UMC555, 444

Digital Weight Indicators

Installation Manual

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UMC555 \ UMC444

TABLE OF CONTENTS

REVISED 1/26/96

SECTION 1
GENERAL INTRODUCTION

This Digital Weight Indicator is a microprocessor based instrument specifically designed to meet the needs of the scale industry.

FEATURES INCLUDE:

* Analog and Digital Calibration via Front Panel Entry.

* NON - VOLATILE memory for Configuration, Auto Zero, Auto Tare, PAZ values.

* 10,000 Displayed Graduations; 100,000 Internal .

* Analog Sensitivity - To 0.3 microvolts/graduation .

* 10 Updates/Second at Full Scale, with Selectable Digital Averaging and Analog Active 5 HZ filter for smooth response.

* Automatic Zero and Span Temperature Compensation.

* Standard AZM (Zero Tracking) and PAZ (Pushbutton Auto Zero) features.

* Bidirectional Serial Port #1 (RS232C or 20mA I Loop); Simplex Serial Port #2 (RS232C and 20mA I Loop).

* Standard "Net/Gross" and "Auto (Stored) Tare" features.

* Excitation for eight (8) 350 - ohm load cells at 10VDC.

* Operable from 117/237 VAC or external 12 VDC.

* lb/kg conversion for weight and tare values.

* Six (6) digit LED display - 0.6 inch Digits

* Tilt - Stand Kit for wall or ceiling mounting.

* Panel Mount Kit.

POWER-UP INDICATION:

THE UNIT PROVIDES AUTOMATIC DISPLAY CHECKING DURING "POWER-UP" BY ROTATING AN "8" FOR VISUAL VERIFICATION OF DISPLAY OPERATION. IN ADDITION, THE SOFTWARE "SET" ,"VERSION", AND OPTION STATUS IS SUPPLIED.

FORMAT: "Pr. -x.y"

EXAMPLE: PROGRAM NO. KBF1921-1 Ver 11 is "Pr.-1.11" in power up message.

OPTION FORMAT: "OPt.---" Where each "-" will be replaced with a corresponding number to the enabled option.

FOR SERVICE CONTACT:

MODEL NUMBER GUIDE

555 (___) (___) (___) (___)

ENCLOSURE

A. Mild steel painted enclosure
with tilt stand base.

B. Mild steel painted enclosure
with panel mtg. brackets.

C. Uncased board set

INPUT POWER

A. 117 VAC, 60 Hz

B. 217 VAC, 50 Hz

C. 12 VDC (External input)

OPTIONS

A. Standard

B. Battery pack with charger.

C. Parallel BCD.

D. Analog 4-20mA\0-10VDC output.

LOAD CELL TERMINATION/SHIELDING

A. Standard

C. RFI - Shielded

444 (___) (___) (___) (___)

ENCLOSURE ____________________

A. Mild steel painted enclosure
with tilt stand base.

B. Mild steel painted enclosure
with panel mtg. brackets.

C. Uncased board set

D. NEMA 4X SS Enclosure

INPUT POWER ________________________

A. 117 VAC, 60 Hz

B. 217 VAC, 50 Hz

C. 12 VDC (External input)

D. 117 VAC with battery

E. 217 VAC with battery

OPTIONS ______________________________________

B. Standard Duplex Serial (RS232 or 20ma)

LOAD CELL TERMINATION/SHIELDING ______________________

A. Standard Unit

B. Standard Unit with Load Cell Connector

C. RFI - Shielded

D. RFI - Shielded - with Load Cell Connector

OPTION KITS

KBY7116-4 ANALOG OUTPUT,0-10VDC OR 4-20MA (117/217VAC).

KBY7116-1 PARALLEL I/O 117VAC
-2 217VAC

-10 12VDC

SECTION 2
SPECIFICATIONS

LOAD CELL EXCITATION	10VDC Fixed, Short-Circuit Proof, 240 mA max (8, 350-ohm Load Cells)
LOAD CELL CABLING	4 - Wire std, 6 - Wire (Remote Sensing) with PC trace cuts
ANALOG SIGNAL INPUT	0.7 mV/V to 3.2 mV/V
ANALOG SENSITIVITY	0.3 uV/grad max
TRANSIENT OVERLOAD PROTECTION	"100VDC without damage - 100 uS duration at 2% duty cycle
UPDATE RATE	10 update/second, no averaging
DISPLAY RESOLUTION	10,000 Displayed Grads 100,000 Internal Grads
DISPLAY INCREMENTS	1 - 2 - 5 - 10 - 20 - 50 - 100
FULL SCALE CAPACITY	Keyboard selectable to: 500 1,000 1,500 2,000 2,500 3,000 4,000 5,000 6,000 8,000 10,000
DISPLAY BLANKING	Overload blanking occurs at 103% of Full Scale Capacity
UNDERRANGE BLANKING	(-)400 Displayed Grads, typical
LEAD ZERO BLANKING	Standard, per NBS H-44 Requirements
DISPLAY	Six (6) Decades, 0.6 inch LED digits
DECIMAL POINT	Keyboard Selectable to:

XXXXXX XXXXX.X XXXX.XX
XXX.XXX XX.XXXX X.XXXXX

FRONT PANEL KEYS .... "ZERO", "GROSS/NET", "TARE", "PRINT"

DISPLAY ANNUNCIATORS ...... "Center Zero", "Net", "lb", "kg", "Motion" (Red Spot LED's)

AZM (ZERO TRACK) .... "Gross" mode only

AZM CAPTURE BAND .... Keyboard Selectable to "off", " 0.5, " 1.0, " 3.0 grads

AZM APERTURE .... Keyboard Selectable + 1.9% Full Scale or 100% Full Scale

MOTION BAND .... Keyboard Selectable to " 1 or " 3 displayed grads, 1 sec delay

POWER INPUT .... 120/220 VAC, 50-60 HZ, External DC

DISPLAY CHECK .... All digit segments and annunciators sequentially illuminated when upon power is applied

SERIAL OUTPUTS .... RS232C or 20mal bidirectional serial port and a Simplex RS232C or 20mA current loop.

ENCLOSURE .... Mild Steel, NEMA I General Purpose Tilt - Stand Base (Standard)

CASE SIZE .... 7.76 in (19.7 cm) wide x 4.81 in (12.2 cm) high x 4.09 in (10.4 cm) deep

OPTIONS .... KBT7116 - 5 Rack/Panel Mount Kit

D I S P L A Y M E S S A G E S

DISPLAY	EXPLANATION	REMEDY
Err1	Loss of Configuration	Enter Configuration Mode and Reconfigure
Err1A	Loss of option	Enter Option Mode and Reconfig
Err2	Loss of Zero Calibration	Enter Digital Calibration Mode and Recalibrate Unit
Err3	Loss of Span Calibration	
Err5	Loss of Auto Tare	Acquire Tare
Err6	Loss of Auto Zero	Acquire Zero
Err9	"ENTER" key pushed when unit is not in the Span Calibration Mode	Enter the desired weight value before pushing "ENTER" key
Err10H Err10L Err10P Err10-	Input range high Input range low Auto Gain error Auto Gain error	Recalibrate
CAL	Indicates Successful Calibration	
OL	Gross Overload	Check Load Cell Wiring

UL	Gross Underrange

SECTION 3
INSTALLATION

This digital weight indicator is a general purpose unit designed for a wide variety of weighing and scale related applications. In addition to standard tabletop applications, the unit can be equipped with a tilt-stand kit for angled tabletop uses, for wall mounting, or for ceiling (or cab) mounting applications. Installations requiring rack or panel mounting lend themselves to the KBT7116 - 5 Panel Mount Kit. Overall dimensions are illustrated in Figures 3.1, 3.2 and 3.3.

POWER WIRING:

The indicator is designed to be operated from 117/237 VAC, 50-60 hz AC "Mains" power sources or, with the installation of the **KHF8924-1** can be powered from a +12VDC external source. The unit power cord must be plugged into a grounded 3 - wire polarized AC wall socket. All normal wiring and grounding precautions should be observed, including use of a "**clean**" AC power line and use of **transient protection** where ever appropriate. (See FIG. 3.5 - 3.8)

LOAD CELL WIRING:

The units are equipped with either a 6 - wire Load Cell Connector or a gland tube for load cell cable insertion. The standard unit is wired for 4 - wire (non - remote sensing) load cells; for 6 - wire applications, two (2) PC trace cuts are required. Consult Figure 3.4 for specifics and wiring information.

SERIAL PORT #1 AND #2 WIRING:

The unit has two (2) Serial Ports; Port #1 is a Duplex (Bidirectional) RS232C or 20 mA Loop, and Port #2 is a Simplex RS232C and 20 mA Loop output. Details on serial transmission may be found in Section 6; for wiring to the Serial Ports refer to Figures 6.1 - 6.4.

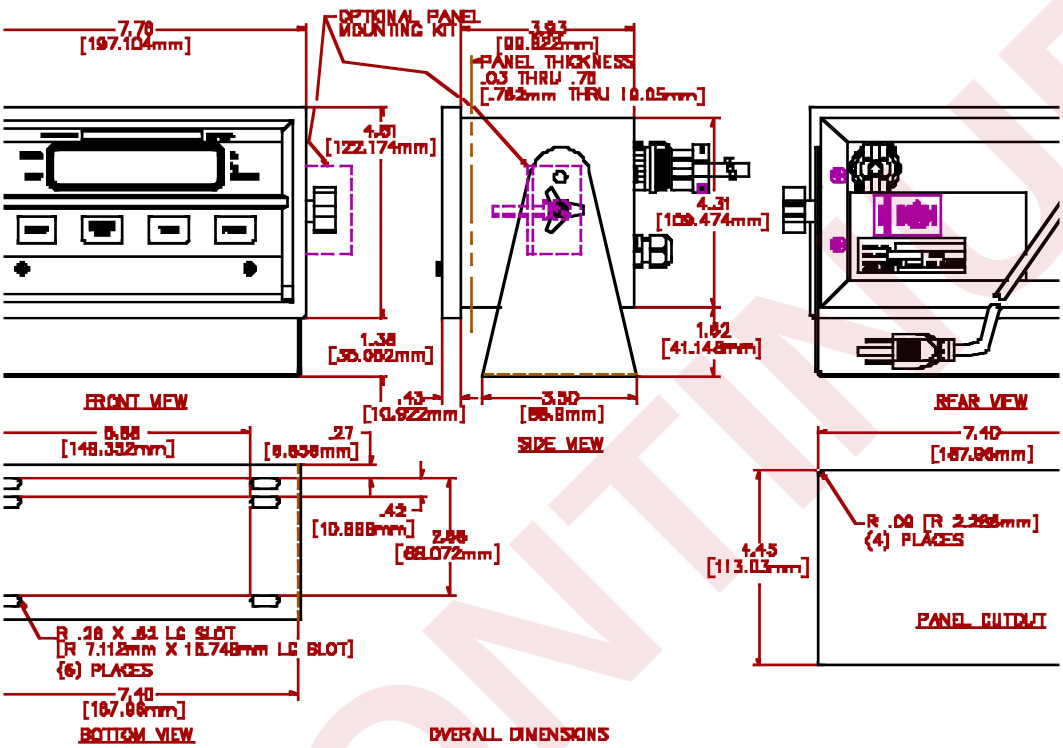

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FIGURE 3.1

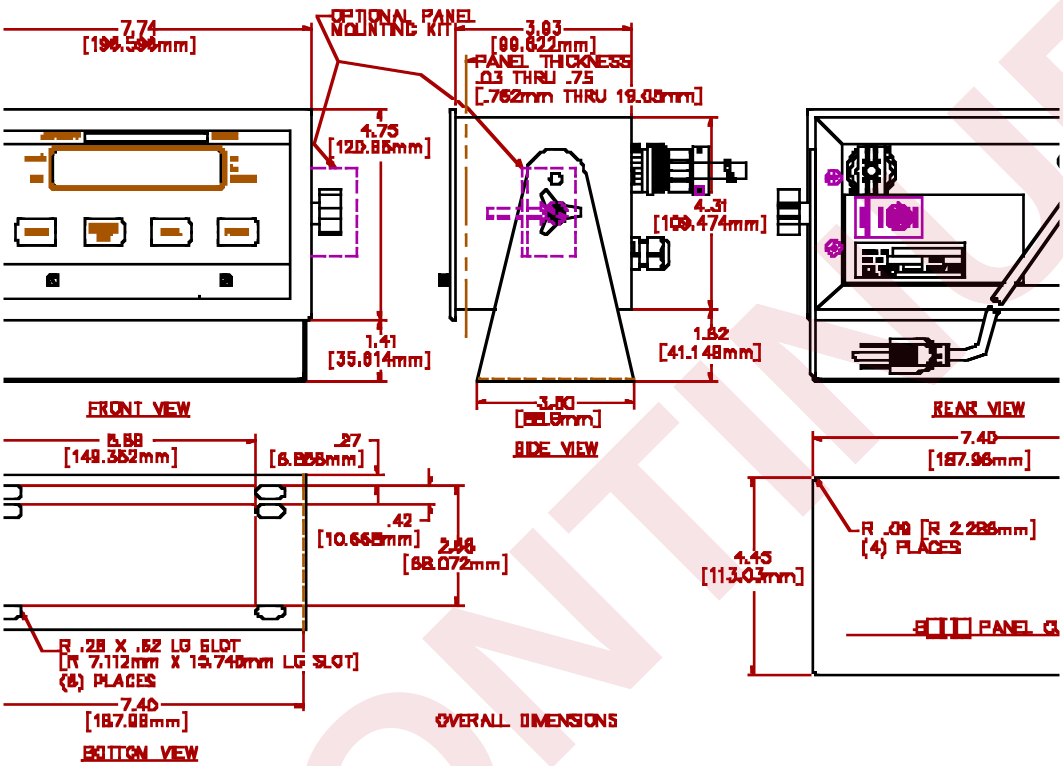

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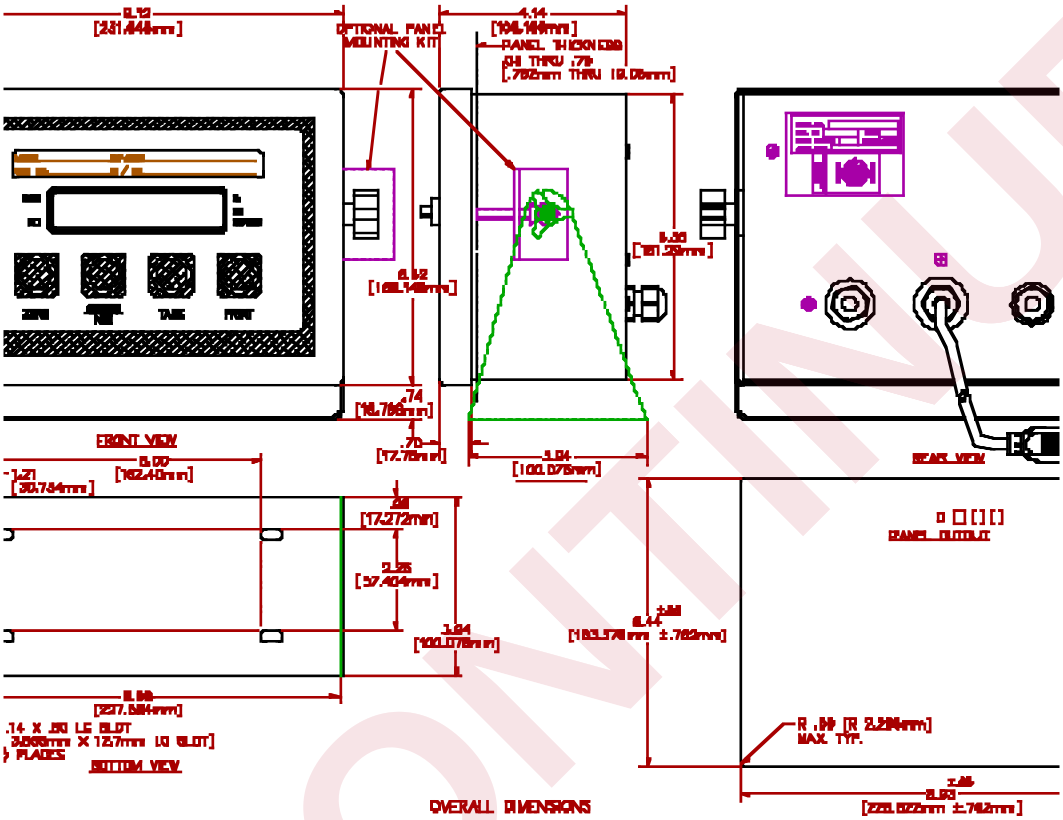
FIGURE 3.2



(**444** NEMA 4X SS ENCLOSURE)

FIGURE 3.3

LOAD CELL WIRING:

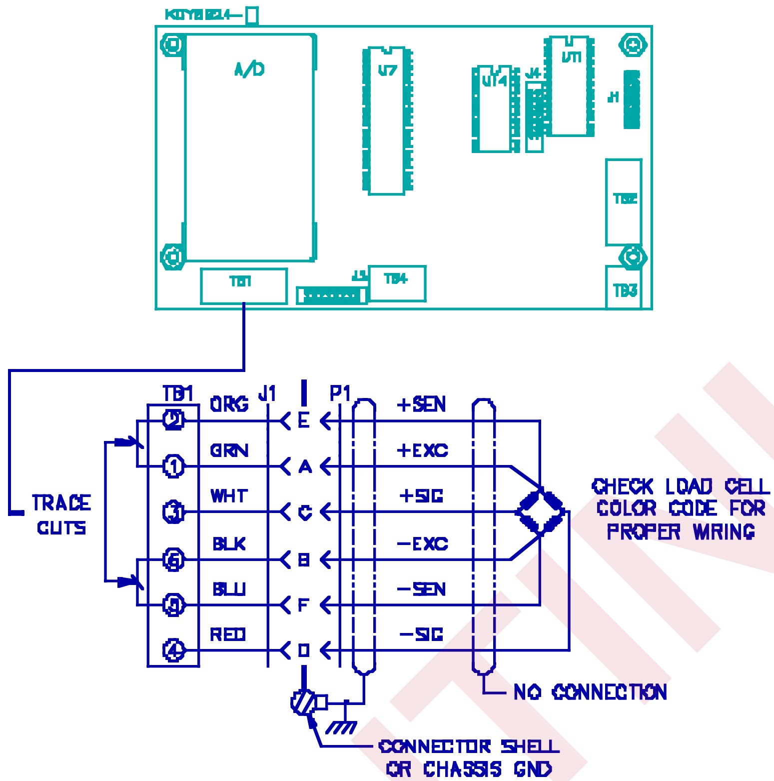
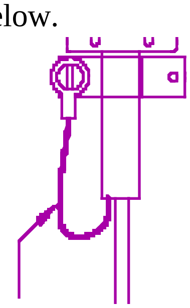
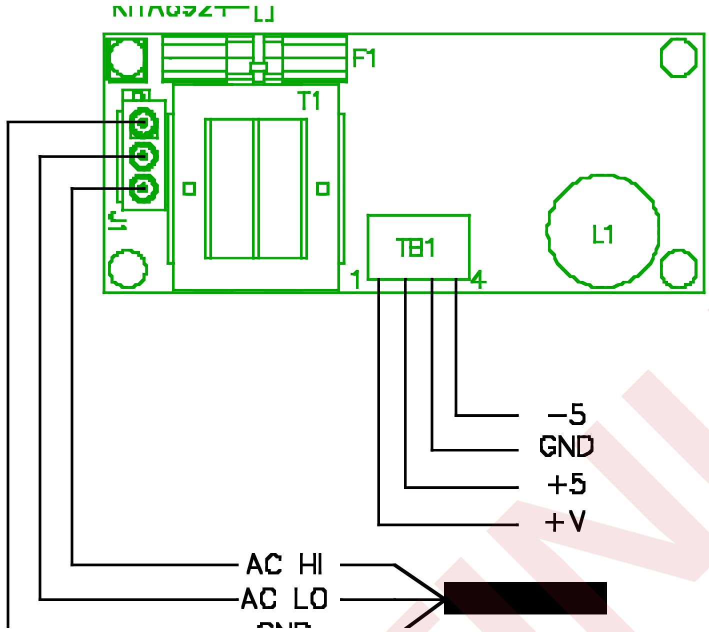


FIGURE 3.4

NOTE: Traces shown are cut ONLY for six (6) wire (remote sensing) applications.

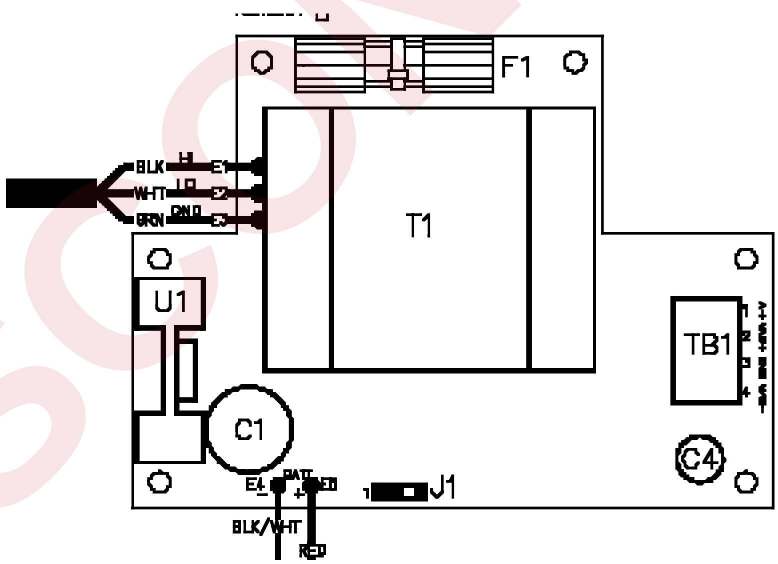
NOTE: The load cell shield wire should be connected to one of the load cell cable clamp screws located on the load cell mating connector. ***CAUTION!*** Shielding is connected at **ONLY** one end (typically at the indicator end). If connected at the strain gauge end disreguard illustration below.





<u>KHA8924 POWER SUPPLY ASSEMBLY WIRING</u>: (AC INPUT)

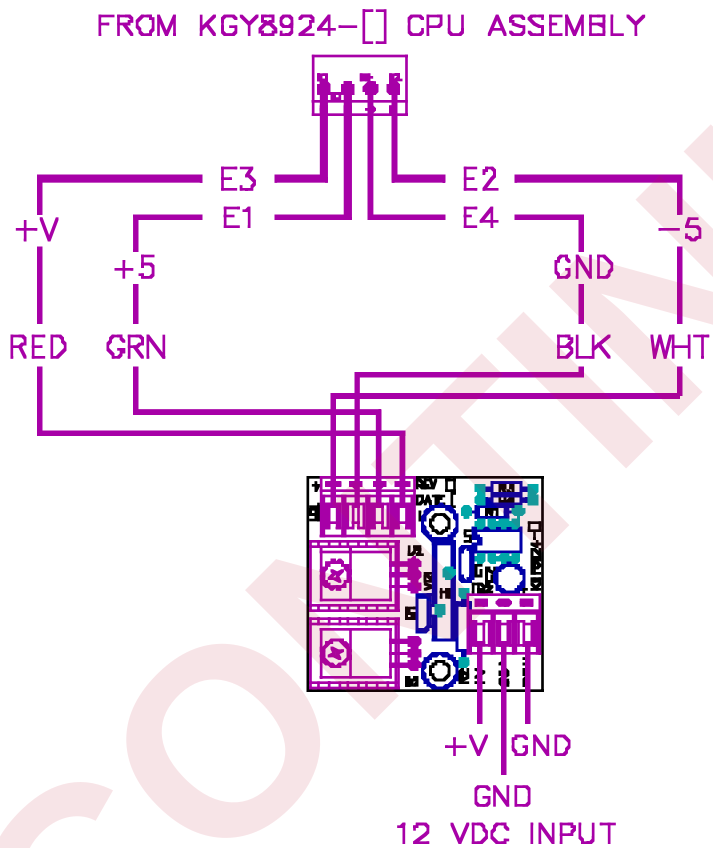
FIGURE 3.5



<u>KGH8924 POWER SUPPLY ASSEMBLY WIRING</u>: (AC\DC BATTERY CHARGER)

FIGURE 3.6

KHF8924 POWER SUPPLY ASSEMBLY WIRING: (EXTERNAL DC SUPPLY)



KGY8924 CPU ASSEMBLY INPUT POWER WIRING :

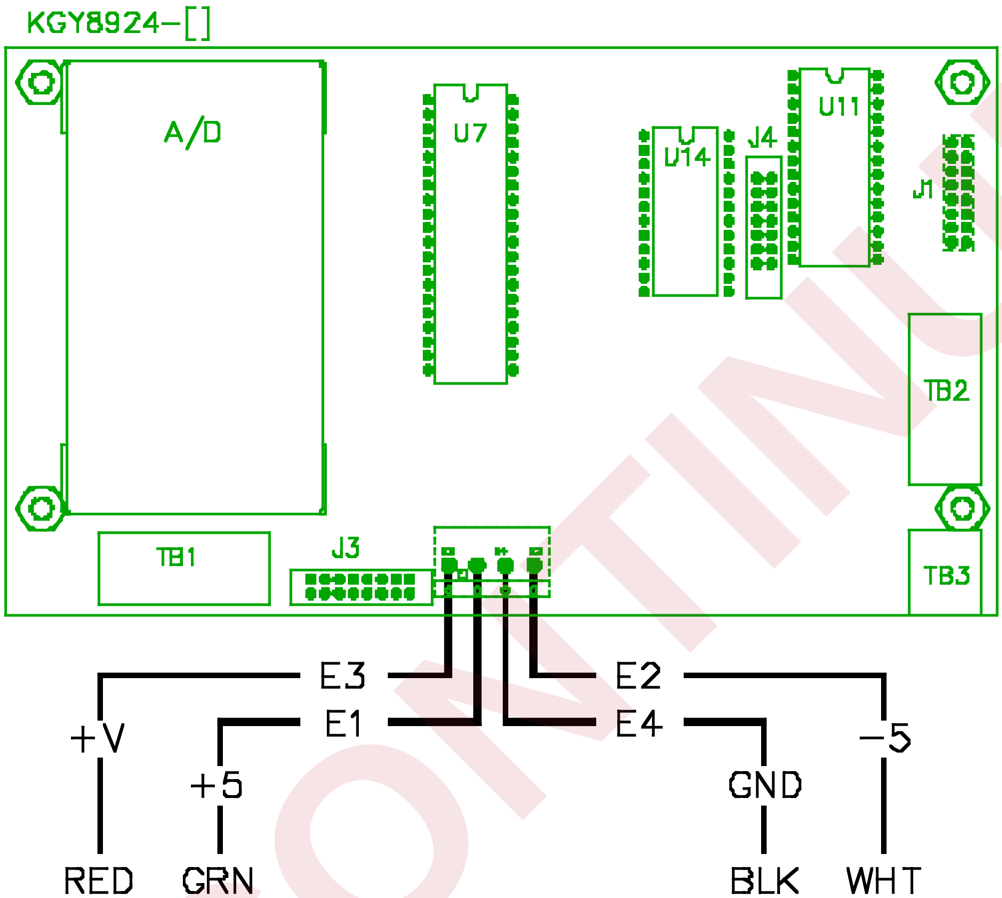


FIGURE 3.8

<u>**CONVERTING FROM 117VAC TO 217VAC**</u>**:**

CAUTION! **THIS SHOULD ONLY BE PREFORMED BY AUTHORIZED SERVICE PERSONNEL - INSTRUMENT WARRANTEE MAY BE VOIDED**

1. **REMOVE POWER FROM UNIT!**

2. Remove rear outer case of unit.

3. Remove rear connector bracket and four standoffs.

4. Remove Power Supply assembly.

5. Remove protective insulator from solder side of assembly.

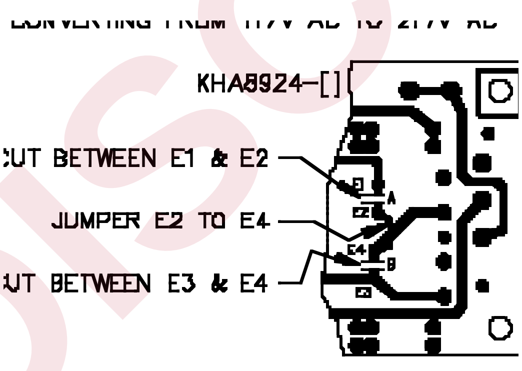
6. Cut circuit traces between E1/E2 and E3/E4 for **KHA8924** assembly or between E6/E7 and E8/E9 for **KGH8924** assembly.

7. Using properly insulated wire with a min. size of #22AWG add jumper E2 to E4 on **KHA8924** assembly or E7 to E9 on **KGH8924** assembly. (See FIGURES 3.9 & 3.10 below)

8. Replace protective insulator.

9. Reassemble unit, test, and label unit for 217VAC.

10. Change power cord.



<u>**KHA8924**</u>

<u>**KGH8924**</u>

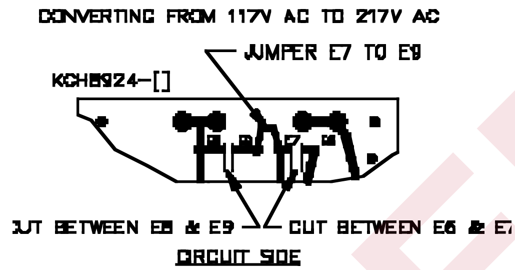
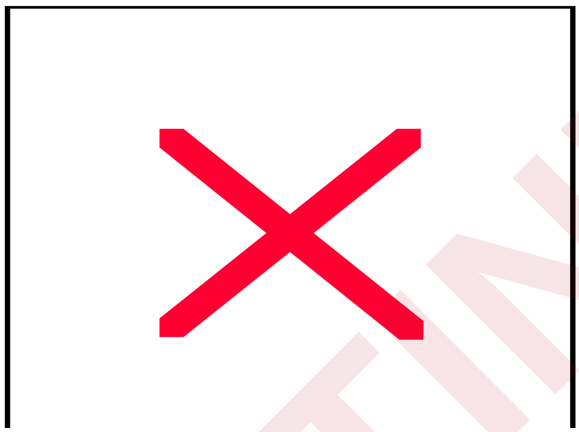


FIGURE 3.9

FIGURE 3.10

SECTION 4
CONFIGURATION

Prior to calibration, the Digital Weight Indicator **must be configured**, or given its set of



operating parameters. To configure the unit :

A. Unscrew the two (2) knurled captive fasteners on the bar of the Front Panel and drop the bar down to expose the four (4) program switches in the center and the Dead Load adjustment potentiometer.

B. Close (to the right) Switch #2, which is marked "**CONF**".

C. The display is used to prompt the operator as follows:

The PARAMETER IDENT is a two digit number (1 - 15). The SELECTED DATA is a number or display symbol which represents the parameter data being entered into the unit's configuration data. See configuration table for settings.

D. If the SELECTED DATA is correct, push the "**ZERO**" ("**PARAMETER SELECT**") key to rotate to the next parameter. The data is automatically entered in SRAM when the parameter number is changed.

E. If the SELECTED DATA is not correct, push the "**NET/GROSS**" ("**DATA SELECT**") key until the appropriate data display appears. Then push the "**ZERO**" ("**PARAMETER SELECT**") key. Continue until all parameters have been selected.

F. Open (to the left) Switch #2. The display will return to a normal display mode. (**NORM** = S1 - 1,2,3 open)

DIGITAL CONFIGURATION PARAMETERS

NOTE: SCALE CAPACITY = DISPLAYED GRADS X RESOLUTION

PROMPT	PROMPT DISPLAY	INTERPRETATION
1	1 5 1 1 0 1 1 5 1 2 0 1 2 5 1 3 0 1 4 0 1 5 0 1 6 0 1 8 0 1 1 0 0	**DISPLAYED GRADUATIONS** 500 Displayed Graduations 1,000 Displayed Graduations 1,500 Displayed Graduations 2,000 Displayed Graduations 2,500 Displayed Graduations 3,000 Displayed Graduations 4,000 Displayed Graduations 5,000 Displayed Graduations 6,000 Displayed Graduations 8,000 Displayed Graduations 10,000 Displayed Graduations
2	2 1 2 2 2 5 2 1 0 2 2 0 2 5 0 2 1 0 0	**DISPLAY RESOLUTION** "lb" or "kg" BASE | "kg" conversion x 1 x 0.5 x 2 x 1 x 5 x 2 x 10 x 5 x 20 x 10 x 50 x 20 x 100 x 50
3	3 0 3 0.0 3 0.0 0 3 0.0 0 0 3 0.0 0 0 0	**DECIMAL POINT** No Decimal Point xxxxx.x xxxx.xx xxx.xxx xx.xxxx
4	Automatically set	**SPAN SELECTION** "Low Span" (1.7 mV/V - 3.0 mV/V) "High Span" (0.6 mV/V - 2.0 mV/V)
5	5 1 5 2 5 4 5 8 5 1 6 5 3 2 5 A 1 5 A 2	**DIGITAL AVERAGING** AVERAGING | UPDATE RATE None 10 per second 2 5 per second 4 2.5 per second 8 1.25 per second 16 2 Seconds 32 3 Seconds 1 - 2 Variable 2 - 4 Variable

PROMPT	PROMPT DISPLAY	INTERPRETATION
6	6 o F F 6 0.5 6 1 6 3	**AZM CAPTURE BAND** AZM "Off" " 0.5 Displayed Graduations " 1.0 Displayed Graduations " 3.0 Displayed Graduations
7	7 1.9 7 F S	**AZM/PAZ APERATURE** " 1.9 % Full Scale Capacity 100 % Full Scale Capacity
8	8 o F F 8 1 8 3	**MOTION BAND** NO MOTION INHIBIT " 1 Displayed Graduations " 3 Displayed Graduations
9	9 L b 9 K G 9 C o n	**lb/kg BASE/CONVERSION** "lb" Base - No Conversion "kg" Base - No Conversion "lb/kg" Conversion
10	10 o F F 10 o n	**"G - T - N" NET PRINTOUT** Net Weight Print Only "G - T - N" Print in Net Mode
11	11.P 1.o F 11.P 1.C o 11.P 1.d E	**SERIAL PORT #1 - COMM MODE** Serial Port #1 "Off" Continuous Output Mode Demand Print Mode
12	12.P 1.S i 12.P 1.d U	**PORT #1 - SIMPLEX/DUPLEX** Simplex Operation (**Note #1**) Duplex Operation (**Note #2**)
13 **Note #1**	13.P 1.1 2 13.P 1.2 4 13.P 1.4 8 13.P 1.9 6	**SERIAL PORT #1 - BAUD RATE** 1,200 Baud 2,400 Baud 4,800 Baud 9,600 Baud
14	14.P 2.o F 14.P 2.C o 14.P 2.d E	**SERIAL PORT #2 - COMM MODE** Serial Port #2 "Off" Continuous Output Mode Demand Print Mode
15 **Note #1**	15.P 2.1 2 15.P 2.2 4 15.P 2.4 8 15.P 2.9 6	**SERIAL PORT #2 - BAUD RATE** 1,200 Baud 2,400 Baud 4,800 Baud 9,600 Baud

PROMPT	PROMPT DISPLAY	INTERPRETATION
13		**SERIAL PORT #1 & 2 - BAUD RATE**
	13.P - 1 2	1,200 Baud
Note #2	13.P - 2 4	2,400 Baud
	13.P - 4 8	4,800 Baud
	13.P - 9 6	9,600 Baud

Note #1: If PROMPT #12 is selected for simplex mode "**12.P 1.S i**" then PROMPT #13 baud rate selection is for PORT #1 **only** and the baud rate selection for PORT #2 is set in PROMPT #15.

Note #2: If PROMPT #12 is selected for duplex mode "**12.P 1.d U**" then PROMPT #13 selects the baud rate for **BOTH** port #1 and PORT #2. No PROMPT #15 in duplex mode. (See table below for PROMPT #13 selection in this mode.)

SECTION 5
CALIBRATION

The indicator must now be calibrated. All zero and span calibration is done from the front panel (***Exception*** - When mounted in a NEMA X4 Enclosure, DEAD LOAD pot (RZ2) and S1 are located on the CPU board (**KGY8924-**). The calibration procedure is as follows:

A. Ensure that the unit is correctly wired to a load cell or scale base.

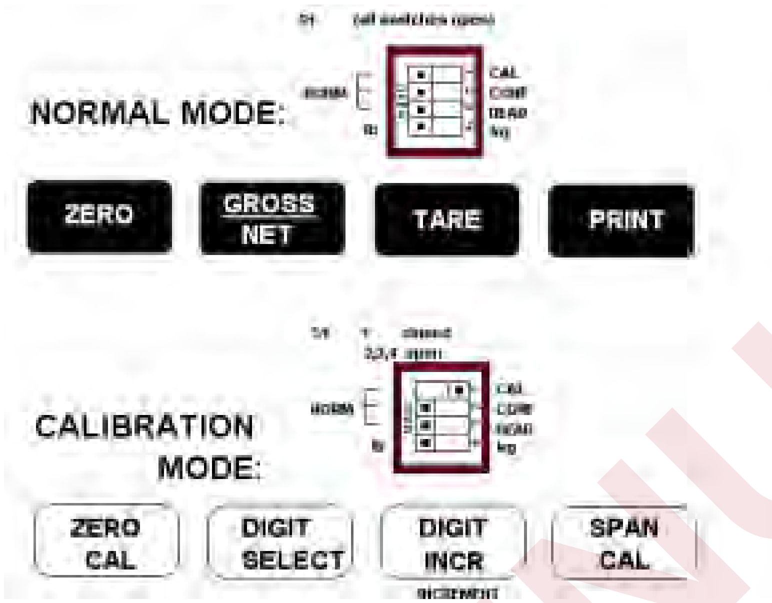
B. Empty the scale.

C. Close (to the right) Switch #3 ("**DEAD LOAD**").

D. Adjust the potentiometer marked "**DEAD LOAD**" to obtain a display reading near "**0**". Note that turning the potentiometer clockwise results in a more positive (or less negative) weight reading.

E. Open Switch #3.

F. Close Switch #1 ("**CAL**"). The weight may change from its previous reading, which is acceptable. A flashing " **C** " will appear on the left-most display digit. The four (4) front panel switches now assume the following functions:


NORMAL MODE:
ZERO
GROSS
NET
TARE
PRINT
CALIBRATION
MODE:
ZERO
CAL
DIGIT
SELECT
DIGIT
INCR
SPAN
CAL

CALIBRATION - CONTINUED

G. Push the "**ZERO**" key. The display will read "**CAL**" for a second, and then go to a "**0**" ("zero") display.

H. Now place a known calibration weight on the scale.

I. The "**GROSS/NET**" key becomes the "**DIGIT SELECT**" key; each push of this key will "select" one display digit and "highlight" it by flashing the selected digit, starting from right ("Least Significant Digit") to left ("Most Significant Digit").

J. The "**TARE**" key becomes the "**DIGIT INCREMENT**" key; once a digit has been "selected", each push of this key will increment that digit by one, from "**0**" to "**9**", and then back to "**0**".

K. After the display has reached a value equal to the weight on the scale, push the "**PRINT**" ("**SPAN CAL**") key to enter the span calibration value. The unit should display the " **CAL** " prompt for a few seconds, and then return to its correct span reading.

COMPUTATION EXAMPLES:

Desired capacity = 200,000 lbs x 20 lb

Number of grads = 200,000) 20 = 10,000

Therefore in the Configuration Mode PARAMETERS 1 & 2 would be set as follows:

PARAMETER "1" = 100 (10,000 grads)
PARAMETER "2" = 20 (resolution)

To determine the live load signal range:

Load cells rated at 2mV/V	rated at 3mV/V
2mv/v x 10v (excitation) = 20 mV	3mV/V x 10v = 30 mV
dead load (est)......... = 5 mV	= 7 mV
Live Load....... = 15 mV	= 23 mV

Other factors to note:

AZM/PAZ   1.9% X 200,000 = 3800 lbs

OVERRANGE 103% x 200,000 = 206,000 lbs

ANALOG SENSITIVITY:

0.7 mV/V x 10v = 7 mV, 7 mV / 10,000 grads = 0.7 microvolts/grad

Sensitivity = 0.3 microvolts, but to handle H-44 requirements, we need a factor of "4", or 1.2 microvolts/grad. So that even if we can calibrate the lower signal range, we may fail acceptance testing. With this in mind, check for minimum live load of 12 millivolts for 10,000 grads or reduce the number of grads accordingly.

SECTION 6
SERIAL OUTPUT

GENERAL: (BIDIRECTIONAL SERIAL PORT #1)

The digital weight indicator is equipped with a Duplex (Bidirectional) Serial Communications Port for information transfer to a computer or other "host" device. The Port is normally configured for RS232C operation (Figure 6.1); 20 mA Loop can be selected (Active - Figure 6.2, or Passive - Figure 6.3). In addition to weight information transmission, remote control of indicator functions ("Gross", "Net", "Tare", "Zero", "Print") can be performed from a remote device.

WIRING: (PORT #1 & #2)

The normal wiring configuration is RS232C, as shown in Figure 6.1 below. Wiring is done through the Serial Port Opening in the rear of the unit case, to the appropriate terminal on the CPU (see Figure 3.4 for Terminal Strip locations).

WARNING ! When using RS232 Ports #1 and #2 - the "signal common" terminal (TB3 - 1) is not isolated from load cell (-) excitation or digital common. Therefore, care must be taken when interfacing to computers or terminals to avoid ground loop problems!

SERIAL PORT #1: (RS232C)

TO CONFIGURE PORT #1 FOR RS232C: JUMPER S3 - 1 to S3 - 2

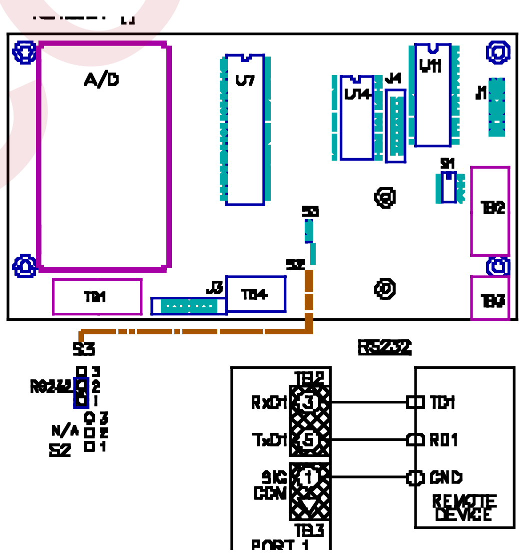


FIGURE 6.1

SERIAL PORT #1: (ACTIVE 20mA I LOOP)

The Bidirectional Serial Port #1 may also be operated as an "Active" 20mA Current (I) Loop (Indicator "Active" - Remote Computer or Device "Passive"). Wiring is done per Figure 6.2 below.

TO CONFIGURE PORT #1 FOR ACTIVE 20mA LOOP:

JUMPER S3 - 2 to S3 - 3
JUMPER S2 - 1 to S2 - 2

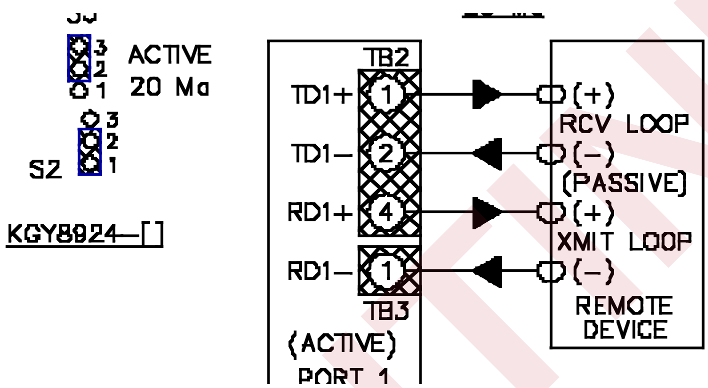


FIGURE 6.2

SERIAL PORT #1: (PASSIVE 20mA I LOOP)

If isolation from ground loop problems is desirable, or if reduced power consumption is a consideration, Serial Port #1 may also be wired as a "Passive" 20mA I Loop (Indicator "Passive" - Remote Computer or Device "Active"). Wiring is done as shown in Figure 6.3 below. In addition to Jumper changes, Integrated Circuit U8 ***MUST BE REMOVED*** from the CPU. Integrated Circuit U16 (Part # KFT1918K) must be installed for "Passive" transmission of serial data. ***NOTE THAT IF INTEGRATEDCIRCUIT U8 IS LEFT IN PLACE, THE CIRCUITRY MAY BE DAMAGED!***

TO CONFIGURE PORT #1 FOR PASSIVE 20mA I LOOP (TRANSMIT) OPERATION:

REMOVE U8
ADD U16
JUMPER S2 - 2 to S2 - 3

SERIAL PORT #1: (PASSIVE 20mA I LOOP - continued)

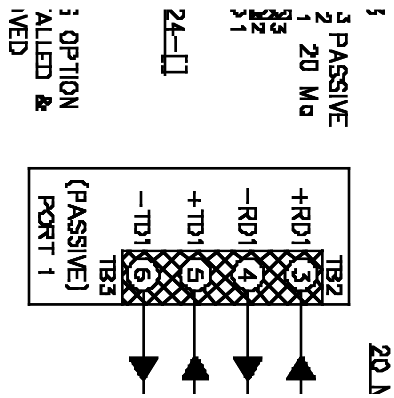


FIGURE 6.3

GENERAL: (SERIAL PORT #2)

The digital weight indicator is also equipped with a second Simplex (Output Only) Serial Port #2. Port #2 may be configured as an RS232C output and as an Active 20mA I Loop. Wiring is done per Figure 6.4 below.

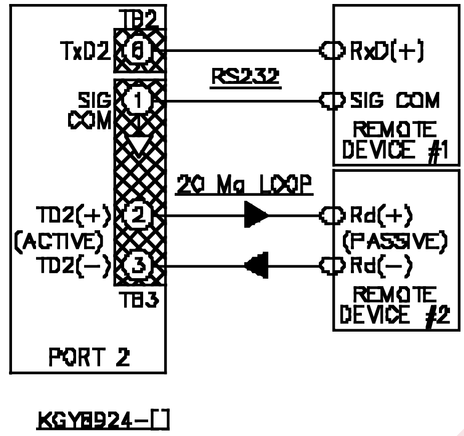

TB2
TxD2
6
RS232
RxD(+)
SIG
COM
1
SIG COM
REMOTE
DEVICE #1
20 Ma LOOP
TD2(+)
(ACTIVE)
TD2(-)
2
3
Rd(+)
(PASSIVE)
Rd(-)
REMOTE
DEVICE #2
TB3
PORT 2
KGYB924-[]

FIGURE 6.4

SERIAL PORTS #1 AND #2: (DATA FORMATS)

The prompts shown in Table 6.1 below control the following serial output parameters:

TABLE 6.1

PARAMETER	PORT #1	PORT #2
Serial Enable Demand/Continuous	Prompt #11	Prompt #14
Simplex/Duplex Control	Prompt #12	Does Not Apply
Baud Rate	Prompt #13	Prompt #13 or Prompt #15

All serial characters are in ASCII and consist of the following:

One (1) Start Bit
Seven (7) Data Bits
One (1) Parity Bit (ODD Parity)
One (1) Stop Bit

DATA FORMATS:

A. DEMAND MODE - SINGLE LINE (NO "G-T-N" PRINTOUT)

<stx><pol><DATA><sp><LB/KG><sp><GR/NT><cr/lf>

B. DEMAND MODE - THREE LINE "G-T-N" PRINTOUT

<stx><pol><DATA><sp><LB/KG><sp><GR><cr/lf>

2 - second time delay

<stx><pol><DATA><sp><LB/KG><sp><TR><cr/lf>

2 - second time delay

<stx><pol><DATA><sp><LB/KG><sp><NT><cr/lf>

C. CONTINUOUS OUTPUT - SINGLE LINE (NO "G-T-N") PRINTOUT

***** (Computer demand format outputed as shown below when **OPTION 2** enabled and selected for "**cptr**". Will output both single & (G-T-N) multiple line.)

<stx><pol><DATA><L/K><G/N><status><cr/lf>

<u>WHERE:</u>

Brackets ("<",">") are shown herein for character definition, and are not sent as a part of a serial transmission.

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

pol: Polarity sign. "SPACE" (ASCII 20H) for positive data or (-) sign (ASCII 2DH) for negative data

sp: Space character (ASCII 20H)

DATA: Seven (7) digit data field including decimal point or fixed (dummy) zero if selected. "Leading Zero Suppression" with leading zeros transmitted as "Space" characters.

LB/KG: Two (2) character field data identification for weight units, in demand (printer) mode.

Weight in LB = "LB" (ASCII 4CH,42H)
Weight in KG = "KG" (ASCII 4BH,47H)

L/K: One (1) character field data identification for weight units in continuous (computer) mode.

Weight in LB = "L" (ASCII 4CH)
Weight in KG = "K" (ASCII 4BH)

GR/NT: Two (2) character field data identification for weighing mode in demand (printer) mode.

Gross Mode = "GR" (ASCII 47H,52H)
Net Mode = "NT" (ASCII 4EH,54H)

G/N: One (1) character field data identification for weighing mode in continuous (computer) mode.

Gross Mode = "G" (ASCII 47H)

Net Mode = "N" (ASCII 4EH)

status: One (1) character field data identification used in the continuous (computer) output mode to identify the status of the indicator display. Characters are listed below in order of priority.

DESCRIPTION	**CHARACTER**
Calibration/Configuration	<C> (ASCII 43H)
Invalid Mode (Dashes on display)	<I> (ASCII 49H)
Over/Under Range	<O> (ASCII 4FH)
Motion	<M> (ASCII 4DH)
None of the Above (normal display)	<sp> (ASCII 20H)

cr/lf: Two (2) character field, "Carriage Return" (ASCII 0DH), "Line Feed" (ASCII 0AH) indicating "End of Message".

GUIDELINES FOR SERIAL OUTPUTS

* To comply with **Legal - for - Trade** requirements, neither port will output data in Demand (Printer) format under the following conditions:

  A. Scale in motion

  B. Negative Gross Weight, either in "Gross" or "Net" modes.

* Pushing the "**PRINT**" key on the front panel will cause a serial transmission from either Port #1 or Port #2 (or both), if both ports are configured for demand operation. An ASCII <P> command will cause a serial transmission **ONLY** on Port #1.

REMOTE COMMANDS: (SERIAL PORT #1)

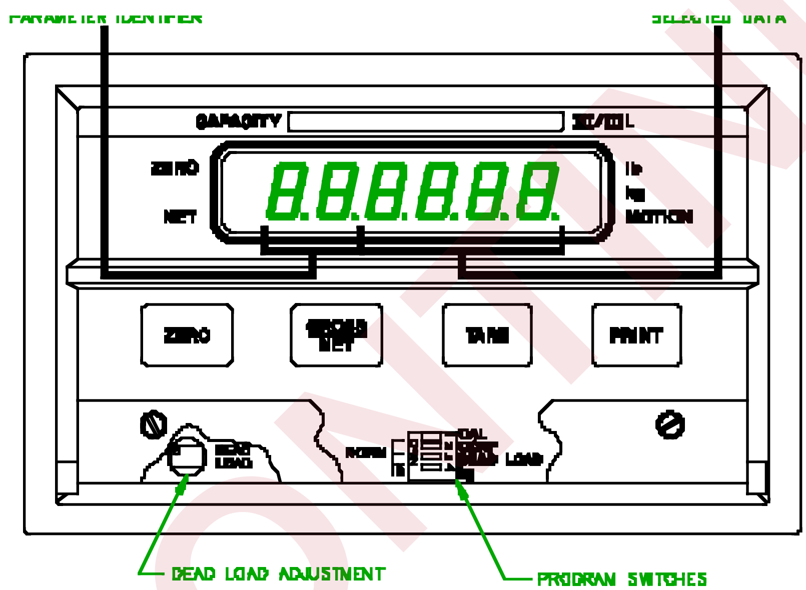
The bidirectional features of Serial Port #1 can also be used to send remote functional commands to the indicator.

REMOTE COMMAND	OPERATION	GUIDELINES
<Z><cr>	Zero Scale	"Gross" Mode, No Motion, Inside PAZ Aperture
<N><cr>	Go to "Net"	in "Gross" Mode
<G><cr>	Go to "Gross"	in "Net" Mode
<T><cr>	Auto Tare	"Net" Mode, No Motion
<P><cr>	Print	Valid Display, No Motion

NOTE: Invalid characters or illegal operations (Auto Tare "in motion" or in "Gross Mode", for example) will be "echoed" by <I><cr> and be ignored.

SECTION 7
OPTIONS

Currently the instrument offers two (2) digitally programmable Options; Option 1 configures the digital weight indicator for interfacing with the Analog Output Module and Option 2 when enabled configures the serial output format for Tag, or for selections between "printer or computer" output formats.



1. To select the OPTIONS mode, close S-2 and S-3.

2. Press "**ZERO**" key to select between OPTION 1 & 2.

3. Use the "**GROSS/NET**" key to enable\disable OPTIONS 1 & 2 (turn on /off).

4. Use the "**TARE**" key to step through sub-parameters. The "**PRINT**" key changes data selection for sub-parameters.

OPTION 1

ANALOG OUTPUT

* Converts serial data into analog: 0-10 vdc or 4-20 ma.

* Directly mounted on the rear of the indicator or operated remotely.

* Self powered, 117/217 VAC provides isolated output

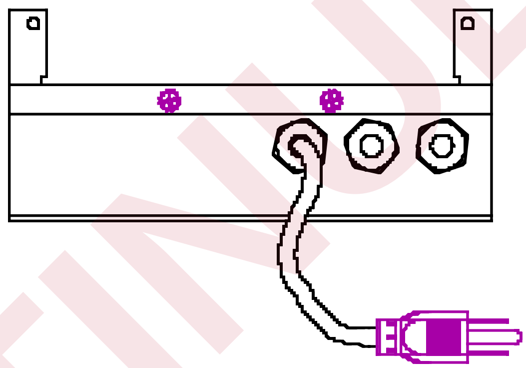
* Mild steel, painted enclosure 7.26W x 2.06H x 3.31D, wt.2Lbs

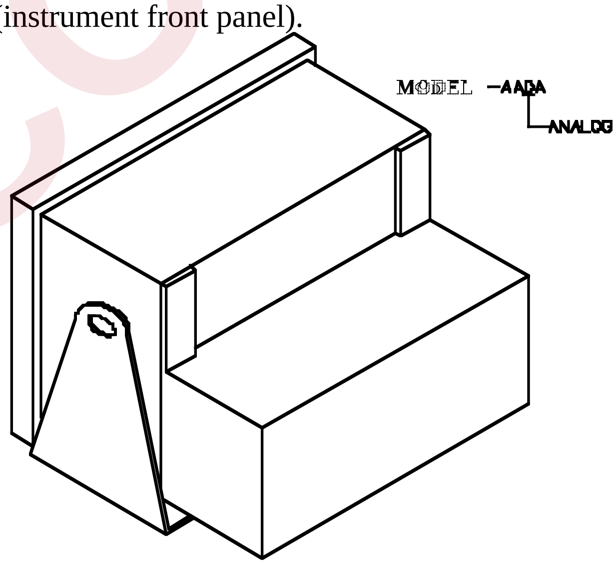
* Automatic data checking/verification

* Serial data "pass-thru"

* Analog output tracks: gross, net, or displayed weight.

* Full digital calibration (instrument front panel).





GENERAL:

Serial data from the indicator is modified to include scaled information specifically for the analog output module. The standard communications are also included to allow the module to "pass-thru" printer or scoreboard information. If external switches (ZERO, TARE, etc) are desired, utilize the Duplex port of the instrument. **Note:** the serial "pass-thru" does not have duplex capability. The analog output is fully isolated with its own transformer (power supply) and passive current loop communications. While the analog module can be located remotely up to 1000 ft, the standard package mounts on the rear of the indicator. After wiring and setting the module's baud rate, the remaining setup and calibration is carried out in the host instrument.

TEST MODES: Switch settings are provided to force the analog output to zero, full scale, or provide a continuous sawtooth waveform to facilitate system checking.

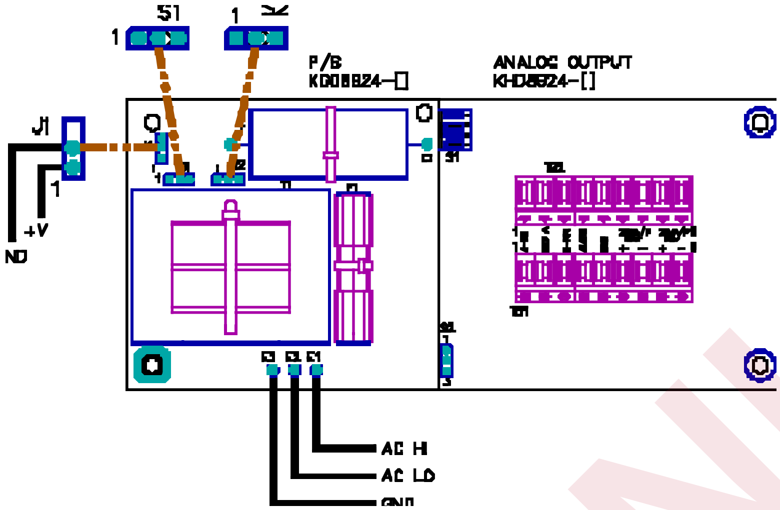
ERROR CHECKING: Serial data is continually checked for parity, valid characters, and presence of communications. Loss of data is indicated by forcing the analog output to a minimum value of - 0.5 Vdc or 3.2 ma (approx.). If the host is in "overload", the analog output is forced to 5% over full scale. With the 4-20 ma output, an additional alarm is provided to detect the lack of current (break) in the loop.

COMMUNICATION VERIFICATION: A led(DS1) is provided on the analog module:

on = communications OK
pulse = communication Errors
off = no power

CALIBRATION: Using the host, settings are provided for zero, span, and trim adjustments. The settings are all digital therefore no potentiometers are required. During the trim adjustment, the analog output is forced to the zero/span previously selected in option mode parameters 1.5 and 1.6 . While reading the analog output the TRIM is inc\dec from 0 to ±175 until the reading agrees with the values entered in 1.5 and 1.6.

ANALOG MODULE SETUP/WIRING:

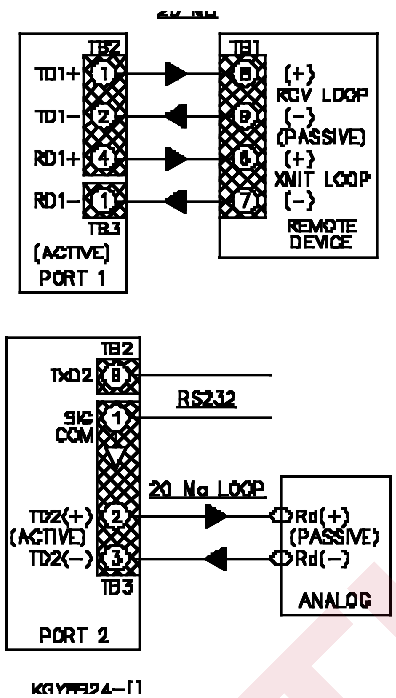


TB1	DESCRIPTION	TB2	DESCRIPTION
3	0 - 10 VDC OUTPUT	1	ZERO
2	GND	2	GROSS/NET
1	4 - 20 MA OUTPUT	3	TARE
4	ALARM	4	START

8	+ 20mal (RX+) serial	5	COMMON
9	- 20mal (RX-) serial	6	TX+ (RS232)
6	+ 20mal (TX+) serial	7	+5VDC
7	- 20mal (TX-) serial	8	-20MA (SERIAL)
		9	DEMAND (PRINT)

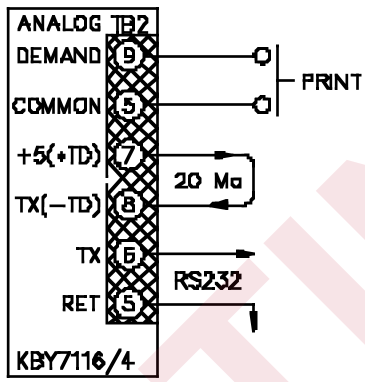
SWITCH 1	**1**	**2**	**RECEIVE** (baud rate from weight indicator)
(switch position)	0	0	1200
0 = open	1	0	2400
1 = closed	0	1	4800
	1	1	9600

SWITCH 1	**3**	**4**	**TEST MODES**
	0	0	NORMAL
	1	0	0 VDC/ 4 MA
	0	1	10 VDC/ 20 MA
	1	1	0-10 VDC/ 4-20 MA RAMP



WIRING TO HOST:

ANALOG MODULE SERIAL "PASS-THRU":



The serial data from the host is provided as a simplex output with the same format as the host.

Refer to **NOTES 1 - 3** on following page before proceeding!

OPTION 1 CONFIGURATION

OPTION	PROMPT DISPLAY	INTERPRETATION
OP.1	OP.1 o F OP.1 o n	**ANALOG OPTION** off on Analog Option enabled
	1.1 dSP Gr net	Analog tracks Display Analog tracks Gross Weight Analog tracks Net Weight
NOTE 1	1.2 P.1 P.2	Indicator data output on Port1(to Analog) Indicator data output on Port2(to Analog)
NOTE 1	1.3 OFF dE Co	Analog module does not pass serial data Analog module outputs serial on demand Analog module outputs serial continuously
	1.4 12 24 48 96	1200 baud "Pass-Thru" serial output 2400 baud baud rate selection. 4800 baud 9600 baud
NOTE 2	1.5 Zr	Enter weight value for analog "**ZERO**" (See NOTE 2 for procedures)
NOTE 2	1.6 FS	Use the same procedure as 1.5 to enter analog "**FULL SCALE**" value.
NOTE 3	1.7 Zr.A	**ZERO TRIM**, While measuring the analog output, use the "**GROSS/NET**" and "**PRINT**" keys to increment/decrement the zero value. Inc/dec function will force a test mode zero output.
NOTE 3	1.8 SP.A	**SPAN TRIM**, Same as 1.7 except a span test mode output is provided.

SPECIFICATION:

4 - 20mA analog output, **maximum impedance ≤ 600_**

NOTE 1 : Use standard setup for serial configuration under menu "11 - 15" (configuration switch S-2 closed) to establish communications before using the Option 1 menu.
The selected transmit Port from the indicator to the Analog module must be set for the desired baud rate and be in continuous output mode. In the Option 1 menu be sure to set the analog module for the selected communication Port and S1 baud rate switches (1 & 2) to match the indicator's.

NOTE 2 : The "**GROSS/NET**" key changes digit position and "**PRINT**" increments to the desired value.

NOTE 3 : During Trim adjustments, "**GROSS/NET**" will decrement the count and "**PRINT**" will increment the count.

OPTION 2

TAG/PRINTER OR COMPUTER SERIAL FORMAT

When the "**tAg**" mode is selected the two digit address (**2.2. Addr**) Is added to the standard serial format as follows:

-------- <AA><POL><DATA> -- etc.

Where: AA = The two digit address.
POL = Polarity sign.
DATA = Weight numeric data field.

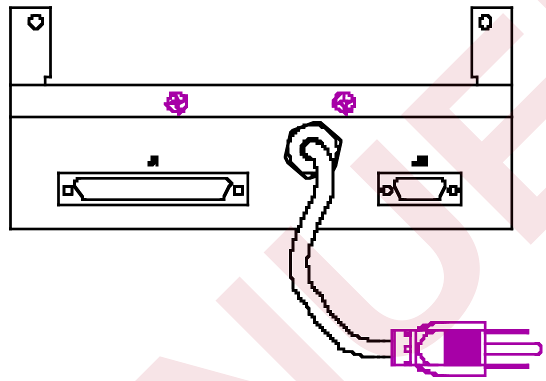
***** In computer format "**cptr**" the demand serial output is in the "CONTINUOUS OUTPUT" format (See Section 6 pg. 6-5 for details).

OPTION 2 CONFIGURATION

OPTION	PROMPT DISPLAY	INTERPRETATION
OP.2	OP.2 o F OP.2 o n	**TAG/PRINTER/COMPUTER FORMAT** off on Option enabled
	2.1. Std tAg Addr	Standard serial output format(see Config) Tags serial data with a unit address. RS485/422 format
	2.2. Addr	Selects a system address from (01 - 98)
	2.3. Std	Standard serial (demand) output format

	cptr	Computer format (condensed data output)

PARALLEL BCD OPTION
(SERIALLY UPDATED)



* Converts serial data into full parallel BCD

* Tri-state buffer drivers (5 volt logic)

* Source or sink up to six (6) milliamps

* Direct mount on indicator or remote

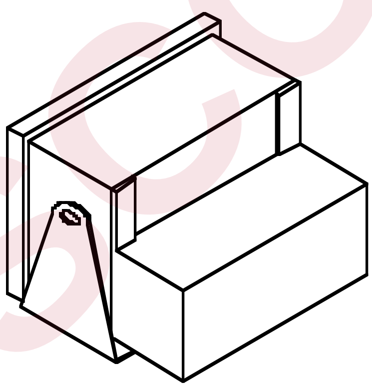
* Self powered, 117/217 VAC

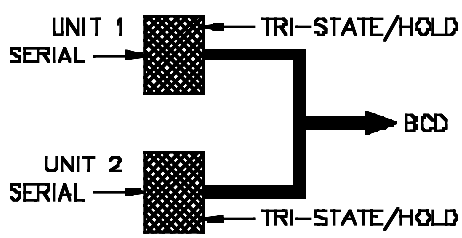
* Mild steel, painted enclosure 7.26W x 2.06H x 3.31D, wt.2Lbs

* Automatic data checking/verification

* Serial data "pass-thru"

* Parallel data output compatible with UMC2000 format





MULTIPLEX BCD

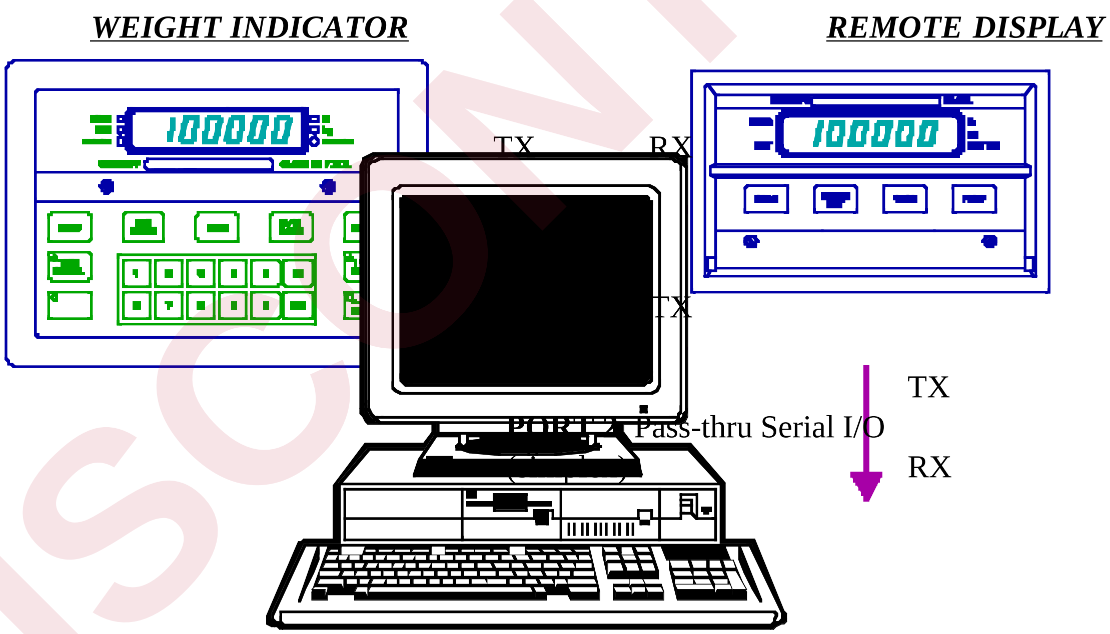
APPLICATIONS:

REMOTE DISPLAY

GENERAL INTRODUCTION:

As a remote display serial communication device this unit is designed to receive, on Port 1, either RS232 or 20 ma loop continuous serial output data from a WEIGHT INDICATOR (UMC600, IQ700, UMC555/444 or UMC2000) and update the remote display with the display data from the WEIGHT INDICATOR (sending unit). In addition, the UMC555/444 REMOTE DISPLAY offers a pass-thru RS232 or 20mal serial simplex output on PORT 2 which is configurable for baud rate, demand, continuous or no output (OFF), a delay on demand print, and a selection for Printer or Computer output format. If the serial communicationis disrupted to the REMOTE DISPLAY, after 5 seconds it will blink all dashes across the display until communication is reestablished.

When remote function key operations (ZERO, GROSS/NET, TARE & PRINT) are required, these functions can be serially downloaded from the REMOTE DISPLAY front panel keys to the WEIGHT INDICATOR if Port 1 is wired and configured for "full duplex" serial communicationwith the WEIGHT INDICATOR (UMC600, UMC555/444, or UMC2000).



REQUIREMENTS: EPROM - ***KBL1921-5***

The standard UMC444 or UMC555 is easily converted to a REMOTE DISPLAY by installing the **KBL1921-5** EPROM.

CONFIGURATION: (Configuration Table provided on following page)

A. Close S1 - 2 (CONF). This places the instrument in the configuration mode.

B. PARAMETERS are selected by pushing the "**ZERO**" key. PARAMETER DATA SELECTION is selected using the "**GROSS/TARE**" key. (See Configuration Table)

C. Parameter 1 selects the baud rate at which the REMOTE DISPLAY will receive continuous serial output data from the sending unit.

Baud rate must be set to the same baud rate as the weight indicator (sending unit) !!

D. Parameter 2 selects the baud rate for PORT 2 Pass-Thru simplex RS232 or 20mal serial output.

E. Parameter 3 configures PORT 2 for print on demand, continuous serial output, or disables PORT 2 output (oFF). In demand mode the "**PRINT**" key on the REMOTE DISPLAY is active.

☞ When PORT 2 is selected for demand print the serial output from the REMOTE DISPLAY is inhibited if the weight data is "**negative gross data**" or in "**motion**".

F. Parameter 4 selects PORT 2 demand print for "printer" (Pr) or "computer" (CP) serial output format.

G. Parameter 5 enables a (3) second delay between demand prints on PORT 2.

H. Open S1 - 2 (CONF). The REMOTE DISPLAY is returned to the normal operating mode.

CONFIGURATION TABLE

PARAMETER SELECT	PARAMETER DATA SELECTION	FUNCTION
1		PORT 1 BAUD RATE
See Note below	P1.12 P1.24 P1.48 P1.96	1 2 0 0 Baud rate for 2 4 0 0 receiving wt. 4 8 0 0 data 9 6 0 0
2		PORT 2 BAUD RATE
	P1.12 P1.24 P1.48 P1.96	1 2 0 0 Transmit baud 2 4 0 0 rate selection 4 8 0 0 9 6 0 0
3		PORT 2 CONFIGURATION
	oFF dE Co	Port 2 disabled Demand print Continuous output
4		PORT 2 SERIAL OUTPUT FORMAT
	Pr CP	printer format output computer format output
5		PORT 2 TIME DELAY(DEMAND PRINT)
	oFF dely	time delay disabled time delay enabled

Note - Parameter 1 selection must be configured to agree with the selected output from the WEIGHT INDICATOR.

INSTALLATION:

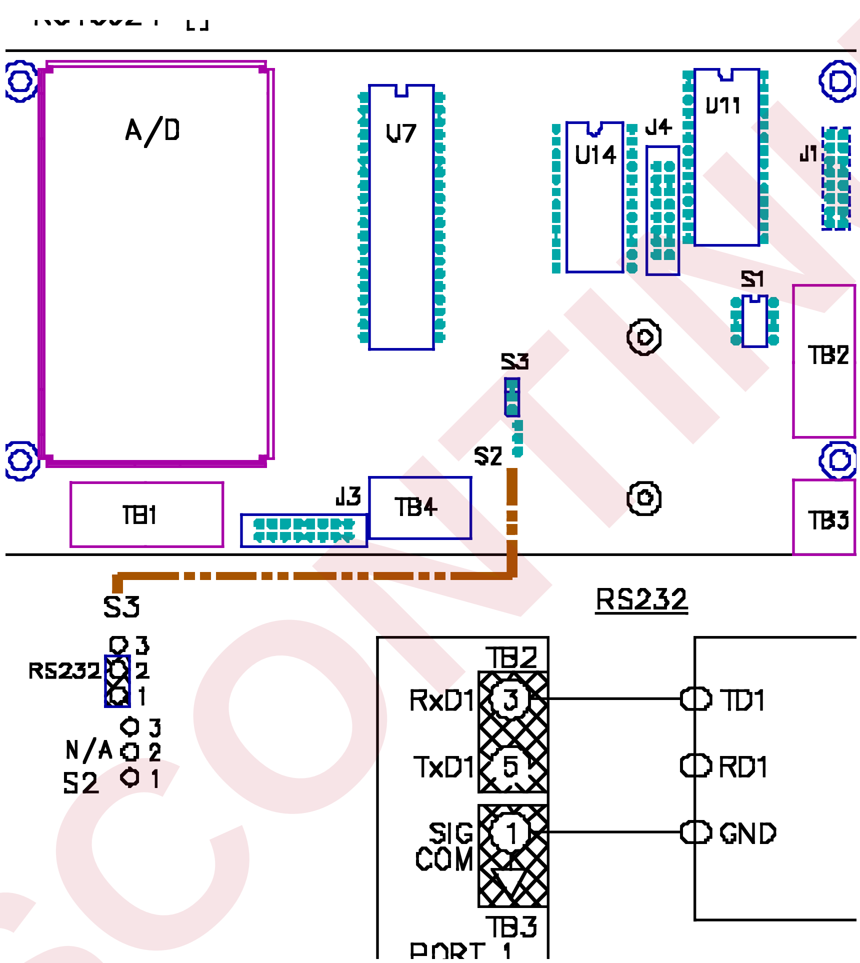
Per application requirements (RS232 or 20 mal) connect the transmit port of the WEIGHT INDICATOR to the appropriate receiver on Port 1 of the REMOTE DISPLAY.

If front panel function keys from the REMOTE DISPLAY are to be active the system must be wired for "Full Duplex" communication.

SERIAL PORT 1

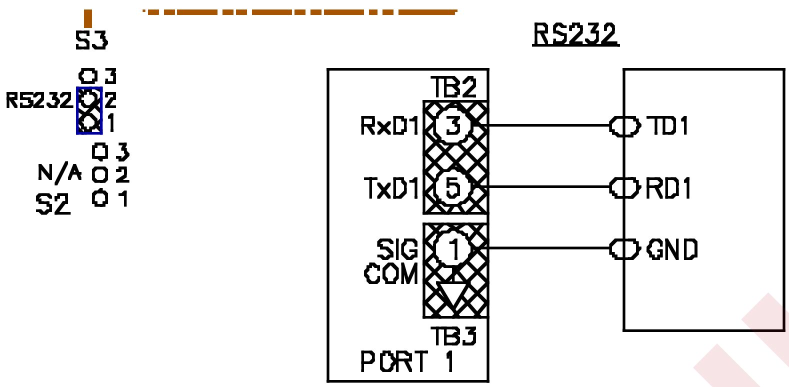
(RS232C simplex)

TO CONFIGURE PORT #1 FOR RS232C: JUMPER S3 - 1 to S3 - 2



REMOTE DISPLAY **WEIGHT INDICATOR**

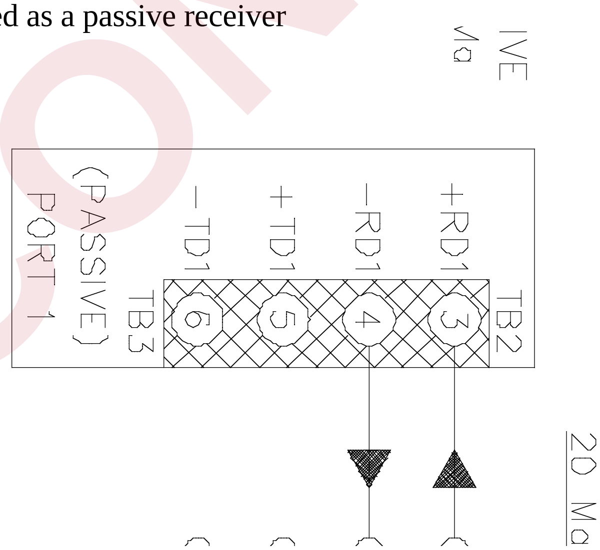
(RS232C duplex)



REMOTE DISPLAY **WEIGHT INDICATOR**

(20mA I LOOP simplex)

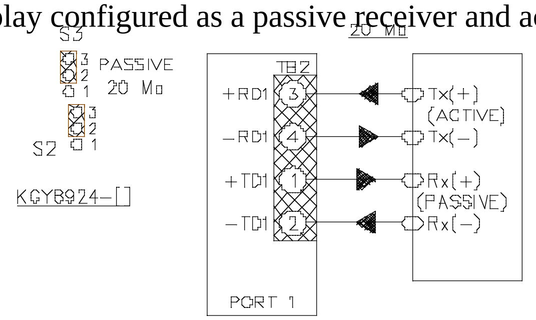
Remote Display configured as a passive receiver



REMOTE DISPLAY **WEIGHT INDICATOR**

(20mA I LOOP duplex)

Remote Display configured as a passive receiver and active transmitter.

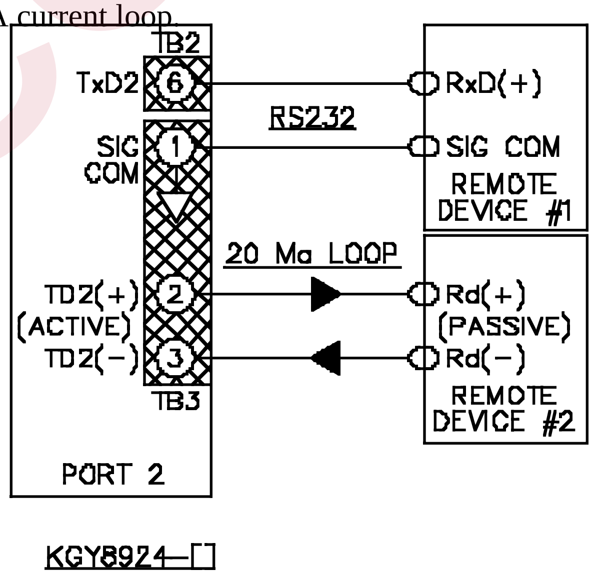


REMOTE DISPLAY **WEIGHT INDICATOR**

SERIAL PORT 2

(Simplex Only)

The UMC444/555 REMOTE DISPLAY is also equipped with a second simplex output on Serial Port 2 for Pass-Thru serial I/O. Pass-Thru serial output data is the serial data received on Port 1 of the REMOTE DISPLAY from the WEIGHT INDICATOR and then sent back out on Port 2 of the REMOTE DISPLAY. Two (2) additional remote devices may be wired to Port 2; one on the RS232C output and another on the Active 20mA I Loop. Diagram below shows wiring configuration for both RS232 and 20mA current loop.



WIRING TABLE

UMC555/444 REMOTE DISPLAY		UMC555/444/600/2000
PORT 1 RS232		
TB2 - 5	TX1	RX (RS232)
TB2 - 3	**RX1**	**TX (RS232)** ☜
TB3 - 1	**sig. common**	**sig. common** ☜
PORT 1 20MAL		
TB2 - 1	TX+ (active)	RX+ (passive)
TB2 - 2	TX- (active)	RX- (passive)
TB2 - 3	**RX+ (passive)**	**TX+ (active)** ☜
TB2 - 4	**RX- (passive)**	**TX- (active)** ☜

☞ Highlighted signals show wiring requirements for simplex communication between the REMOTE DISPLAY and the WEIGHT INDICATOR, in either RS232 or 20mal configuration.

Important ! 1.) Serial output data from the WEIGHT INDICATOR to the REMOTE DISPLAY must be configured for continuous output.

2.) Port 1 baud rate of the REMOTE DISPLAY must be compatible with the continuous output from the WEIGHT INDICATOR. Baud rate selection is in Parameter 1.

Note - When 20 ma loop "Full Duplex" communication is required the UMC444/555 REMOTE DISPLAY is typically wired in its active loop configuration since passive transmission requires the additional installation of the U16 (HCPL 4100) IC **option**. In this configuration the WEIGHT INDICATOR must therefore receive in 20mal passive mode.
Refer to the UMC444/555 Operational Manual for further instructions regarding 20mal passive transmission.

SECTION 8
RECOMMENDED SPARE PARTS

PART NUMBER	DESCRIPTION
KGY8924 - 1	STD.CPU/Analog to Digital Assembly
KGY8924 - 2	STD.CPU with RFI shielded A/D Assembly
KFL8924 - 1	LED Display Assembly
KHA8924 - 1	Power Supply
KHY7237	TD. Front Panel Overlay
KHY7237G	UMC444 Front Panel Overlay
KDK7238	UMC444 Capacity Label Plate
KBF8918C	Microprocessor (80C31)
KBT7116 - 4	6 - Pin Standard Load Cell Connector
KBT7116 - 5	Panel - Mount Kit