, while the shipper stands ready to assist in any way possible, it is the responsibility of the receiving party to file any and all shipping damage claims.

Immediate inspection of the package contents will also insure that the installer has the proper unit and all accessories needed to complete the installation. Please report any missing parts or incorrect unit shipments to the installer or dealer listed on th next page.

This instrument installed by:

_____

_____

_____

_____

_____

Installer's name: _____

Date of installation: _____

Emergency Telephone Number: _____

NOTES:

SECTION 1.2

UMC2000 DESCRIPTION

FIGURE 1.1

* 5 1/2 DIGIT LED DISPLAY
* FRONT PANEL CONTROL OF AUTO ZERO (OR DISPLAY CHECK), NET/GROSS, AUTO TARE, AND FINE ZERO ADJUST.
* INDICATORS FOR CENTER OF ZERO, GROSS/NET, AND LB/KG.
* "SLIDE-OUT" CHASSIS FOR ACCESS TO CONFIGURATION AND CALIBRATION CONTROLS.
* NTEP CERTIFICATE OF CONFORMANCE #88-066.
* CANADIAN WEIGHTS & MEASURES APPROVAL #S.WA-3021.
* UL LISTED AND CSA APPROVED.

UMC2000 PART NUMBERING SYSTEM

UMC2000 ( ) - ( )

FRONT PANEL.....
F. Display Check
G. Auto Zero

OPERATING VOLTAGE.....

A. 117 VAC, 60 Hz
B. 217 VAC, 50 Hz
C 237 VAC, 50 Hz
D. 100 VAC, 50 Hz

DIGITAL OPTIONS.....

C. Expanded Unit - With
Parallel BCD (*),
Serial Output (*),
Setpoint/Fixed Tare Capability

ANALOG OPTIONS.....

A. Shielded A/D, No Analog Output
B. Sheilded A/D, 0-10 VDC Analog Output
D. Unsheilded A/D, No Analog Output
F. Shielded A/D, Isolated 4-20 mA Analog Output

* Parallel BCD and Serial Outputs require an optional KKU354CB mating connector.

NOTE:

If non-standard instrument configurations are supplied, the normal letter coding system will be replaced by the manufacturer with a two digit number, used to uniquely define the modified unit.

EXAMPLE: UMC2000-29

The UMC2000 is designed for Table Top or Panel Mounting Applications. See the "Panel Mounting" section on the next page if panel mounting is desired; you will need the optional KW116-8 kit.

Consult the UMC2000 "Part Numbering Guide" on the preceding page, and the serial plate label on the rear of the unit, to determine the specific unit configuration and which options (if any) are a part of your unit. Then refer to the "Options" section in the appropriate section of this manual for wiring, calibration, and operation guidelines. Sealing the unit for "Legal-for-trade" applications is done by closing the instrument, then passing a sealing wire through a hole in the body of the left-hand knurled knob and a hole drilled in the outer case flange.

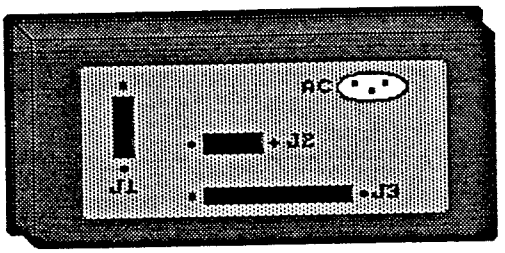


FIGURE 1.2

UMC2000 REAR PANEL

J1 LOAD CELL CONNECTOR

J2 SETPOINT/FIXED TARE OPTION

J3 PARALLEL BCD AND SERIAL CONNECTOR

PANEL MOUNTING

The UMC2000 is designed to be mounted in a rack or panel for use in a multi-instrument or a system application. Figure 1.3 shows the mounting procedure, which is as follows:

1. Remove the unit from its case.
2. Remove the rubber mounting "feet".
3. Using a hammer and screwdriver, carefully tap out and discard the two knockouts on each side of the outer case.
4. Cut the panel as shown on Sheet 1 of 1, Drawing R-UMC2000 B & D.
5. Insert the outer case in the panel.
6. Attach the mounting bracket, one to each side, to the case and tighten the screws until they are tight.
7. Insert the inner chassis of the Indicator into the outer case.

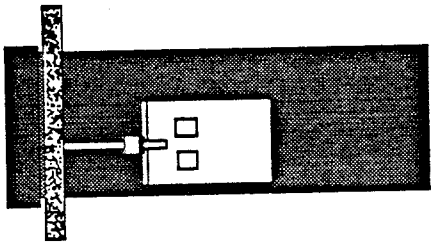
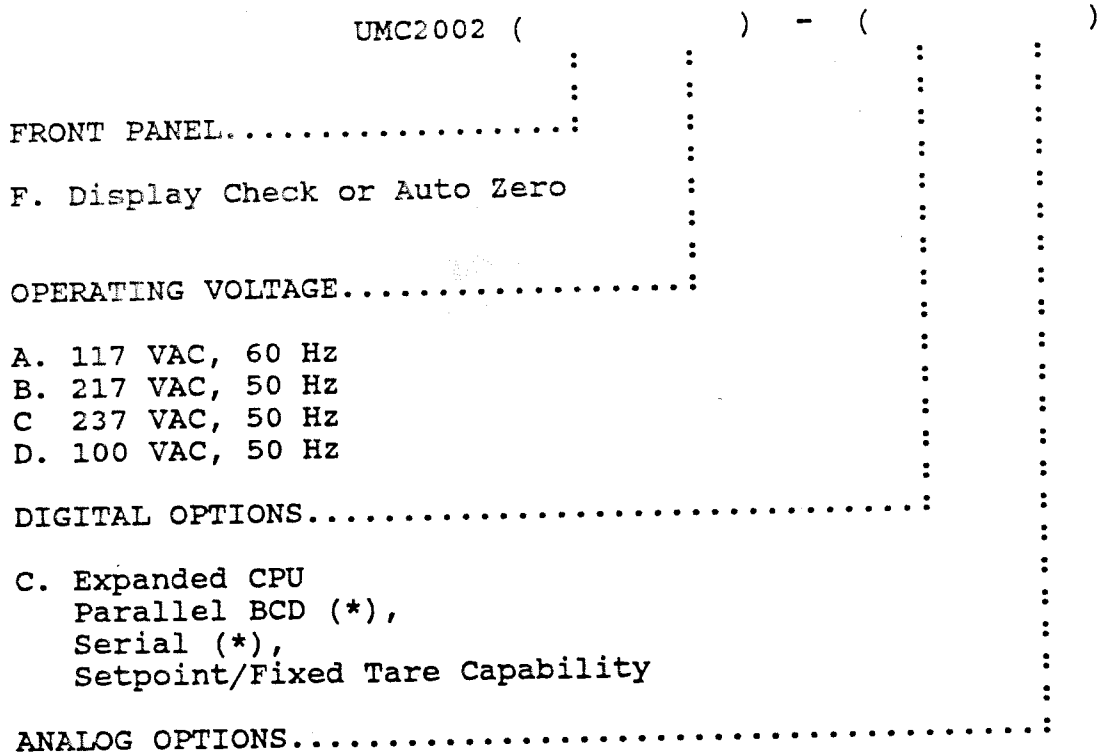


FIGURE 1.3

UMC2002 PART NUMBERING SYSTEM



* Parallel BCD and Serial data outputs require an optional KKU354CB mating connector.

NOTE:

If non-standard instrument configurations are supplied, the normal letter coding system will be replaced by the manufacturer with a two digit number, used to uniquely define the modified unit.

EXAMPLE: UMC2002-19

SECTION 1.4

UMC2004 DESCRIPTION

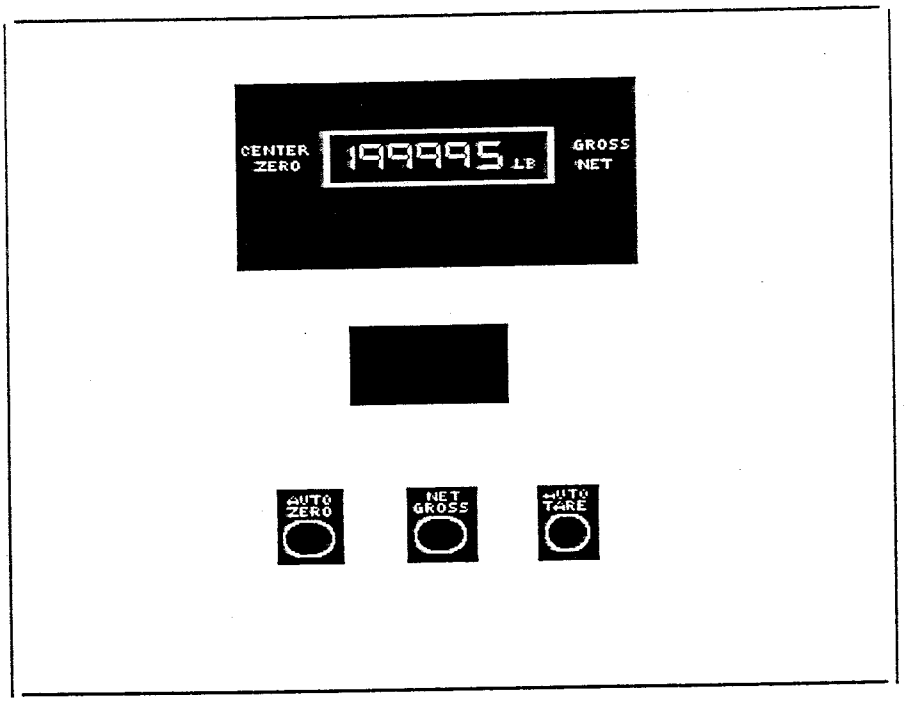


FIGURE 1.5

* UMC2000 MOUNTED IN A NEMA 4 ENCLOSURE
* INDUSTRIAL GRADE CONTROLS FOR AUTO ZERO, GROSS/NET, AND AUTO TARE
* OPTIONAL STEPOINT OR FIXED TARE THUMBWHEEL

UMC2004 PART NUMBERING SYSTEM

UMC2004 ( ) - ( )

FRONT PANEL.....

F. Display Check
G. Auto Zero

OPERATING VOLTAGE.....

A. 117 VAC, 60 Hz
B. 217 VAC, 50 Hz
C 237 VAC, 50 Hz
D. 100 VAC, 50 Hz

DIGITAL OPTIONS.....

C. Expanded CPU
   Parallel BCD (*),
   Serial Output (*),
D. Single Setpoint/Fixed Tare

ANALOG OPTIONS.....

A. Shielded A/D, No Analog Output
B. Sheilded A/D, 0-10 VDC Analog Output
D. Unsheilded A/D, No Analog Output
F. Shielded A/D, Isolated 4-20 mA Analog Output

* Parallel BCD and Serial Outputs require an optional KKU354CB mating connector or optional KW116-21 Terminal Strip Assembly.

NOTE:

If non-standard instrument configurations are supplied, the normal letter coding system will be replaced by the manufacturer with a two digit number, used to uniquely define the modified unit.

EXAMPLE: UMC2004-19

SECTION 2

UMC2000/UMC2002/UMC2004 DIGITAL WEIGHT INDICATOR SPECIFICATIONS

2.1 ANALOG INPUT CHARACTERISTICS

Sensitivity	0.8 to 24 microvolts/graduation, fully programmable
Full Range Scale	12.5 mV to 100 mV, fully programmable
Input Bias Current	8 nA, typical
Input Noise Voltage	0.34 uV peak to peak, typical (0.1 to 10 Hz)
Transient Overload	+/- 100 volts without damage. Transient duration - 100 u sec. maximum at a 2% duty cycle

2.2 LOAD CELL EXCITATION

Voltage	10 or 15 VDC, switch selectable, short circuit proof
Load Current	175 mA max. (sufficient to drive four 350 ohm load cells at 15VDC)
Cable	4 or 6 wire cable, plus shield. 6 wire cable required for "remote sense" operation.

2.3 ANALOG TO DIGITAL CONVERSATION

Converter Type	Modified dual slope integrator, auto zeroed, ratiometric, line synchronous operation
Conversion Rate	10 per second, typical (1 to 20 per second, optional)
Integration Time	Crystal controlled, 50 mSec
Resolution	20,000 Displayed Graduations 128,000 counts internal resolution
Full Scale Display	Programmable from 1000 to 20,000 full scale increments in 1000 increment steps. Plus 2% over range - all ranges

2.4 ANALOG TO DIGITAL CONVERSION (Continued)

Digital Sensitivity	Full scale display counts programmable to 20,000, 8,000 or 4,000 count sensitivity for full range analog load cell output.
A/D Separation	Digital and analog sections optically isolated
Common Mode Rejection	> 120 db at input line frequency
Normal Mode Rejection	>100 db at input line frequency

2.5 ZERO AND SPAN CONTROLS

Coarse Zero	Four, binary-related DIP switches provide coarse zero selection
Medium Zero	Internal, 20-turn potentiometer for interpolation between coarse settings
Fine Zero	20-turn front-panel mounted, screw-driver adjusted potentiometer for precise zero adjustment +2% F/S (Not available on "Auto Zero" units or UMC2004)
Coarse Span	Four, binary-related DIP switches provide course span selection values
Medium Span	Internal, 20-turn potentiometer provided for span interpolation between coarse settings
Fine Span	Internal, 20-turn potentiometer permits precise setting of span values

2.6 ACCURACY

Display Non-linearity	< 0.01% of F.S. range
Temperature Coefficient	Zero* +/- 0.18uV/count/degree F max Span +/- 0.002% F.S./degree F max
Long Term Stability	+/- 0.01% of full scale for either span of zero per year, typical

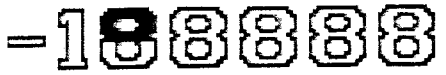
*Zero temperature coefficient does not exist when the auto zero maintenance (AZM) feature is functional.

2.7 DISPLAY

Type	High intensity, red LED digits, 0.43" high
Active Digits	5 1/2 decades, 199,980 maximum indication (6 Digit Display Optional)
Polarity Indication	"-" sign
Decimal Points	Switch selectable to the right of any active digit
Lead Zero Blanking	a. For zero data - all but the least significant digit will be blanked b. When selected, fixed zero will not be blanked for valid data c. When a decimal point is selected. one digit to the left and all digits to the right of the decimal point will remain unblanked for valid data
Status Annunciators	Red LED indicators for: Center Zero, Gross, Net, Lb and Kg. Indicators illuminated when function selected or active
Display Check	With application of power or upon demand, ("Display Check" units only), all active segments, decimal points LED annunciators are initially "blanked" and then "illuminated" for periods of two seconds
Verification Check (Optional)	Upon completion of the Display Check above, a 4-digit diagnostic number may be displayed for two seconds. This number is uniquely related to each combination of standard, internal, digital programming switches and may be used to verify that a specific program is in effect
Special Indication	For operator convenience, special display symbols have been programmed in to define conditions under which the display is normally blanked. See table 2.1

TABLE 2.1

SPECIAL DISPLAY FUNCTIONS

DISPLAY INDICATION	OPERATIONAL CONDITION	REASON
	POSITIVE GROSS OVERRANGE	A
	NEGATIVE GROSS OVERRANGE	B
	LOSS OF AZM OR PUSHBUTTON ZERO VALUE	C
	LOSS OF TARE VALUE	D
	NON-INCREMENTAL FIXED TARE	E

"A" - Scale is overloaded or span is set incorrectly. Either remove weight from scale or readjust span switches.

"B" - Scale is underloaded or zero is set incorrectly. Either add weight to scale or readjust zero switches.

"C" - Unit has lost power and the contents of the Auto Zero maintenance memory have been erased. Momentarily push the "Display Check" or "Push-To-Zero" pushbutton to return to normal operation.

"D" - Unit has been switched from "Gross" to "Net" mode, and there is no entry in the Auto Tare memory, because of power loss. Momentarily push the "Auto Tare" switch to enter an auto tare value.

"E" - Thumbwheel Tare dialed into unit through the remote thumbwheel assembly does not agree with display resolution (X1, X2 or X5). Change the LSD (least significant digit) to agree with display resolution.

2.8 FRONT PANEL CONTROLS

Standard Switches

Net/Gross - momentary action push-button; selects Net or Gross weighing mode (all units).

Auto Tare - momentary action push-button (optionally may be tool operated). Activates auto tare feature with unit in Net mode (all units).

Display Check - momentary action pushbutton to check all lights and display segments ("Display Check" units only)

Auto Zero - momentary action push-button which zeros weight on scale. Operable over +2% F.S. or 20% Full Scale ("Auto Zero units only).

Standard Adjustment

Zero Adjust Potentiometer - screw-driver operated, recessed potentiometer for fine adjustment of zero +/- 2% F.S. (deleted in "Auto Zero" units and UMC2004).

2.9 OPERATIONAL MODES

Lb/Kg Operation

In Lb operation, displayed weight is calibrated in pounds or multiples thereof. In Kg operation, displayed weight is calibrated in kilograms or multiples thereof.

Net/Gross Operation

In Gross mode, total system weight is displayed by the instrument. In Net mode, the display indicates the difference between the actual gross weight and the internally stored tare weight. The tare value is acquired and stored by momentarily actuating the TARE switch

Center of Zero

Causes an annunciator indication that the display value is in the range of true zero + 1/4 graduation. This display indication is an aid in making a precesion zero adjustment

2.10 DISPLAY GRADUATION SIZE

Minimum Display Increments	Internal DIP switch segments used to program display for X1, X2, X5, X10, X20, X50. The full scale display is multiplied by these increments.
Handbook 44 Compliance	As required by H-44, zero increment characteristics are as follows: a. The zero increment is exactly one (1) graduation wide b. A - 0 indication cannot occur c. The increment below zero is minus one graduation The above characteristics are maintained for all "count-by" and scaling conditions

2.12 POWER REQUIREMENTS

Input Voltage	100, 117, 220, 240 VAC +10% 50/60 Hz standard. Desired input voltage level selected via tapped transformer primary connections
Power Consumption	12 watts, nominal
Line Filter	Line to line and line to neutral filtering, standard
Fuse	1/4 amp, 125V, slow-blow
EMI/FRI Suppression	Protection per SMA guidlines
Power Loss Detector	This feature protects against incorrect readings caused by loss of stored tare or AZM value during a power removal or failure. In the NET mode, a loss of tare indication can be corrected by momentarily actuating the TARE switch.

2.13 PACKAGING (UMC2000)

Mounting Styles	Free standing table top with feet or panel mount configurations
Norminal Size	7 1/2" wide, 4" high and 10" deep
Weight	Approximately 10 pounds (4.5 Kg)

2.14 PACKAGING (UMC2002)

Nominal Size	10.65" Deep x 7.90" Wide x 4.34" High Plus separate display PC board assembly with 26" cable.
Mounting Configuration	Designated to mount in environmental enclosure. See UMC2002 drawing.
Weight	Approximately 8 pounds (3.6 Kg)

2.15 PACKAGING (UMC2004)

Mounting Style	NEMA 4X stainless steel wall mount enclosure
Nominal Size	12" wide, 14" high and 6" deep
Weight	Approximately 34 pounds (15.5 Kg)

2.16 ENVIRONMENTAL

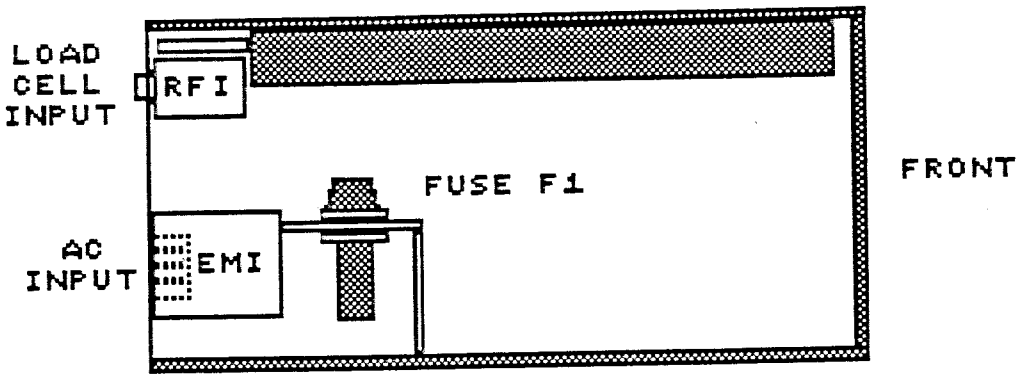
Operation Temp. Range	-10 to +50oC (+15 to +125oF)
Storage Temp. Range	-15 to +85oC (+5 to +185oF)
Relative Humidity	95%, non-condensing

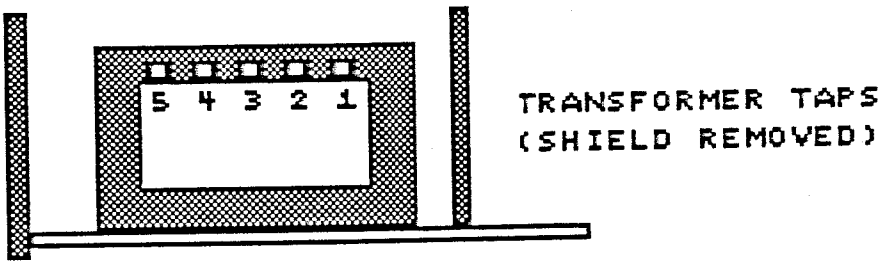
2.17 OPTIONS

* Setpoint or Digital Tare (Remote Thumbwheel only on UMC2000).
* RS232C Simplex Serial Port using KDB8924-1 Assembly.
* 0-10 VDC Analog Output (2:1 Range Maximum)
* 4-20mA Isolated Analog Output (2:1 Range Maximum)
* Full 6-digit (999,900) display with KNW1924-1 display board and EPROM (KAL1921-14-1).
* 2-HZ low-pass analog filter.
* Full Duplex Serial Port for 20 mA (KW116-30) or RS232C (KW116-31) operation using KAL1921-10-1 EPROM.

SECTION 3

INITIAL POWER-UP





PLEASE REMEMBER TO TURN OFF POWER BEFORE REMOVING OR CHANGING ANY COMPONENTS IN THE UNIT OR THE KIT. FAILURE TO DO SO MAY RESULT IN COMPONENT DAMAGE AND WILL VOID ALL WARRANTIES.

3.1 GENERAL

This section provides the power requirements and initial power-up procedures for the UMC2000 series units. Figure 3.1 on the preceding page shows the location of the power supply assembly on the CPU Assembly board and the location of the power fuse; and Figure 3.2 shows the location of the power transformer secondary taps.

3.2 TRANSFORMER WIRING

The UMC2000 series units are designed to operate under any of the 4 voltage configurations outlined in Table 3.1, at a frequency of 48 to 62 HZ. Note the domestic United States usage is nomally 117VAC at 60 HZ. If you have a unit which does require rewiring from one voltage configuration to an alternate voltage configuration, please consult Figure 3.2 for wire and terminal tap locations; and Table 3.1 for wiring locations for the secondary wires.

3.3 REPLACING THE FUSE

The power fuse is a 3AG, .25 ampere, slow-blow fuse, commercially available through most electrical distributors. This fuse should be replaced with the same amperage; use of overrated power fuses may result in damage to the unit and will void all equipment warranties.

3.4 ELECTRICAL GROUNDING CONNECTIONS

The UMC2000 is supplied with a three-wire line cord and plug. The third wire is physically connected to the units case to eliminate shock hazard to operating personnel. In addition, the analog and digital grounding system for the Indicator is separated into two electrically-isolated ground lines. Both of these ground lines are,in turn, completely isolated from the unit's case. To avoid creating ground loop currents and/or spurious noise voltages, these conditions should be maintained when externally interfacing the instrument.

When making external digital ground connections, be sure to use the "logic common" pin(s) associated with the particular output function being interfaced.

The UMC2002 or UMC2004 is provided with a three-position terminal strip. (See Figure 1.4). Note the locations of the wire terminations given in Table 3.1.

3.5 LOAD CELL EXCITATION

The load cell excitation voltage may be selected to be either 10 VDC or 15 VDC.

Selection is accomplished via a two-position DIP switch S3 which is located toward the rear portion of the vertical A/D assembly and is accessed through the circular opening provided (shielded unit only).

For Proper operation, only one(1) switch must be closed at any given time. For example, if 10 VDC excitation were desired, switch #2 must be "closed" and switch #1 "open". For either voltage level, see Table 3.2.

Load currents of up to 175 mA may be utilized. This allows up to four (4) 350 ohm load cells to be operated in parallel at 15VDC continuously. The outputs are short-circuit protected.

TABLE 3.1

TRANSFORMER WIRING

UMC2000 PART NO.	PRIMARY AC VOLTAGE	AC INPUT HI	AC INPUT LO	JUMPER
( ) A - ( ) ( )	117 VAC	1	5	1-4, 3-5
( ) B - ( ) ( )	220 VAC	2	5	3-4
( ) C - ( ) ( )	240 VAC	1	5	3-4
( ) D - ( ) ( )	100 VAC	2	3	2-4, 3-5

TABLE 3.2

EXCITATION VOLTAGE SWITCH SETTINGS (S3)		SELECTED EXCITATION VOLTAGE
S3-1	S3-2	
0	1	10 VDC
1	0	15 VDC

0 = Open Setting

3.6 LOAD CELL TERMINATION-UMC2000 SHIELDED UNITS

If your unit is a UMC2000 shielded unit (part numbering code UMC2000**-*B, or UMC2000**-*F with a connector on the rear in position J1), use Table 3.3 below for termination information. A load Cell mating connector is included with each shielded unit. If you require a spare connector, order the following:

Factory Part No.: KKU354BW
Amphenol Part No.: 17-90150-16

TABLE 3.3

J1 OR TB1 LOAD CELL TERMINATION

J1 Pin No.	Function	Analog Output Option
1	+Excitation	STANDARD
5	+Sence	
4	-Excitation	
6	-Sense	
3	+Signal	
2	-Signal	
7	Analog Output-HI	OPTIONAL
8	Analog Output-LO	
11,12,13	Shield	STANDARD

C A U T I O N

IF ONLY A FOUR (4) WIRE CABLE CONNECTION IS USED (NO REMOTE SENSING), JUMPERS MUST BE INSTALLED BETWEEN THE (+) EXCITATION AND (+) SENSE LEAD (J1, PINS 1 TO 5) AND BETWEEN THE (-) EXCITAION AND (-) SENSE LEADS (J1, PINS 4 TO 6).

3.7 LOAD CELL TERMINATION-UMC2000 UNSHIELDED UNITS OR UMC2002 AND UMC2004

If your unit is a UMC2000 unshielded unit (part numbering code UMC2000**-*D), or a UMC2002 or UMC2004 unit, use Table 3.4 below for wiring information.

TABLE 3.4

LOAD CELL TERMINATION

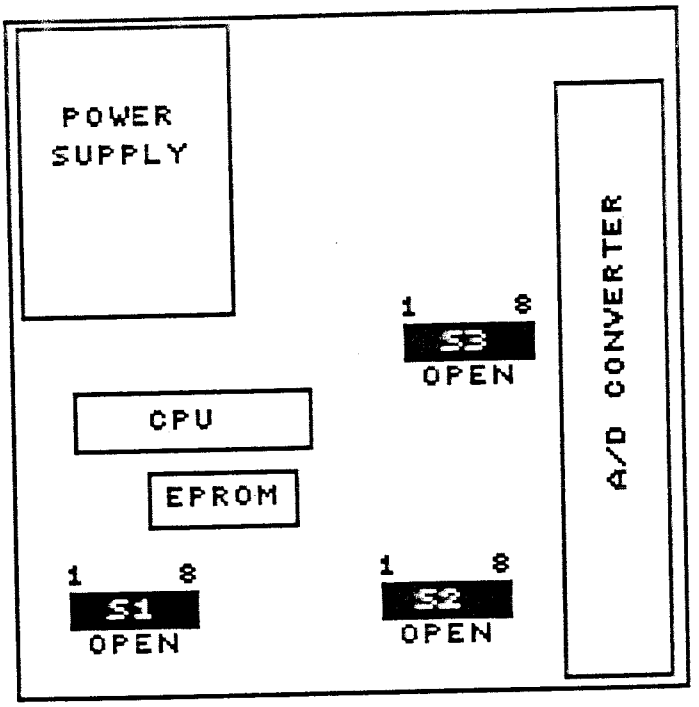
TERMINAL NO.	FUNCTION	CAUTION
1	+Excitation	IF ONLY A FOUR (4) WIRE CABLE CONNECTION IS USED, JUMPERS MUST BE INSTALLED ON THE TERMINAL STRIP BETWEEN THE (+) EXCITATION AND THE (+) SENSE AND THE (-) EXCITATION AND THE (-) SENSE.
2	+Sense	
3	-Excitation	
4	-Sense	
5	+Signal	
6	-Signal	
	Shield*	

* Load Cell cable shield may be attached to either TB1 mounting lug.

Note also that Analog Outputs are not available on the "unshielded" unit configuration.

SECTION 4

DIGITAL PROGRAMMING SWITCHES



4.1 GENERAL

This section provides the switch settings for digital programming switches S1, S2 and S3. This digital programming switches should be set prior to the Analog Calibration sequence shown in Section 4.2. Table 4.1 below provides a "quick-reference" set up table. Note that program switch S2 now has eight (8) positions.

TABLE 4.1

DIGITAL PROGRAM SWITCHES

"EXPANDED" UNITS

FUNCTION OR PARAMETER	PROGRAM SWITCHES	RECOMMENDED VALUE	RECOMMENDED SETTING
Capacity	S1-1,2,3,4	A/R	A/R
Display Resolution	S1-5,6	A/R	A/R
Lb-Kg Base	S1-7,8	A/R	A/R
Decimal Point	S2-1,2,3	A/R	A/R
Setpoint/TW Tare	S2-4	Auto Tare Enable	S2-4=1
Serial & Parallel Output	S2-5,6,7,	A/R	A/R
Front Panel Switch Function	S2-8	A/R	A/R
Motion Band	S3-1	+3 Grads	S3-1=1
Sensitivity and Digital Averaging	S3-2,3,4	A/R	A/R
Power on "Dashes"	S3-5	Dashes Disabled	S3-5=1
AZM Aperture	S3-6	+2%	S3-6=0
AZM Capture Band	S3-7,8	+3 Grads	S3-7+1 S3-8=1

TABLE 4.2

KAL1921-3-1 EPROM - PROGRAM SWITCH SETTINGS

S1(CPU) 1 2 3 4	CAPACITY IN GRADUATIONS
0 0 0 0	20,000
1 0 0 0	15,000
0 1 0 0	14,000
1 1 0 0	13,000
0 0 1 0	12,000
1 0 1 0	11,000
0 1 1 0	10,000
1 1 1 0	9,000
0 0 0 1	8,000
1 0 0 1	7,000
0 1 0 1	6,000
1 1 0 1	5,000
0 0 1 1	4,000
1 0 1 1	3,000
0 1 1 1	2,000
1 1 1 1	1,000

S1(CPU) 5 6	DISPLAY RESOLUTION Lb	Kg
1 1	x1	x0.5
0 1	x2	x1
1 0	x5	x2
0 0	x10	x5

S1(CPU) 7 8	Lb - Kg MODE CAL DISPLAY	
0 0	Kg	Kg
1 1	Lb	Lb

S2(CPU) 1 2 3	DECIMAL PT. BASE	CONV
0 0 0	xxxxx0	xxxxx
1 1 1	xxxxx	xxxx.x
0 1 0	x.xxxx	.xxxxx
1 1 0	xx.xxx	x.xxxx
0 0 1	xxx.xx	xx.xxx
1 0 1	xxxx.x	xxx.xx

S2-4(CPU) 0 1	TARE MODE TW Tare Auto Tare

S2(CPU) 5 6 7	SERIAL ENABLE	MODE	BAUD RATE	J3-4 FUNCTION
0 0 0	Dis	Dis	Dis	Hold
1 0 0	En	Cont	1200	Demand
1 0 1	En	Cont	4800	Demand
1 1 0	En	Demand	300	Demand
1 1 1	En	Demand	1200	Demand

S2-8(CPU) 0 1	FNT PNL DispChk A-Zero

S3-1(CPU) 0 1	MOTION 1 Grad 3 Grad

S3(CPU) 2 3 4	DIGITAL AVERAGING
0 0 0	2
1 0 0	1
0 1 0	32
1 1 0	16
0 0 1	8
1 0 1	4
0 1 1	2
1 1 1	1

S3-5(CPU) 0 1	DASHES Enable Disable

UPDATES PER SECOND
5 - 6
10 - 12
1/3
1/2
1
2
5
10

S3-6(CPU) 0 1	AZM/PAZ APERTURE
	2% Full Scale
	Full Scale

S3(CPU) 7 8	AZM CAPTURE RANGE
0 0	Off
1 0	0.5 Grad
0 1	1 Grad
1 1	3 Grad

4.2 CAPACITY SETTING

Table 4.4 below gives capacity settings. Note that the 20,000 x1 graduation setting has replaced the 16,000 x1 setting; the display will show "19,999" and blank at "20,000". Otherwise,display blanking occurs at 2% over the listed capacity setting shown.

TABLE 4.4

CAPACITY:

S1 SWITCH SETTINGS*				CAPACITY IN GRADUATIONS
1	2	3	4	
0	0	0	0	20,000
1	0	0	0	15,000
0	1	0	0	14,000
1	1	0	0	13,000
0	0	1	0	12,000
1	0	1	0	11,000
0	1	1	0	10,000
1	1	1	0	9,000
0	0	0	1	8,000
1	0	0	1	7,000
0	1	0	1	6,000
1	1	0	1	5,000
0	0	1	1	4,000
1	0	1	1	3,000
0	1	1	1	2,000
1	1	1	1	1,000

* 0 = OPEN

4.3 DISPLAY RESOLUTION

Next, set the Display Resolution, using switches S1-5 & 6 and Table 4.5 below. The Display Resolution defines the increment size of the displayed data.

Note that if a "10 Lb" Display Increment is required, use the following switch configuration:

RECOMMENDED	DO NOT USE
S1-5 = 0	S1-5 = 1
S1-6 = 0	S1-6 = 1
S2-1 = 1	S2-1 = 0
S2-2 = 1	S2-2 = 0
S2-3 = 1	S2-3 = 0

TABLE 4.5

DISPLAY RESOLUTION:

S1 SWITCH SETTING*		LB - BASE DISPLAY RESOLUTION			Kg - BASE DISPLAY RESOLUTION		
5	6	Gain	Lb	Kg	Gain	Lb	Kg
1	1	x1	1	.5	x1	None	1
0	1	x2	2	1	x2	None	2
1	0	x5	5	2	x5	None	5
0	0	x10	10	5	x10	None	10

*"0" = "Open" Setting

4.4 Lb-Kg BASE AND DISPLAY SELECT

Use Table 4.6 and switches S1-7 and S1-8 to define the "base" and to convert between Lb and Kg displays. Consult Section 6.1.3 for remote or external Lb-Kg switching. Note that if the unit is in the "Kg Base" mode (S1-7 = 0), no Lb-Kg switching is possible.

TABLE 4.6

Lb-Kg BASE AND Lb-Kg
DISPLAY SELECTION:

S1 (CPU) SWITCH SETTINGS*		OPERATIONAL MODES	
7	8	CALIBRATION MODES	DISPLAY LEGEND
0	0	Kg	Kg
0	1	Kg	Kg
1	0	Lb	Kg**
1	1	Lb	Lb

* "0" = Open Setting
** Lb/Kg Conversion Performed

4.5 DECIMAL POINT SELECTION

Next use switches S2-1, 2, 3 and Table 4.7 below to select the desired decimal point location. Please note the limitation on "10 Lb" builds outlined in Section 4.3

TABLE 4.7

DECIMAL POINT SELECTION

S2*			OPERATIONAL MODE	EXAMPLE Lb BASE, x1	
1	2	3		Lb	Kg
0	0	0	No Decimal Point Fixed Zero	100,000	45360
1	0	0	No Decimal Point	10000	4536.0
0	1	0	Dec Pt #5	1.0000	.4536
1	1	0	Dec Pt #4	10.000	4.536
0	0	1	Dec Pt #3	100.00	45.36
1	0	1	Dec Pt #2	10000.	4536
1	1	1	** No Decimal Point	10000	4536.0

* "0" = "Open" Setting

** Recommended setting

4.6 SETPOINT/THUMBWHEEL TARE SELECTION

Switch S2-4 and Table 4.8 define the setting for the use of the TW as a Setpoint or TW Tare input. Switching the TW to a Setpoint enables the Auto Tare function, while enabling TW as a TW Tare option disables the Auto Tare. Thus, if no Thumbwheel assembly is used, switch S2-4 must be left in the "1" or "closed" position.

TABLE 4.8

S2 SWITCH SETTING* 4	OPERATIONAL MODE
0	Thumbwheel Tare Mode - Auto Tare Disabled -TW Position #1 TW Tare
1	Setpoint Mode - Auto Tare Enabled - TW Position Setpoint

* "0" = "Open" Setting

4.7 SERIAL AND PARALLEL OUTPUT SELECT

The "expanded" units are equipped with BOTH a Parallel BCD and a Serial Output. Table 4.9 below, in conjunction with switches S2-5, 6, 7 defines the Serial Output mode and baud rate, as well as the appropriate function for J3-4. Please consult Section 6.1 for more information on the Parallel Output, and Section 6.3 for information on the Serial Output.

TABLE 4.9

SERIAL AND PARALLEL OUTPUT SELECT

S2*			SERIAL OUTPUT			J3-4
5	6	7	ENABLED DISABLED	DEMANDS VS. CONTINUOUS	BAUD RATE	FUNCTION
0	0	0	SERIAL OUTPUT DISABLED			PARALLEL BCD "HOLD"
0	0	1				
0	1	0				
0	1	1				
1	0	0	Serial Output Enabled	Continuous Output Mode	1200 Baud	FUNCTION
1	0	1			4800 Baud	
1	1	0		"Demand" Mode	300 Baud	Serial "Demand"
1	1	1			1200 Baud	

* "0" = "Open" Setting

4.8 FRONT PANEL SWITCH FUNCTION

These units may be configured with the left-hand front panel switch either in a "Display Check" or an "Auto Zero" configuration.The functions of the "Net-Gross" and "Auto Tare" switches remain the same. The unit will normally be configured in the "Display Check" mode, using a KVT182 front panel.

TABLE 4.10

DISPLAY CHECK VS. AUTO ZERO

S2-8	FUNCTION	FRONT PANEL
0	Display Check	KVT182
1	Auto Zero	KWU182

* "0" = "Open" Setting

4.9 MOTION DETECTION

The function of a "Motion Detection" circuit is to sense when the displayed weight data is changing at a greater rate than preset limits (or is "unstable"), and to inhibit certain functions at such times. Functions inhibited include:

1. Printing or output of serial or parallel data.
2. Entry of a PAZ value
3. Entry of an Auto Tare value
4. Activation of AZM (Zero Tracking).

The detection circuit looks at two parameters when determining "Motion"; the Rate of Change, or difference between two successive readings and the Time Sensitivity, or the time difference between two readings. In other words, using the "normal" or "recommended" settings, the unit checks a display reading every one second (the Time Sensitivity), and looks to see if the new reading has not changed from the old reading by more than 3 displayed graduations (the Band Width).

The Time Sensitivity is fixed at (1) second, while the Motion Band Width is adjustable as shown in Table 4-11. The recommended setting (**) is +3 displayed graduations.

TABLE 4.11

MOTION BAND

S3-1*	MOTION BAND
0	+ 1 Graduation
1	+ 3 Graduation

* "0" = "Open" Setting
** Recommended Setting

4.10 SENSITIVITY AND DIGITAL AVERAGING

The update rate is fixed at 10 per second. The unit may be run "Full Speed" (no averaging), or as slow as 1 update every 3 seconds for high-vibration applications. In addition, the sensitivity (amount of A/D range used) can be fixed at "X1" or "full Scale" (to provide the fastest possible update rate), or can be a function of the capacity setting.

TABLE 4.12

SENSITIVITY AND DIGITAL AVERAGING

S3*			Number of Updated Averaged	Update Rate Per Second	Sensitivity
2	3	4			
0	0	0	2	5-6	X1 Based on 20,000 Capacity
1	0	0	1	10-12	
0	1	0	32	1/3	Function of Capacity Selection (S1-1,2,3,4)
1	1	0	16	1/2	
0	0	1	8	1	
1	0	1	4	2	
0	1	1	2	5	
1	1	1	1	10	

* "0" = "Open" Setting

4.11 "DASHES" ON "POWER-UP"

The unit may be configured in a "Legal For Trade" mode which requires "Dashes" on the display when power is interrupted or in a mode which automatically returns the unit to normal operation, using switch S3-5.

TABLE 4.13

"DASHES" ON "POWER-UP"

S3-5*	FUNCTION
0	Enables Dashes
1	Disables Dashes

* 0 = Open Setting

4.12 AZM (AUTOMATIC ZERO MAINTENANCE)

AZM, also known as "Zero Tracking", is an electronic means of providing a "true zero" at all times on a digital scale. AZM compensates for such conditions as Indicator or Load Cell drift, or dirt or debris on a scale platform, by "tracking out" minor variations around zero electronically.

PAZ, or "Pushbutton Auto Zero", is a extension of the AZM function using a front panel pushbutton. The PAZ function replaces the fine zero adjust potentiometer, particularly in harsh environmental applications.

The APERTURE is the total range (in percentage of full scale capacity) over which the AZM and PAZ function will operate. NBS H-44 requirements (and Canadian SGM-3A specifications) permit a maximum of +2% of full scale capacity (+20 Lb on a scale with a 1000 Lb capacity, for example, regardless of the display increment size). The AZM circuitry will not "track" outside this band and the PAZ button, if pushed, will force "dashes" on the display if the displayed weight is outside the +2% band. The scale must be cleared of all weight and the PAZ button repushed. Table 4.14 below defines the AZM/PAZ aperture.

Switch S3-6 defines the Aperture setting for AZM (Zero Track) as well as the "Pushbutton Zero" if used. Note that the Maximum aperture setting is +20% not 100%. Also note that the AZM must be turned on (Table 4.15 on page 4-16)) for the functions to work.

TABLE 4.14

AZM AND PAZ APERTURE

S3-6	APERTURE
0	+ 2% Full Scale
1	Full Scale

* "0" = "Open" Setting

The other AZM value to be set via program switches is the CAPTURE BAND, which is the amount of weight (expressed in displayed graduations) which is "zeroed off" or "captured" at one time. The H-44 "Legal-For-Trade" settings vary from +0.6 graduations to +3 graduations, depending on the scale type. The AZM "Capture Band" is adjusted by program switches S3-7 and 8, as shown in Table 4.15 below.

TABLE 4.15

AZM CAPTURE BAND

SWITCH SETTINGS* S3		CAPTURE RANGE (GRADUATIONS)
7	8	X1
0	0	OFF
1	0	+.5
0	1	+1
1	1	+3

*"0" = "Open" Setting

SECTION 5

ANALOG ADJUSTMENT

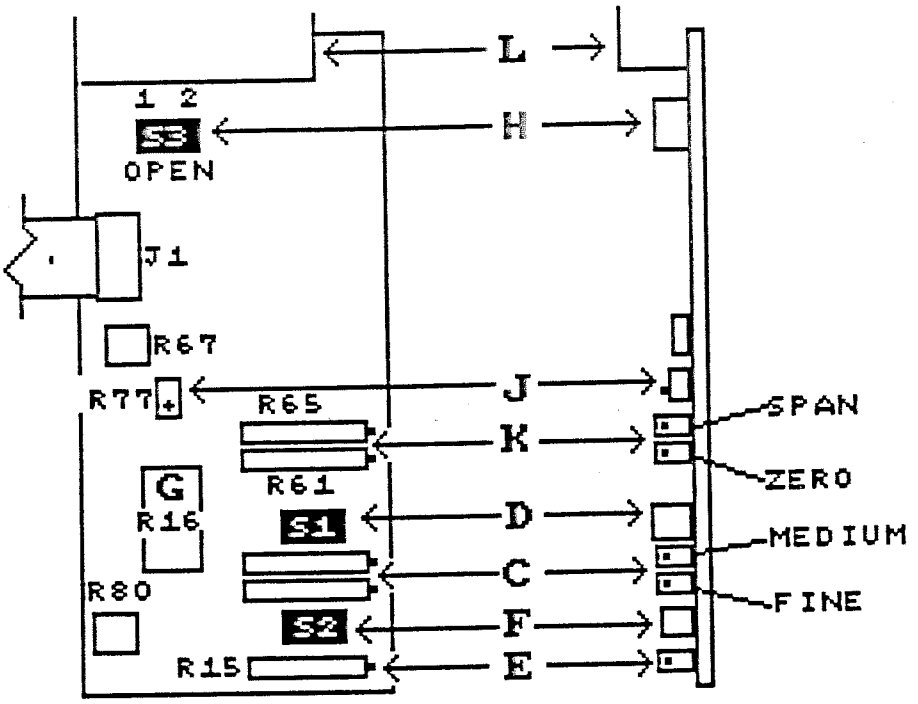


FIGURE 5.1

(C) Medium/Fine Span Adjustments Filter

(D) Coarse Span Switches

(E) Medium Zero Adjustment

(F) Coarse Zero Switches

(G) Fine Zero Adjustment

(H) Excitation Voltage Select Switches

(J) Coarse Span Adjustment - Analog Output

(K) Span and Zero Adjustment - Analog Output

(L) EMI Filter

Figure 5.1 on the preceding page show the location of the A/D Converter Assembly and the switches and controls used to calibrate the analog section of the unit. The following sequence should be used in analog calibration:

5.1 Perform all of the digital programming adjustments outlined in Section 4.

5.2 Set the Load Cell Excitation, using switch S3 to the rear of the A/D Converter assembly. See Section 3.5 and Table 3.2.

5.3 a) Set the Zero (or initial or offset) Adjustments, using the coarse zero switches (F) and the medium zero potentiometer (E), and the fine zero potentiometer (G), located on the front panel. Note the positions of AZM switches S3-6,7 and 8; then turn the switches to "1" or "not open" until after the zero and span adjustments are made. Before connecting the unit to a scale understructure, insure that compatibility exists between the understructure capacity desired and the digital indicator.

b) To begin the zero adjustments, push the four course zero switches to "0" or "open" position and turn the medium zero control counter-clockwise.

c) Switch the coarse zero switches the negative reading position which is closest to zero.

d) Next, turn the medium zero potentiometer clockwise until the reading is zero and the "center zero" light is on steadily.

5.4 a. Set the span adjustments, using the coarse span switches (C), the medium and fine span controls (D), as outlined in Figure 5.1 .

b. First, place weights on the scale corresponding to full scale capacity or a known weight.

c. Turn the four coarse span switches to the "0" or "Open" position, and turn both the medium and fine span controls counter-clockwise as far as they will travel (until an audible "click" is heard or the weight display does not change).

d. Set the coarse span switches to the reading which is just below the desired reading.

e. Adjust the medium span control clockwise until the display is within a few counts of the desired weight readings.

f. Adjust the fine span control clockwise until the display coincides with the desired weight reading.

5.5 a. Although the Indicator is designed to eliminate or minimize the interaction between zero and span, a check should be made to insure that both are set correctly.

b. To do so, remove the weight from the scale and check for zero. If adjustment is necessary, repeat step "C".

c. If adjustment of zero was necessary, return the weights to the scale and recheck span.

d. Continue rechecking zero and span until they are both correct.

e. If the zero tracking switches had been turned off during the previous steps, turn S3-6,7 and 8 to their previous positions.

f. The unit should now be calibrated, and performance checks should be made on the entire scale.

SECTION 6

STANDARD FEATURES - "EXPANDED" UNITS

6.1 PARALLEL BCD

6.1.1 GENERAL

The "Expanded" UMC2000 series units come equipped with several features normally only available as options. The first of these is Parallel BCD Output.

The Parallel BCD wiring information is found in Table 6.1 on Page 6-3. The data is updated after each display update, and is continuously available for use with Remote Displays and Scoreboards as well as printers or other data collection devices. A "data valid" signal informs the external device that the Parallel output registers have been updated and data is "true". In order to insure Legal-For-Trade printing compatability, a "print enable" signal is available. This signal, normally tied to the "print inhibit" line from most printers, is a summation of the following signals:

* Data Valid
* Motion
* Overload, Positive or Negative
* Positive Gross Weight
* Unit in "Display Check" cycle

If the serial output is disabled (S2-5 = 0), Pin J3-4 becomes a "hold" input from an external device. Grounding this input "freezes" the Parallel BCD registers and insures a valid print.

6.1.2 WIRING

Refer to Table 6.1 on Page 6-3 for wiring specifics, if you are using a UMC2000. Also note that the external mating connector is an option; to order it, specify:

Factory Part Number - KKU354CB
Amphenol Part Number - 17-90370-16

If you are using a UMC2002 or UMC2004 and desire the flexibility of Terminal Board wiring rather than a connector, order the KW116-21 Terminal Board Kit. This kit installs directly to the UMC2002 chassis, and the silk-screened nomenclature on the assembly serves as a wiring guide.

Because the units are used with printers which have a "hardwired" decimal point, and because Lb/Kg switching may be used, the following occurs in the 1 Lb graduation (or 0.5 Kg graduation) mode:

DISPLAYED WEIGHT	PARALLEL OUTPUT					
	5th SD	4th SD	3rd SD	2nd SD		LSD
	---	---	---	---	---	---
2721 Lb	2	7	2	1	.	0
1234.5 Kg	1	2	3	4	.	5

In other words, a 1 Lb graduation appears on, the parallel BCD output as "1.0 Lb". If the trailing zero is not wanted, and Kg switching is not used, wire the "units" digit on the printer to the 2nd SD digit on the parallel BCD output, and do not wire the "LSD" digit. Also insure that the printer wiring is in accordance with the printer manufacturer's recommendations.

TABLE 6.1

J3 - PARALLEL I/O CONNECTOR

PIN NO.	FUNCTION	SIGNAL CHARACTERISTICS
31	1	
30	2	
29	4 LSD	
28	8	
32	1	
27	2	
26	4 2nd SD	BCD Output Data
25	8	
24	1	
23	2	
22	4 3rd SD	DTL/TTL Compatible
21	8	
8	1	
7	2	
6	4 4th SD	Sink - 5 mA at Logic "0"
20	8	
12	1	
14	2	
16	6 5th SD	Source- 240 uA at Logic "1"
18	8	
10	Leading One-MSD	
9	Polarity Bit	Logic "0" = Minus
11	Center Zero Bit	Logic "1" = Center Zero
13	Print Enable Bit	
15	Data Valid Bit	Logic "0" = Data Changing
17	Overload Bit	Logic "0" = Overload
19	Motion Bit	Logic "0" = In Motion
34	Gross/Net Switch	See Section 6.1.3
35	Net	
37	Check Switch	See Section 6.1.3
36	Serial Return **	See Section 6.3
3	Lb/Kg Switch	See Section 6.1.3
4	Hold Bit or **	See Section 6.1.3
5	**	See Section 6.1.3
1	Logic Common	
2	Logic Common	
33	Auto Tare Switch	See Section 6.1

** Serial Output - See Section 6.3 *or "Auto Zero" switch

6.1.3 REMOTE OPERATION OF FRONT PANEL SWITCHES

The three front panel switches can be operated from a remote location, if the "standard" unit is ordered. Consult Figure 6.1 for specific information. Momentary-action pushbuttons should be used. Note that each "Push" of the remote switches will change the state of the output.

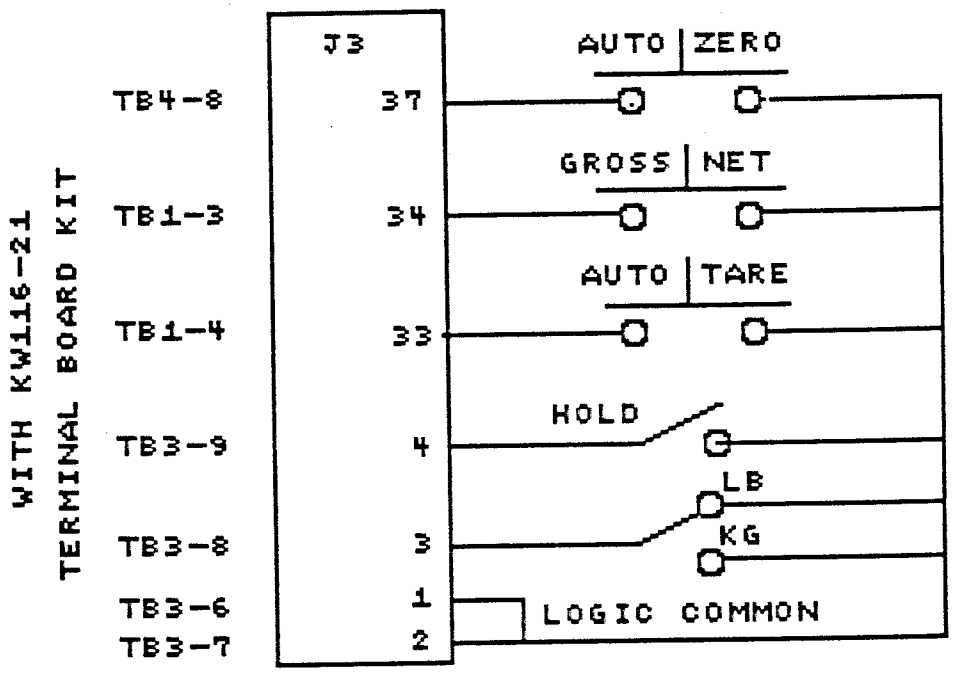
If the continuous operation of the unit in a non-normal condition is desired, the appropriate pin on J3 may be continuously "grounded", or connected to "logic common". For example, if you wish to use the instrument only in the "net" mode, J3-34 must be grounded. This will also inhibit the function of that particular front panel switch. Note: ground the pins to "logic common" only, not to case ground or other grounds.

In addition to the three front panel switches, the Hold and Lb/Kg commands are brought out to J3. The Hold command "freezes" the parallel BCD output register while the line is grounded, and is often used in conjunction with a printer or other output device to ensure "stable" output data. The display readout is also inhibited by this switch.

An alternate action (form "C", SPDT) switch is required to operate the Lb/Kg switch. If internal program switches S1-8 is "open" and the instrument is in the"Kg" mode, continuously grounding J3-3 will place the instrument in the "LB" mode. Note that switch S1-7 must be "1" or "closed" (Lb Base), or the switch will not function.

If switch S1-8 is "closed", and the instrument is in the "Lb" mode, the external switch will have no effect.

Good engineering practices suggest that the switches be placed no more than six (6) feet (or two meters) from the Indicator.



REMOTE SWITCH OPERATION

FIGURE 6.1

6.2 SETPOINT/FIXED TARE

6.2.1 GENERAL

The Indicator is equipped with an optional output to be used as a single setpoint control or fixed tare depending on the setting of internal program switch S2-4. If S2-4 is set to the "1" position, "not open", the external control is used as a setpoint, and the "Auto Tare" function of the Indicator is operable. In this mode, the weight display is compared to the input from the external thumbwheel controller and the setpoint output is activated when the displayed weight value exceeds the setpoint value. The setpoint output is capable of driving a solid state relay (Part No. KHK431C or equivalent). Wiring information for the setpoint/fixed tare connector is given in Table 6.2. Note that the external setpoint controller must be in BCD complement format. Note that if the setpoint/fixed tare option is not used, switch S2 must be set to the "1" position, or "not open", or erroneous readings will occur in the "net" mode.

If switch S2-4 is switched to the "0", "open" position, the external control operates as a fixed tare, and the "auto tare" feature is not operable. The "gross/net" switch must be pushed to the "net" mode, and then the digital value displayed on the external thumbwheel assembly will be subtracted from the instrument's displayed weight.

TABLE 6.2

J2 - SETPOINT/FIXED TARE CONNECTOR

J2 or J5 (CPU) PIN NO.	FUNCTION	SIGNAL CHARACTERISTICS
24 13 11 9	1 2 4 LSD 8	
23 25 12 10	1 2 4 2nd SD 8	Thumbwheel Switch Interface
8 5 4 3	1 2 4 3rd SD 8	Data Input in Standard BCD Format
7 6 1 2	1 2 4 4th SD 8	"BCD Complement" Thumbwheel switch required (all outputs shorted to "common" when switch reads "0")
14 15 16 17	1 2 4 MSD 8	
20	+5VDC	
21	Common	
18	Setpoint Output	Logic "0" Above Setpoint value - sink 16mA at 0.4 VDC.
19	Spare Output	
22	Spare Output	

6.2.2. WIRING

QTY	PART NUMBER	DESCRIBTION
1	KAA8924-1	Thumbwheel Assembly
1	KDU2302	Switch Cover (Rubber Boot)
1	KGS1314-2	Bezel Assembly
1	KGS1314-2	Cable Assembly
1	KHK431C	Relay Assembly

Wiring to the Thumbwheel Assembly is done with standard 26-conductor ribbon cable (part no. KTG314C or equivalent). The mating connector for the Thumbwheel Assembly is part no. KGR354B; the ribbon cable mating connector for J2 on the rear of the UMC2000 is part no. KKU354BM. For proper operation, the Thumbwheel Assembly should be located no more than 15 feet (or 5 meters) from the UMC2000.

The KHK431C Remote Relay is designed to be used with the Setpoint output from the UMC2000. It provides a "form A" 1.5 amp solid-state closure rated at 120/240VAC. Relay operational characteristics are given in Table 6.2 on Page 6-9.

Drawing KDK7399 also shows the internal schematic of the relay, and also gives a wiring diagram for the assembly tied to the Setpoint output. Note that the use of a 270Vrms varistor (part no. KLS3100, General Electrical part no. V270LA2 or equivalent) is recommended for transient clipping.

In addition, in certain situations involving inductive loads an external R-C "snubber" circuit may have to be added to the output to insure that the relay turns off. When required, a 0.05 uF capacitor in series with a 100-ohm resistor should be adequate. With some motor loads, a 0.1 uF capacitor in series with a 50-ohm resistor, might be more satisfactory.

Also observe caution in soldering to the relay terminals, to avoid accidental unsoldering of internal connections.

TABLE 6.2

KHK431C REMOTE RELAY

OPERATIONAL CHARACTERISTICS

Isolation (Input to output and output to case)	2500 Vrms minimum
Insulation Resistance	1000 Mohms at 500VDC
Turn-on Time	8 msec. typ, 16 msec. max
Turn-off Time	25 msec. typ, 60 msec. max
Continuous Load Current, rms	50 ma min., 1.5 amps max
Surge Current max, one cycle	50 amps, rms
Leakage Current	1 u amp typ, 0.1 ma max
Repetivitive Peak Blocking Voltage	+400 V pk
Output Transient Immunity dV/dt Blocking	100 V/usec. min.
Output Frequency Range	47 to 70 Hz
Transient Clipping	270 Vrms varistor across contacts suggested

6.3 SERIAL OUTPUT

6.3.1 GENERAL

The serial Output is a single ASCII-compatible 20mA loop. The output format is compatible with most printers. The output can be set for a continuous output for the use with remote controllers and computers or can be activated on demand by a switch closure. As standard, the 20mA output is active only (i.e supplies the 20mA of current for the loop).

6.3.2. DATA FORMAT

All characters are in ASCII and consist of the following:

1 Start Bit
7 Data Bits
1 Parity Bit (odd)
2 Stop Bits

Program switches S2-5,6,7 controls the following serial output parameters:

* Serial Enable/Disable
* Continuous vs. Demand Mode
* Baud Rate

If serial output is not used, leave S2-5=0, or unit response may be appreciably slower.

The Data formats are:

A. Standard format in manual demand mode:

<STX> <POL> <DATA> <SP> <LB/KG> <SP> <GR/NT> <CR/LF>

B. Standard format in continuous mode:

<STX> <POL> <DATA> <L/K> <G/N> <STATUS> <CR/LF>

WHERE:

STX: Non-recording "Start of Text" character (ASCII 02H)

POL: Polarity sign. "Space" for positive data and "minus (-)" for negative data.

SP: Space character.

DATA: Seven digits of data including decimal point or fixed zero when selected. LEADING ZERO SUPRESSION WITH THE LEADING ZEROS TRANSMITTED AS SPACES.

LB/KG: TWO CHARACTER FIELD DATA INDENTIFICATION FOR DEMAND MODE SELECTED PER TABLE 6.4.

WEIGHT IN LB = "LB"
WEIGHT IN KG = "KG"

L/K: ONE CHARACTER FIELD DATA IDENTIFICATION IN CONTINUOUS MODE SELECTED PER TABLE 6.4.

WEIGHT IN LB = "L"
WEIGHT IN KG = "K"

GR/NT: TWO CHARACTER FIELD FOR DEMAND MODE, "GR" FOR GROSS WEIGHT DATA AND"NT" FOR NET WEIGHT DATA.

G/N: ONE CHARACTER FIELD FOR CONTINUOUS MODE, "G" FOR GROSS AND "N" FOR NET.

STATUS: A SINGLE CHARACTER USED IN THE CONTINUOUS OUTPUT MODE ONLY, TO INDICATE THE STATUS OF THE INDICATOR. CHARACTERS LISTED IN ORDER OF PRIORITY:

CHARACTERS	DESCRIPTION
"C"	CHECK MODE
"I"	INVALID DATA (DASHES ON DISPLAY)
"O"	OVER/UNDER RANGE
"M"	MOTION
"SP"	NONE OF ABOVE

CR/LF: TWO CHARACTER FIELD, "CARRIAGE RETURN" AND "LINE FEED" CHARACTERS, USED IN THE DEMAND MODE TO SIGNAL END OF MESSAGE.

TABLE 6.4

SERIAL AND PARALLEL OUTPUT SELECT

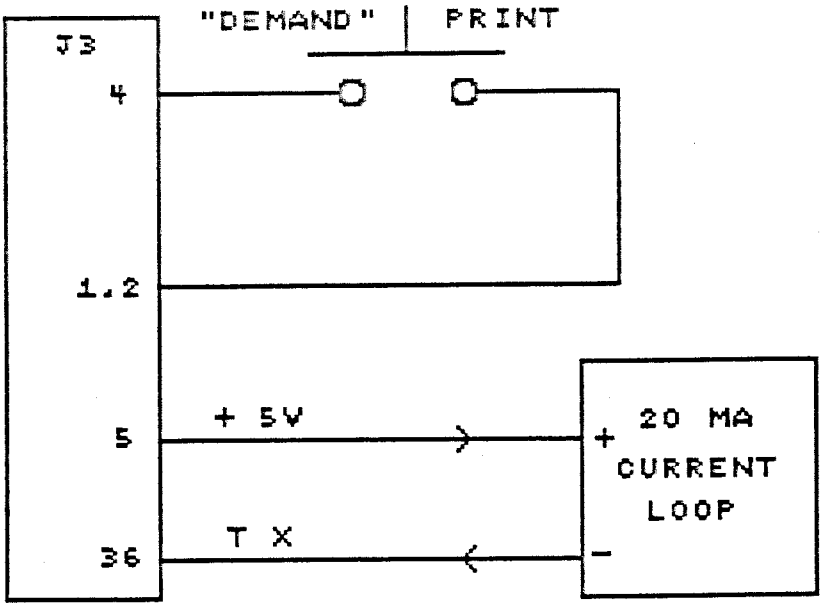
S2*			ENABLED DISABLED	SERIAL OUTPUT DEMANDS VS. CONTINUOUS	BAUD RATE	J3-4 FUNCTION
5	6	7				
0	0	0	SERIAL OUTPUT			
0	0	1	DISABLED			PARALLEL BCD
0	1	0				"HOLD"
0	1	1				FUNCTION
1	0	0	Serial	Continuous	1200 Baud	
1	0	1	Output	Output Mode	4800 Baud	
1	1	0	Enabled	"Demand"	300 Baud	Serial
1	1	1		Mode	1200 Baud	"DEMAND"

6.3.3 DEMAND VS. CONTINUOUS MODE

The transmission of serial output data can be initiated in either of two ways as follows:

DEMAND - The demand mode is used to interface to printers and requires a manual "print" command to initiate the output data in the formats as described in Section 6.3.2. The output is inhibited during the following conditions.

a. Scale in motion
b. Positive overload
c. Negative overload
d. Negative gross wight displayed
e. Instrument in "Display Check" mode
f. Display in dashed mode



SERIAL OUTPUT WIRING

FIGURE 6.2

CONTINUOUS - The continuous mode is used to interface to computers and transmits the data out automatically following each update of the display. The format, as described in Section 6.3.2. includes status information. Table 6.4 gives switch settings for "demand" and "continuous" modes.

NOTE - The Serial Output will extend the conversion period and therefore reduce the number of updates per second and front panel switch response as follows:

Continuous Output Mode	Approx. Number of Updates/Sec (No Averaging)
None	10
1200 Baud	4
4800	8

IT IS NOT RECOMMENDED THAT THE CONTINUOUS SERIAL OUTPUT BE CONFIGURED IN THE 1200 BAUD MODE, NOR SHOULD THE UNIT BE LEFT IN THE "CONTINUOUS OUTPUT" MODE IF THE SERIAL OUTPUT IS NOT USED.

SECTION 7

OPTIONS

7.1 0-10VDC ANALOG OUTPUT

7.1.1 DEFINITION

The Indicator can provide a calibrated analog output which ranges from 0.0VDC at "zero load" to 10.0VDC at full scale capacity. This output is linearly proportional to the gross weight on the scale, and is designed for use with strip chart recorders or other continuous monitoring devices. Connection to the analog output is to J1 - Pin 7 (HI) and J1 - Pin 8 (LO). Operational characteristics of the analog output are given in Table 7.1.

TABLE 7.1

Span Adjustment Range		2:1 Maximum
Standard Output Voltage Range (referenced to full scale signal input)		0 to +5 VDC minimum 0 to +10 VDC maximum
Output Current		0 to 1 mA maximum
Output Resistance		5 ohms maximum
Linearity		+0.1% FS maximum
Static Accuracy		+0.2% FS
Temperature Effect		
	Zero	+0.34 Mv/oC +15ppm/oC of offset voltage
	Span	+50ppm/oC

Since this analog signal is referenced to the same ground as the input potential, it is strongly recommended that the output be used only with floating, differential recorders or other isolated loads if freedom from ground loop and noise problems is to be achieved.

7.1.2 CALIBRATION

Please note that the adjustment range of the 0-10VDC analog output is limited to a 2:1 range. If more output signal is required for a specific application, resistor R64 on the A/D Assembly must be increased in value. The standard value is 12.1K ohms; the value should be increased by 2K ohms for each additional 1 volt of full scale output desired. The use of a precision, wire-wound resistor is recommended for best temperature stability.

1. Adjust the "zero" potentiometer for a reading of 0.0VDC when the scale is empty.
2. Adjust the "Gross Span" potentiometer at the side of the A/D Assembly to close to 10.0 VDC (or desired reading) with full capacity weight on the scale.
3. Fine adjustment of the full scale reading is done with the "Fine Span" potentiometer atop the A/D Assembly.

ANALOG OUTPUT ADJUSTMENTS

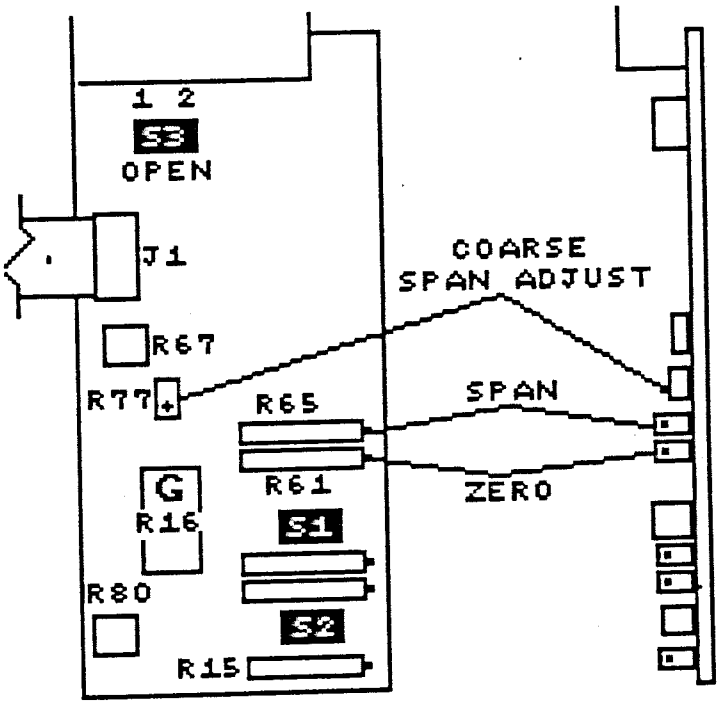


FIGURE 7.1

Installation of an Analog-to-Digital (A/D) Converter Assembly is as follows:

1. Remove the outer case or open the door.

2. Remove the screw (A) which fastens the CPU board to the frame.

3. Remove the two screws (B) which hold the connector Assembly J1 to the rear panel.

4. Remove the fine zero adjust potentiometer shaft (C) and the "O" ring (D) from the front panel. (If used).

5. Unplug the connector (E) from J2 position on the CPU board.

6. Remove the A/D converter by pulling it out and upward.

7. Place the new A/D converter in the frame as shown.

8. Attach the two screws (B)

9. Attach the screw (A).

10. Replace the potentiometer shaft (C) and "O" ring (D).

11. Replug the connector J2 (E).

12. Apply power, and test. Close the drawer.

7.2 ISOLATED 4-20 mA ANALOG OUTPUT

7.2.1 DEFINITION

This option provides an optically isolated output current signal which is directly related to the magnitude of the gross weight applied to the system.

The output current is available on pin 7 (+) and pin 8 (-) of the load cell connector J1.

Both zero and span adjustments are available through access holes located in the cover of the A/D converter assembly. Figure 7.2 below shows the location of these adjustments.

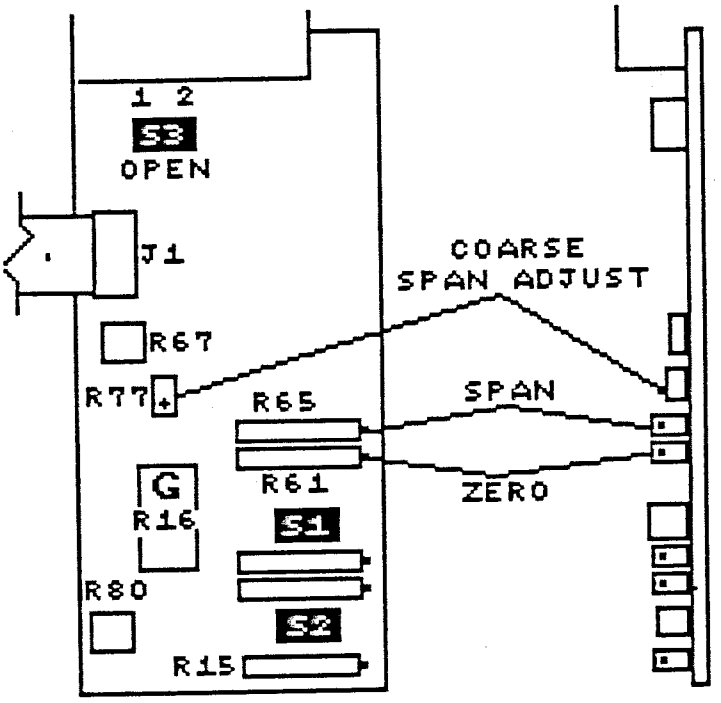


FIGURE 7.2

Operational characteristics and functional specifications for this option are listed below:

TABLE 7.2

Span Adjustment Range	2:1 Typical
Output Current @ Zero	4 mA
Output Current @ Full Scale	20 mA
Output Voltage Compliance	9.0 VDC max.
Load Resistance	0 to 450 ohms max.
Linearity	+/- 0.05% FS max.
Static Accuracy	+/- 0.1% FS max.
Temperature Effect : Zero	+/- 0.6 micro-amp/deg C plus +/- 15 ppm/deg C of offset voltage.
Temperature Effect : Span	+/- 50 ppm/deg C

The 4-20 ma analog calibration is performed as follows:

1. Adjust the "zero" potentiometer for a reading of 4.0 ma when the scale is empty.
2. Adjust the "Gross Span" potentiometer at the side of the A/D assembly close to 20.0 ma (or desired reading) with full capacity weight on the scale.
3. Fine adjustment on the full scale reading is done with the "Fine Span" potentiometer atop the A/D Assembly.

SECTION 8

COMMENDED SPARE PARTS - UMC2000 - "EXPANDED" UNITS

PART NUMBER	DESCRIBTION
KW116-33	CPU Assembly
KW116-17	A/D Converter Assembly (standard)
KW116-11	Display Assembly (UMC2000)
KW116-12	Display Assembly (UMC2002, UMC2004)
KFM1918R	Microprocessor (INTEL 8039)
KAL1921-3-1	EPROM-Programmed
KVT182	Front Panel (Display Check)
KWU182	Front Panel (Auto Zero)
KNW1924-1	6-Digit Display (optional)
KAL1921-14-1	EPROM (6-Digit Display)

UMC2000, 2002, 2004 Limited Warranty

Condec warrants that all Condec equipment and systems manufactured and sold by Condec and properly installed by an authorized Condec Distributor or Original Equipment Manufacturer (OEM) will operate per written specifications as confirmed by the Distributor/OEM and accepted by Condec. All systems and components are warranted against defects in materials and workmanship for two years.

Condec warrants that the equipment sold hereunder will conform to the current written specifications authorized by Condec. Condec warrants the equipment against faulty workmanship and defective materials. If any equipment fails to conform to these warranties, Condec will, at its option, repair or replace such goods returned within the warranty period subject to the following conditions:

- Upon discovery by Buyer of such nonconformity, Condec will be given prompt written notice with a detailed explanation of the alleged deficiencies.
- Individual electronic components returned to Condec for warranty purposes must be packaged to prevent electrostatic discharge (ESD) damage in shipment. Packaging requirements are listed in a publication, *Protecting Your Components From Static Damage in Shipment*, available from Condec Equipment Return Department.
- Examination of such equipment by Condec confirms that the nonconformity actually exists, and was not caused by accident, misuse, neglect, alteration, improper installation, improper repair or improper testing; Condec shall be the sole judge of all alleged non-conformities.
- Such equipment has not been modified, altered, or changed by any person other than Condec or its duly authorized repair agents.
- Condec will have a reasonable time to repair or replace the defective equipment. Buyer is responsible for shipping charges both ways.
- In no event will Condec be responsible for travel time or on-location repairs, including assembly or disassembly of equipment, nor will Condec be liable for the cost of any repairs made by others.

THESE WARRANTIES EXCLUDE ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. NEITHER CONDEC NOR DISTRIBUTOR WILL, IN ANY EVENT, BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

CONDEC AND BUYER AGREE THAT CONDEC'S SOLE AND EXCLUSIVE LIABILITY HEREUNDER IS LIMITED TO REPAIR OR REPLACEMENT OF SUCH GOODS. IN ACCEPTING THIS WARRANTY, THE BUYER WAIVES ANY AND ALL OTHER CLAIMS TO WARRANTY.

SHOULD THE SELLER BE OTHER THAN CONDEC, THE BUYER AGREES TO LOOK ONLY TO THE SELLER FOR WARRANTY CLAIMS.

NO TERMS, CONDITIONS, UNDERSTANDING, OR AGREEMENTS PURPORTING TO MODIFY THE TERMS OF THIS WARRANTY SHALL HAVE ANY LEGAL EFFECT UNLESS MADE IN WRITING AND SIGNED BY A CORPORATE OFFICER OF CONDEC AND THE BUYER.

RICE LAKE WEIGHING SYSTEMS

Voluntary Applicant Information Disclosure

NAME: _____ DATE: _____

POSITION APPLIED FOR: _____

Rice Lake Weighing Systems will recruit, hire, train, transfer, promote, reclassify, lay off, recall, and terminate all employees in all job classifications on the basis of their abilities, qualifications, accomplishments, and experience, without regard to race, color, religion, national origin, citizenship status, ancestry, existence of handicap, marital status, sexual preference, existence of arrest or conviction record, age, sex, or use of a legal substance, except in cases where age , sex or existence of a felony conviction or handicap is a bona-fide occupational qualification.

Please answer the questions below to help us comply with Federal Equal Employment Opportunity record keeping, reporting and other legal requirements. *This form will be kept in your confidential employment file.* This information is not used in making employment decisions. All employment decisions are made without regard to race, color, religion, creed, national origin, sex, ancestry, status with regard to public assistance, marital status, age, or disability.

WHAT IS YOUR RACE/ETHNIC GROUP? (Check One)

- ☐ Caucasian (White)
- ☐ Black
- ☐ Hispanic
- ☐ Asian or Pacific Islander
- ☐ American Indian or Alaskan Native
- ☐ Other _____

(Please Specify)

WHAT IS YOUR SEX?

☐ Male ☐ Female

VETERAN INFORMATION (Check Only One)

- ☐ Veteran
- ☐ Vietnam-Era Veteran
- ☐ Disabled Veteran
- ☐ Other Veteran (see back)

Are you able to perform the essential functions of the position for which you have applied, with or without reasonable accommodation? ☐ Yes ☐ No If no, please explain: _____

_____

Have you ever been convicted of a felony? ☐ No ☐ Yes If yes, state nature of offense, when, where and disposition: _____

Conviction of a felony will not necessarily result in rejection of your application. This information will be used only for job-related purposes and only to the extent permitted by applicable law. The information will be discussed with you in regards to the specific job you are applying for. Failure to divulge a Felony conviction may result in immediate rejection of your application or termination of your employment.

Federal laws require that employers hire only individuals who are authorized to be lawfully employed in the United States. In compliance with such laws, all offers of employment are subject to verification of each applicant's identity and employment authorization, and it will be necessary for you to submit such documents as are required by law to verify your identification and employment authorization upon employment.

Are you authorized to work for all employers in the United States on a full-time basis, or only for your current employer?

☐ All employers ☐ Current employer only