



H90-5200-A Digital Instrument



3051

Amendment Record

H90-5200-A
Digital Instrument
50515

Manufactured by Fairbanks Scales Inc.
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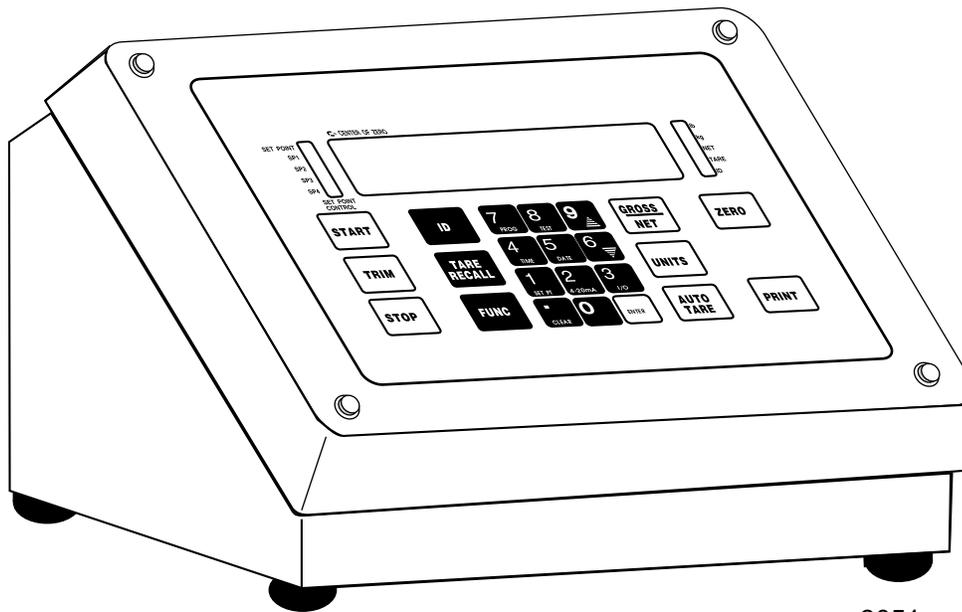
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DISCLAIMER

Every effort has been made to provide complete and accurate information in this manual. However, although this manual may include a specifically identified warranty notice for the product, Fairbanks Scales makes no representations or warranties with respect to the contents of this manual, and reserves the right to make changes to this manual without notice when and as improvements are made to the product.

SECTION 1: DESCRIPTION



A. Introduction:

The model H90-5200-A indicator is a general purpose indicator that can be used with a wide variety of Fairbanks platforms. Stainless steel construction makes the instrument well suited for use in wash-down locations. The standard unit can be bench, wall, or pillar mounted.

The H90-5200-A features a bi-directional serial output and four setpoint outputs. Front panel programming enables easy setting or changing instrument operation parameters. The instrument also includes all of the standard weight processing controls, such as digital tare, tare recall, automatic tare, push button zero, print, and lb/kg conversion.

B. Specifications:

1. Model Number: H90-5200-A
2. Units: lb, kg, lb/kg, or custom (no units indicator)
3. Accuracy: Commercial, 10,000 divisions Non-commercial, 20,000 divisions
4. Load Cells: Up to 4-350 ohm load cells, or 12-1,000 ohm load, Excitation 10VDC
5. Division Size: Programmable from 0.0001 to 50 for both lbs. and kgs.

6. Display: High visibility, 6 digit LED display, with 0.8 inch digits.

Separate indicators for:

Left Side Display	Right Side Display
SP Enable	lb
SP 1	kg
SP 2	NET
SP 3	TARE
SP 4	ID

Center-of-Zero Indicator appears in the display.

7. Display update rate: Programmable for 0.1, 0.3, 0.5, 0.8 or 1.0 seconds.
8. Digital Filter: Programmable - 5 levels
9. Tare: 10 key numeric TARE entry or Auto Tare entry, TARE operation(s) may be disabled in the setup mode.
10. Programmable Features: Primary Units, Scale ID, Time and Date in Military, US, and International Formats, Security Code, Switch Inhibit, and remote switches.
11. AUTO-ZERO tracking: Programmable OFF, 0.5d, 1 .0d, or 3.0d
12. Auto-Zero Time Delay: Programmable from 1 to 6 seconds.
13. Re-zero Range: Programmable +/- 2% or 100% of capacity
14. Overcapacity Warning: The display will show “—OL—” if the weight exceeds 105% capacity
15. Underload Warning: The display will show “—UL—” if the weight on the platform is below the A/D input range.
16. Balance/Motion band: Programmable 0.5,1.0, 2.0, 3.0d
17. Controls: 23 key keypad
18. Setpoints: Four setpoints with open collector outputs rated at 60VDC @ 100mA. Setpoint status is shown by 4 LED indicators, one indicator to show the setpoints are active, and a separate indicator for each setpoint to show its status.

Setpoint mode available with dribble, preact, discharge and zero band.

Checkweigh modes available with preact, discharge and zero band.

Batch modes available with dribble, preact, discharge, zero band and setpoint inhibit.

Auto Batch mode available with dribble, preact, discharge, zero band, setpoint inhibit, setpoint auto zero, delay 1, and print.

Auto Batch Repeat mode available with the same features as Auto Batch but includes delay 2.

19. Serial output: One bi-directional serial port, which may be configured for RS-232 or 20mA current loop. Selectable BAUD rates are 300, 600, 1200, 2400, 4800, 9600, and 19200.
20. Power: 100-130 VAC, 50/60 HZ 10 watts standard
200-250 VAC, 50/60 HZ 10 watts optional

Options:

Accessories:

a. Second Serial Output:

Accessory 145 (1-57364-1) - Output configured for 20mA current loop

Accessory 146 (1-57365-1) - Output configured for RS-232

Accessory 147 (1-57401-1) - Output configured for RS-422 or RS-485

b. Accessory 148 (4-57402-1) - SMART 4-20mA analog output. Output can also be configured for 0-20mA, or 0/1-5VDC, 0-10VDC with customer supplied resistor.

NOTE: One Accessory, A or B can be used , NOT BOTH.

c. Accessory 149 (4-57568-1) - NEMA 12 Relay Accessory. Accessory can be attached to instrument or remote mounted. Accessory is driven by setpoint outputs and provides (4) Form C contacts rated at 5 Amps @ 250 VAC or 5 Amps @ 30 VDC.

d. Accessory 150 (701138) - Cable for remote mounting of Accessory 149 or Accessory 151, up to 100 ft from the instrument

e. Accessory 151 (4-57838-1) - NEMA 4 Remote Relay Accessory Accessory is driven by setpoint outputs and provides (4) Form C contacts rated at 5 Amps @ 250 VAC or 5 Amps @ 30 VDC.

f. Pillar Accessory - The H90-5200-A is compatible with all Series 7 Pillar Accessories

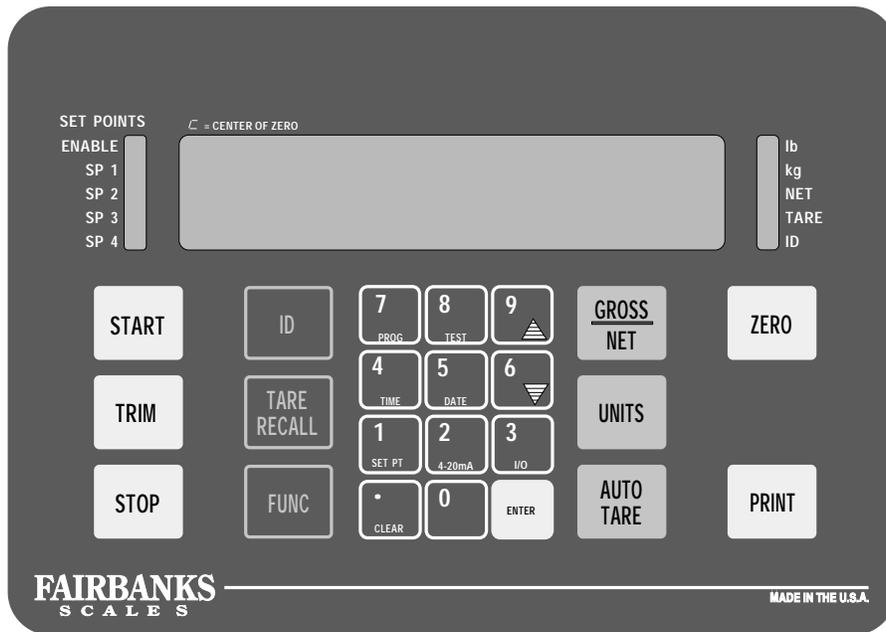


FIGURE 1-2:

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C. Keypad Description

The functions of the front panel keys vary depending on the mode in which the instrument is operated. This Subsection defines the operation of each front panel key. Refer to Figure 1-2.



START: Initiates setpoint batching operation to pre-selected setpoint weight. Batching modes only.



TRIM : Overrides setpoint control to add additional weight in touch controlled increments. Manual batch mode only.



STOP: Overrides setpoint control cycle to turn off all set points, in batching modes only. During batching it is used to change selected setpoint(s) for subsequent batching operation.



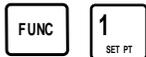
ID: Up to a 6 - digit product ID for printer/computer print out, not maintained at power loss.



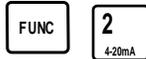
TARE RECALL: Tare retrieval. Displays current tare for approx. 5 seconds.



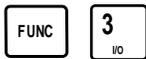
FUNC: Press function key and then one of the following keys to enter special modes described below. Up to six digit security code is then required (if security code entered does not equal 0) to change displayed value using keypad. Refer to Section 2 for further information on all function key operations.



a. **FUNC 1:** Setpoint key will access setpoint setup mode.



b. **FUNC 2:** 4-20 ma key will access the Smart 4-20 ma current loop calibration mode.



c. **FUNC 3:** I/O key access the serial I/O setup mode.



d. **FUNC 4:** Accesses and displays time. A new time can now be entered or ENTER can be pressed to keep the current time.



e. **FUNC 5:** Accesses and displays date. A new date can now be entered or ENTER can be pressed to keep the current date



f. **FUNC 7:** Program key accesses and displays the current operating parameters of the instrument.



g. **FUNC 8:** Instrument test. Shows security level, flashes A/D counts, deadload counts, span counts, display test, RAM Test, EE Prom Test, and Switch Test.



GROSS/NET: Switches weight display mode to Gross or Net, or used to exit programming menu.



UNITS: Allows the displayed weight to be converted to new weight units if the option was enabled.



AUTOTARE: Will set Tare memory equal to the Gross weight on the Platform (which will then force the Net weight to zero). Auto tare must be enabled and gross weight cannot be negative. Display will automatically switch to Net mode, not maintained at power loss.



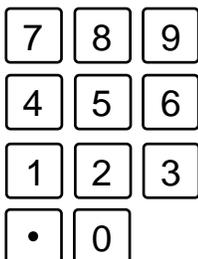
ZERO: Will set the Gross weight equal to zero provided the weight to be zeroed does not exceed the programmed zero range.



PRINT: Causes the instrument to transmit information to the output device if enabled.



CLEAR: This is a dual function key. The first time it is pressed it produces a decimal point. Pressing the key twice “CLEARS” the last entry made.



KEYPAD: Keys “0” through “9” and “.” and “ENTER” are used to enter Tare, programming codes, setpoints, etc.

D. Indicator Description

lb, kg : Indicates the units of the displayed weight. If neither indicator is lighted, then “Custom Units” is enabled.

NET: Indicates the instrument is displaying NET weight.

TARE: Indicates the instrument is displaying TARE weight.

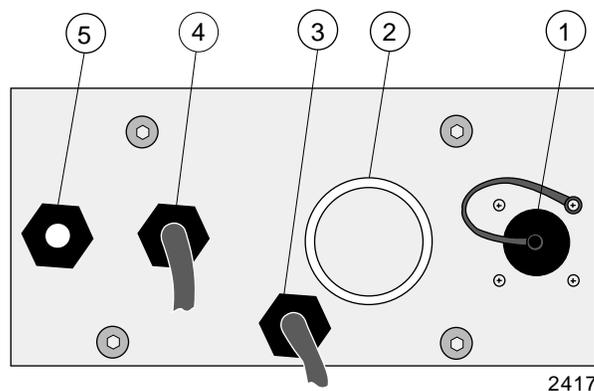
ID: Indicates the instrument is displaying a product ID or date in international date (day/month/year) format.

ENABLE: Indicates the setpoint outputs are active

SP1, SP2, SP3, SP4: Indicates the particular setpoint output is ON when the SP Enabled indicator is also ON.

C = Center-of-Zero: A “C” will appear in the left most digit to indicate that the weight is within a quarter grad of zero.

E. Back Panel Description



1. Serial Output Port
2. Accessory Port
3. AC Power cord, water tight gland.
4. Load Cell, water tight gland.
5. Setpoint output, water tight gland.

F. Basic Weighing Operations

1. General Gross Weighing

- a. Push GROSS/NET to select Gross. When the instrument is in Gross Mode, the NET Indicator light will be OFF.

- b. With the platform empty push ZERO, the display will indicate zero.
- c. Place the loaded carrier on the platform.
- d. Read the Gross weight at the display.

2. Net Weighing Using Keypad Tare

- a. Enter the known Tare weight through the keypad.
- b. Press ENTER
- c. The instrument will display a negative weight value and the NET Indicator will be ON.
- d. Place filled container on platform. The display will show the Net weight of the material.

3. Net Weighing Using AUTO TARE

- a. Place an empty container on the platform.
- b. Press the AUTOTARE key. The empty container weight is transferred to tare memory.
- c. The weight display will now be zero and the NET Indicator light will be ON.
- d. Place the material in the container and the instrument display will show the Net weight.

4. Entering Product ID

- a. Press ID.
- b. Current ID is displayed.
- c. Press GROSS/NET to exit and retain displayed ID, or enter new ID (up to 6 digits) using the keypad. Press ENTER.

5. Printing Weight Information

- a. In any mode above, Press PRINT when weight on the platform is stable.

6. For Other Operating Features, Refer to Section 2

G. Power-UpTest

Upon instrument power-up the H90-5200-A will perform the following tests:

- 1. RAM Test** - The RAM test verifies the operation of the processors external memory device.
- 2. Display Test** - The display will perform a warm-up sequence. This routine is designed to test that all display segment lines, digit lines, and annunciator LEDs, have no defects. This is a passive test and the user must observe the display throughout the test to check for any anomalies.
- 3. EEPROM Read** -The processor will attempt to retrieve the stored scale programming data from the EEPROM. This data includes: deadload and span counts, grad size, capacity, security level, etc.

If the processor detects any out-of-range data, it will repeatedly request data from the EEPROM until the retrieved data is deemed valid. During this period, the display will flash "EE Err."

Very often the problem is with the data itself and not the actual hardware. The two most common causes are as follows:

- a. A replacement board has just be installed in the instrument and this is a first-time power-up. Thus, the current EEPROM data might not be appropriate for the software in use.
- b. You are using a new (or different) software program or revision level than used at the previous instrument power down. This result is that the new software might be trying to access data from the wrong areas of memory.

SECTION 2: PROGRAMMING

A. Security Code “S.Code” Operation

If the security code is programmed with a value other than zero, the display will indicate “S.COdE” when accessing the front panel programming. The operator must enter the security code through the keypad and then press ENTER. The entered keys will then be compared to the security code. If the correct security code has been entered, the display will enter the appropriate programming routine, otherwise the instrument will return to the weigh mode.

B. Programming Operating Parameters

When in the program mode, the value displayed at each step is the value currently stored in the program. When in the programming mode, if a key is not pressed within one minute, the instrument will time out and return to the weigh mode. Some of the keys and switches have special functions in the program mode.

These functions are defined as follows:

The **ENTER** key is used to store the displayed value in memory and advance to the next program step.

The **UP or DOWN** arrow keys or the numeric keypad (0-9) can be used to change the displayed value.

The **GROSS / NET** key can be used to immediately exit from most programming menus.

To program the operating parameters, press the calibrations switch, SW3, located on the main PC Board next to the load cell terminal block (standard programming), once, or press FUNC 7 (front panel programming).

1. Program Steps

NOTE: If the programming mode is entered by pressing the SW3 switch, all of the following programming steps can be changed. If the programming mode is entered via the front panel, some steps may not be able to be changed depending on the scales security level (selected in Step 15).

2. Program Number Display

This display will show the program number and revision level (P294X). This information should be recorded for reference should any problems arise with the operation of the scale. This is a nonprogrammable step.

3. Weight Units Selection

The display will read “ U “, and one or more of the units indicator lights may be ON. The lighted indicator(s) show the current selection(s). Units of lb,kg, lb/kg or custom (no units indicated) can be selected, depending on the operators requirements. Custom or “no” units are not front panel selectable

a. Primary Weight Unit Selection

This program step will only appear if lb/kg was selected in step 2. The display will read “ PU “ and ONE of the units indicator lights will be ON. The light indicates the primary weight unit. The primary weight unit is the weight unit the scale is calibrated in and the units the scale will start in when it is powered up.

4. Grad Size Selection

This display will read “GSxxxx”, where the “xxxx” is the grad size. The grad size displayed is for the primary units selected in program step 2a. Grad sizes for other weight units are dependent on the primary unit grad size and are not independently programmable.

Grad sizes from 0.0001 to 50 can be selected. If an unacceptable grad size is selected, an error message “EIL” or “E1H” will be displayed. A grad size is unacceptable IF The number of divisions for any weight unit is less than 100 or more than 10,000 (number of divisions = capacity/grad size). These error messages and inhibits will only be displayed when programming through the front panel.

5. Balance / Motion Band Selection

The display will read “bALx.x”, where “x.x” is the width of the motion band in divisions, “0.5,1.0, 2.0 or 3.0”. If the current A/D reading exceeds the digitally filtered output by more than the motion band for 1/2 second, there is “motion” on the scale and the instrument will switch to the fast filter mode, where the display tracks the input.

If there is “motion” on the scale, zero, autotare and print operations are inhibited until “motion” stops.

6. AUTOZERO Tracking (AZT) Selection

The display will read “AO x.x”, where the “x.x” is the width of the AZT band in divisions. AZT enables the instrument to automatically zero off small changes in the zero balance of the scale. For an AZT to occur, the weight must be within the AZT band for a time defined by AZTD (see 7. Auto Zero Time Delay).

7. Auto Zero Time Delay

The display will read “AOtd x”, where x is 1, 2, 3, 4, 5 or 6. The Auto Zero Time Delay is the number of seconds that the weight must be stable in the AZT band before an Auto Zero operation will take place. AZTD will not be offered unless AZT was enabled in the previous step.

8. Zero Limit Selection

The display will read "OL xxx", where the "xxx" is 100 or 2. The Zero Limit controls the weight range over which the zero switch will operate. The weight range is either 100% or +/- 2% of the scale capacity.

9. AUTO TARE Selection

The display will read "AtArEx", where the "x" will be a 1 or a 0. The "1" indicates the AUTOTARE key is enabled and the "0" indicates disabled.

10. Keyboard Tare Selection

The display will read "tArE x", where "x" will be a 1 or a 0. The "1" indicates the keyboard tare is enabled and the "0" indicates the keyboard tare is disabled.

11. Display Update Rate Selection

The display will read "SECx.x", where the "x.x" represents the update rate in seconds. The rates available are 0.1, 0.3, 0.5, 0.8, and 1.0.

12. Digital Filter Selection

The display will read "FF x", where the "x" is the digital filter factor. The available values are 0, 1, 2, 3, or 4. A "0" will disable the filter, a "1" will give a minimum amount of filtering, and a "4" will give the maximum amount of filtering. The digital filter is used to stabilize the weight display, when it behaves erratically due to low signal levels or unstable weight on the platform. The more filtering, the more stable the display will be.

NOTE: When using the remote display accessory, the update rate must be 0.5 seconds or greater.

13. Scale ID Selection

The display will read "id xxx" where "xxx" is the scale ID number used for polled computer serial interface. If the computer polled with ID option is not used, ID should be set to "0". If the computer polled with ID option is used, any number from 1 to 255 may be entered.

14. Time/Date Format Selection

The display will read "tdxxyy", where "xxyy" is the format used to display and print time (xx) and date (yy). The options available are "12" or "24" hour clock for time and "US" (mo/day/yr) or "id" International date (day/mo/yr).

15. Security Code Selection

The display will read "S.CODe" to indicate the security code selection step. The current security code is not shown. The security code is used to limit access to front panel programming. A security code up to 6 digits long may be used. A security code of "0" enables free access to all front panel programming.

16. Security Level Selection

The display will read "SL x", where "x" is a "0", "1", or "2". The "0" enables full programming capability from the front panel for non-commercial applications. The "1" enables limited front panel programming for commercial applications. The "2" disables all front panel programming for commercial applications.

CAUTION:

- a. If Security Level "1", or "2" is selected at this step, Security Level "0" CANNOT be selected at a later time from the front panel. Be sure of your selection before you continue***
- b. If Security Level "1" is selected, program steps 3, 4, 5, 6, 7, 14 and 15 cannot be changed from the front panel.***
- c. If Security Level "2" is selected, NO parameters can be changed from the front panel***
- d. Security Level must be set to "1" or "2" for commercial applications. If the Security Level is set for "0", the instrument is NOT considered "LEGAL FOR TRADE", therefore the Security Level should be set for "1" or "2" for any commercial application.***

17. Inhibit Switch Selection

The display will read "inhS x", where x will be a "1" or a "0". If "1" is selected then one or more front panel switches may be inhibited from operating. If "0" is selected then all switches are operational. All keys except the ENTER key may be inhibited. If "1" is selected, the display will show which switches are inhibited upon re-entering programming mode. If no switches are inhibited the display will be blank.

- a. If the displayed list is acceptable, press the ENTER key.
- b. If a new key inhibit list is wanted
 - 1) Press the keys that are to be inhibited
 - 2) When the list is complete, press the ENTER key

If there are more switches inhibited than the display can show at one time, the display can be shifted over one switch at a time by pressing the FUNC key. Pressing the ENTER key will retain the current list. If any other key is pressed the current list will be cleared and a new one started. The new list will end when the ENTER key is pressed.

Some examples of this feature are:

- a. The instrument is monitoring the weight of a hopper and the user is afraid someone will accidentally ZERO the indicator and lose the weight readings. By inhibiting the ZERO switch this can be prevented.
- b. The supervisor feels the instrument is too complicated and the operator could accidentally change the desired setup. Inhibit all the switches except ZERO and that is the only key the operator can use.
- c. Instrument is hooked to a remote computer and user doesn't want anyone to interfere with the computer control. Inhibit all the switches once the indicator is setup.

NOTE: When a switch that has been disabled/inhibited is pressed, the display will momentarily flash "Error".

18. Remote Switch Enable

Three (3) remote or external switches can be used to emulate only the following keys, ZERO, START, PRINT, AUTO TARE, TRIM, TARE RECALL, UNITS, STOP. All remote switches must be momentary dry contact type (without power), and are hard wired to the optically isolated 10 position connector, TB3 on the main board. See Appendix XI for wiring diagram.

- a. Display will read: "rS 0" where rS means remote switch and 0=OFF. By pressing "1" then "enter" the display will read "rS 1" and enable this function.
- b. The display will read "rS1 " which means remote switch 1 is enabled for the ZERO function. (See chart of key symbols in APPENDIX XII). To change, press the key you wish to be remotely controlled and press "enter".
- c. The display will advance to show "rS2 A" meaning remote switch 2 is set to function as an AUTO-TARE key. Change as required by pressing the key you want to emulate, then press "enter".
- d. The display will advance to show "rS3 P" meaning remote switch 3 is set to function as a PRINT key. Change as required by pressing the key you want to emulate, then press "enter".
- e. After "enter" is pressed for "rS3 X", the display will return to the weigh mode

C. Displaying and Setting Time

1. From a gross or net weight display, press FUNC, the display will indicate "Func".
2. Press the 4 key.
3. The display will indicate the current time where "A" stands for AM and "P" stands for PM (e.g. "11:36 AM will be shown as "1136 A").
If the time was set in 24 hour military format (00:00 thru 23:59), the AM or PM legends will not be shown.
4. Press ENTER if time is correct The display will return to the weigh mode or enter the correct time by pressing the numeric keys "0" through "9" .Enter the hours first and then the minutes (see example).
The time must be entered in 24 hour military format (0000 through 2359).
Example: Military Time Setting
To set the time to 8:49AM, enter "849". To set 8:49 PM, enter "2049".
Do not enter leading 0's.
5. When the correct time is entered, press the ENTER key to store the displayed time.

D. Displaying and Setting Date

1. From a gross or net weight display, press FUNC, the display will indicate "Func".
2. Press the 5 key. The display will show the current date e.g. 121598.
If ID LED is ON - the date is in International format. Standard Format - MM DD:YY International Format - DD MM:YY
3. Press ENTER if the date is correct. The display will return to the weight display.
4. Enter the date by pressing the numeric keys "0" through "9" (omitting leading zeroes).

Enter the date as day/month/year or month/day/year format (see examples). When entering days 1 - 9 the digits must be preceded by a zero (e.g. 06 for the sixth day). Entering only a 6 will cause the entry to be interpreted as the 60th day of the month).

- Examples:**
1. To set the date to January 16, 1999 in month/day/year format, the key sequence would be as follows: 11699 enter. (US format).
 2. To set the date to 16 January 1999 in day/month/year format, the key sequence would be as follows 160199. (International format).
 5. Press the ENTER key to store the displayed date. The time and date format is set when programming operating parameters.

E. Test Mode

The 8 key is used by the operator to verify proper operation of the instrument.

1. Select the Gross or Net Mode.
2. Push the FUNC key, then the 8 key.

The instrument will show the security level "SLx and then a blinking internal counts display, which is equivalent to the weight on the platform This function can be used to verify that the A/D is operating properly.

Press ENTER to continue.

3. Instrument will display in the following sequence:
 - a. The deadload counts, "0 xxxx".
 - b. The span counts, "S xxxx".
 - c. All segments and legends are lit to verify display operation.
 - d. A RAM and EEPROM test are done. A summary of error messages may be found in Appendix XII.

4. A switch test can be done by the operator or ENTER can be pressed to exit. When a particular switch pressed, it's corresponding display may be found in Appendix XII.

F. SETPOINT Operation And Programming

1. General Description, SETPOINT Modes

The Setpoints are used to control alarms, gate controls etc. that are furnished by the customer. Setpoint operation is dependent on Gross or Net weight. The setpoint outputs can only change state when the instrument is displaying Gross or Net weight. If the instrument is not displaying Gross or Net weight, the setpoint outputs will revert to their OFF state.

A setpoint output is ON if the Setpoint "Enable" LED is lighted AND the individual Setpoint LED is ON.

Setpoint Mode Summary

Refer to Appendix VII for more information.

a. Individual (Single Feed) Setpoints Fast Feed Cutoff = $SP - P$

b. Paired (Dual Feed) Setpoints

Fast Feed Cutoff = $SP - D - P$ Dribble Cutoff = $SP - P$

SP (Setpoint) = weight value desired at end of weighing operation

D (Dribble) = weight range at end of setpoint over which material flow changes, usually from "fast" to "slow" feed

P (Preact) = weight value which is used to compensate for material in suspension or other delays in control loop

There are six operating modes. "Mode 0" turns the setpoint option "OFF". Two modes are for setpoints only and three modes are for batching operations. In addition, a zeroband operation in the Gross Mode only, up to capacity, is available in all modes, if Setpoint 4 is available. The following sections explain each of the modes.

MODE 0- SETPOINTS OFF

The display shows "SP OFF". The setpoint outputs are disabled.

MODE 1- SETPOINT MODE

The display shows "SP SP". The setpoint mode is used for simple operations Where the setpoint outputs are not directly controlling valves or gates and it is not desirable or necessary to manually "start" and "stop" the setpoints.

Setpoint mode configures the outputs as simple "dumb" setpoints. When the absolute value of the weight is less than the setpoint, the setpoint output is ON and when the absolute value of the weight exceeds the setpoint, the setpoint output is OFF. The setpoints are always active when the instrument is monitoring weight and the START, TRIM, and STOP keys are not functional.

Up to 4 setpoints may be enabled and dribble, preact, discharge and zeroband options are available. Some application examples are:

a. turning on a light to signal that a box has been filled to the proper weight.

- b. providing inputs to a process controller that is controlling an automatic batching process, where the batching controller is providing the intelligence to control the valves or gates.

MODE 2- CHECKWEIGH MODE

Display shows "SP CH".

The checkweigh mode is used to determine if a weight is under, within or over a programmed weight range.

The setpoint outputs operate as follows:

SP1 = Overrange(On when weight > Setpoint 1)

SP2 = Accept range(On when Setpoint2 <= weight <=Setpoint 1)

SP3 = Under range(On when weight < Setpoint 2)

Checkweigh outputs are active immediately upon startup and are always on except for any programming which interrupts the weight monitoring process.

START, TRIM, and STOP keys are not functional in this mode. Preact, discharge and zeroband options are available.

MODE 3- MANUAL BATCH MODE

Display shows "SP bA".

The batch mode is used to control simple filling operations where gates or valves are controlled by the setpoint outputs and an operator is manually controlling the sequence of operation. The setpoint outputs are controlled by the START, TRIM, and STOP keys. In the batch mode, the setpoints may be set up as one to four FAST FEED outputs with optional PRACT, or one or two paired setpoints with FAST FEED and DRIBBLE outputs, with optional PRACT.

When the START key is pressed, the outputs will be enabled ("Setpoint Enabled" LED is lighted) assuming the setpoint inhibit function is satisfied or disabled. The active setpoint output(s) will be ON if the absolute value of the weight is less than the CUTOFF VALUE. When the absolute value of the weight exceeds the CUTOFF VALUE, or the STOP key is pressed, the setpoint output will turn OFF. If all setpoints are OFF, the "Setpoint Enabled" LED will turn OFF and the active setpoint indicators will light. The TRIM key can be used to momentarily turn ON an individual setpoint output. If outputs are paired, the TRIM key will only operate on the dribble setpoint of the selected pair. When the TRIM key is released, all setpoint outputs will turn OFF. Another batch of the same ingredient can be released by pressing the START key again.

A new ingredient can be batched by pressing the **STOP** key until the SP indicator for that ingredient is lit and then pressing the **START** button.

If individual setpoints are used, the cutoff value is equal to the Setpoint entered minus the PRACT value. If paired (Dual Feed) setpoints are used, the FAST FEED cutoff (SP1&3) is equal to Setpoint - Dribble -Preact and the Dribble cutoff (SP2&4) is equal to Setpoint - Preact.

With paired setpoints, setpoint outputs 1 and 3 are the FAST FEED outputs and setpoint outputs 2 and 4 are the DRIBBLE outputs. Setpoint 1 is paired with Setpoint 2, and Setpoint 3 is paired with Setpoint 4.

IMPORTANT NOTES

- 1. The front panel STOP key should never be used as the primary STOP control (EMERGENCY STOP) in a critical batching operation.*
 - 2. The batch cycle will automatically stop if any operation interrupts the weight monitoring process. For example, if print, zero or tare operations are initiated during weight operations.*
- Up to 4 setpoints may be enabled and dribble, preact, discharge, zeroband and setpoint inhibit options are available.*

MODE 4- AUTO BATCH MODE

Display shows "SP AbA":

The Auto batch mode is used to control simple filling operations where gates or valves are controlled by the setpoint outputs and the operator desires to batch one set of ingredients automatically after the START button is pressed. The Auto Batching mode operates the same as the batch mode except that instead of requiring the operator to press the START key to turn each setpoint ON and the STOP key to change setpoints, the instrument will automatically sequence from the first setpoint to last setpoint. When the last enabled setpoint has been reached, the instrument will automatically return to the first setpoint and then turn OFF. The amount of delay, DELAY 1, between each setpoint, or setpoint pairs, is programmable.

When the START button is pressed, if the instrument is not inhibited from operating by the setpoint inhibit (refer to setpoint operation), the following sequence will occur:

- a. If the Setpoint 1 (SP1) is enabled, and the Setpoint Autozero feature is enabled, then the scale will be zeroed.
- b. An autotare will occur and the indicator will switch to NET mode.
- c. The first ingredient output(s) will turn on until the setpoint is reached.
- d. The "ENABLED" indicator will start to flash and the delay time out will start. (If the DELAY 1 = 0 an infinite delay will occur and START must be pressed.)
- e. At the end of the delay, a print operation will occur if the batch print mode is enabled.
- f. The instrument will switch to the next ingredient setpoint.
- g. The "ENABLED" indicator stops flashing and an autotare will occur.
- h. The setpoint is enabled.
- i. When the displayed weight reaches the setpoint, the output will turn off. If print mode is enabled, the currently displayed weight is printed, "AA BB SX".

AA is the weight, BB is the weight unit, and X is the corresponding setpoint number.

- j. Steps d - i will be repeated until the last setpoint has been reached. If batch print mode is enabled, a weight total will be printed.
- k. The instrument will switch back to the first ingredient setpoint.
- l. The setpoint outputs will remain OFF and the unit will return to normal operation in the GROSS mode.

If the batching is stopped in the middle of the cycle, it may be restarted where it left off (Step h) by pressing the FUNC, START keys or started at the beginning of the current ingredient setpoint (Step g) by pressing the START key. The current setpoint can be changed by pressing the STOP key until the desired setpoint indicator is lit. The TRIM Key is not functional in this mode.

IMPORTANT NOTES

- 1. The front panel STOP key should never be used as the primary STOP control (EMERGENCY STOP) in a critical batching operation.*
- 2. The batch cycle will automatically stop if any operation interrupts the weight monitoring process. For example, if print, zero or tare operations are initiated during weight operations.*

Up to 4 setpoints may be enabled depending on settings of : dribble, preact, discharge, zeroband, setpoint inhibit, SP auto zero, delay 1 and print options.

MODE 5- AUTO BATCH REPEAT MODE

Display shows "SP Abr":

The Auto Batching with Repeat mode operates the same as the Auto Batch mode except that instead of stopping after each batching cycle is complete the unit will automatically return to the first setpoint and start a new cycle after a delay of length DELAY2. When the START button is pressed, if the instrument is not inhibited from operating by the setpoint inhibit (refer to setpoint operation), the following sequence will occur:

- a. If Setpoint 1 (SP 1) is enabled and the Setpoint Autozero feature is enabled, then the scale will be zeroed.
- b. An autotare will occur and the indicator will switch to NET mode.
- c. The first ingredient output(s) will turn on until the setpoint is reached.
- d. The "ENABLED" indicator will start to flash and the delay time out will start. (If the DELAY 1 = 0, an infinite delay will occur and **START** must be pressed.)
- e. At the end of the delay, a print operation will occur if the batch print mode is enabled.
- f. The instrument will switch to the next ingredient setpoint.
- g. The "ENABLE" indicator stops flashing and an autotare will occur.
- h. The setpoint is enabled.
- i. When the displayed weight reaches the setpoint, the output will turn off.

- j. Steps d - i will be repeated until the last setpoint has been reached. If batch print mode is enabled, a weight total will be printed.
- k. The instrument will switch back to the first ingredient setpoint(s).
- l. The setpoint outputs will remain OFF and the unit will return to the GROSS mode.
- m. A time out of the second delay will now start. (If the DELAY2 = 0, an infinite delay will occur and **START** must be pressed.)
- n. If the instrument is inhibited by the setpoint inhibit (refer to setpoint operation), the instrument will respond as though delay 2 was set to 0 (infinite). All setpoints will be disabled and the “enabled” indicator will blink until the inhibit condition is removed.
- o. Steps a through o will be repeated until the batching cycle is stopped by pressing the **STOP** key. If the batching is stopped in the middle of the cycle, it may be restarted where it left off (Step h) by pressing the **FUNC**, **START** keys, or started at the beginning of the current ingredient setpoint (Step 9) by pressing the **START** key. The current setpoint can be changed by pressing the **STOP** key until the desired setpoint indicator is lit. The **TRIM** key is not functional in this mode.

IMPORTANT NOTES

1. *The front panel STOP button should never be used as the primary STOP control (EMERGENCY STOP) in a critical batching operation.*
2. *The batch cycle will automatically stop if any operation interrupts the weight monitoring process. For example, if print, zero or tare operations are initiated during weight operations.*

Up to 4 setpoints may be enabled depending on settings of : dribble, preact, discharge, zeroband, setpoint inhibit, SP auto zero, delay 1 and print options.

DISCHARGE (DUMP) OPERATION

The discharge output is an optional output that is used to discharge or dump a completed batch. It is available in modes AbA and Abr only. If enabled, the discharge output will automatically turn on after the last ingredient of an auto-batch or autobatch repeat mode has been added. It will then turn off automatically “delay 2” seconds after the cause of any software inhibit is removed. In the other setpoint modes, the discharge output is manually turned on by pressing **STOP**. In all setpoint modes, an active discharge operation may be turned off by pressing **STOP**.

The discharge function will operate on Setpoint 3 if that setpoint is available. If Setpoint 3 is not available, but Setpoint 4 is unused, the discharge feature will be offered on Setpoint 4. Discharge maintains a higher precedence than zeroband. So, if Setpoint 4 is the only setpoint available, the first option offered is the discharge feature. If discharge is unused, zeroband will be offered.

ZEROBAND OPERATION - Optional

The Zeroband output is an optional output that will turn ON only when the absolute value of the GROSS weight is within the zeroband setpoint. The Zeroband can be used as an inhibit signal, to disable the set-points from operating if the weight is less than the Zeroband. The Zeroband output always uses SP4, and the value of Setpoint 4 determines the Zeroband. The Zeroband is always operational unless the setpoints are disabled. The START button does not have to be pressed.

A hardware inhibit may be obtained by connecting the Zeroband (SP4) output to external control circuits or, if Accessory 149/151 is used, by connecting the SP4 relay contacts in series with the other contacts.

SETPOINT INHIBIT

The setpoint software inhibit (SPi) is available to prevent the start or restart of a batching cycle. The inhibit is active when the weight on the scale is above or below (as defined by the user) a preset gross weight value. This gross weight is programmed as Setpoint 5. However, the user must recognize that the Setpoint 5 value is strictly a software parameter and it does NOT represent a fifth setpoint output.

Within Setpoint programming:

- * If SPi is programmed to "OFF", the inhibit feature is disabled.
- * If SPi is programmed to "LO", the batch cycle will not start if the gross weight on the scale is less than the setpoint 5 weight.
- * If SPi is programmed to "HI", the batch cycle will not start if the gross weight on the scale is equal to or exceeds the Setpoint 5 weight.

Examples using Zeroband and Setpoint Inhibit:

1. In the Manual Batch Mode, to prevent fill operations from occurring when no container is on the scale:
 - * Enable Zeroband, set Setpoint 4 equal to slightly less than the minimum container tare weight, and disable the Setpoint Autozero feature.
 - * If setpoint software inhibit is used, program it for "SPi LO" and set Setpoint 5 to the same weight as Setpoint 4.
2. To prevent an amount to be emptied from a hopper when there is insufficient material in the hopper to complete the batch:
 - * Enable Zeroband, set Setpoint 4 equal to slightly more than the amount to be emptied from the hopper, and disable the Setpoint Autozero feature.
 - * If setpoint software inhibit is used, program it for "SPi LO" and set Setpoint 5 to the same weight as Setpoint 4.

3. In Auto Batch or Auto Batch Repeat Mode, to prevent a fill operation from occurring when no container is on the scale:

- * Enable Zeroband, set Setpoint 4 equal to slightly more than the maximum difference in tare weights between containers, and enable the Setpoint Autozero feature.
- * If setpoint software inhibit is used, program it for "SPi HI" and set Setpoint 5 to the same weight as Setpoint 4.
- * Manually zero off the very first container's tare weight before starting.

Programming Setpoint Mode Of Operation

1. Press FUNC, 1. The display will show "CAL SP". Press the Prog / 7 key to program setpoint mode and other operating parameters
2. The display will now show the current setpoint mode of operation Use the 9 and 6 arrow keys until the desired mode is displayed and then press ENTER.
3. The display will now show "SPon x", where x = 0 or 1. Use the arrow keys to select the desired setpoint ON state, either 0 (LOW) or 1 (HI). Select "0" if you are using Relay Accessory 149/151. Press ENTER
If "0" is selected, the setpoint outputs turn on and provide a Low state.
If "1" is selected, the setpoint outputs turn on and provide a High impedance.
4. The display will now show "ni x", where x represents the number of ingredients which are to be batched. Enter the number of ingredients from 1 to 4. If the number of ingredients is 3 or 4, continue with Step 6.

NOTE: If setpoints are to be "paired", that is a fast feed and dribble are used, the maximum number of ingredients is 2.

5. If the number of ingredients is 1 or 2, the display will show "dr x", where x = 0 or 1. Enter 1 to enable or 0 to disable dribble (paired setpoint) operation.
If dribble is enabled, setpoint 1 (Fast feed) will be paired with setpoint 2 (Dribble), and setpoint 3 (Fast feed) will be paired with setpoint 4 (Dribble).
The second setpoint pair (3 and 4) will only be available if the number of ingredients selected in step 4, is 2.
6. The display will now show "Pr x", where x = 0 or 1 Enter 1 to enable or 0 to disable preact.
7. If Setpoint 3 or 4 is available, the display will show "dc x", where "x" equals 0 or 1. Enter 1 to enable or 0 to disable the discharge output.

NOTE: “Discharge” will normally use the Setpoint 3 output. If Setpoint 3 is unavailable, discharge will use the Setpoint 4 output

8. If Setpoint 4 is unused, the display will show “Zb x” where x = 0 or 1. Enter 1 to enable or 0 to disable Zeroband.
9. If “SP bA” , “SP AbA” or “SP Abr” was selected, the display will show “SPi xxx”, where “xxx” is OFF, LO or HI. Enter OFF to disable the setpoint software inhibit, LO to enable the software inhibit when the gross weight is less than Setpoint 5, or HI to enable the software inhibit when the gross weight is greater than or equal to Setpoint 5.

NOTE: Unlike Setpoint 1 through 4, Setpoint 5 does not have an output. The Setpoint 5 value is the Setpoint Software Inhibit reference. A batch, auto batch, or autobatch with repeat cycle will be inhibited from starting if the weight on the scale is less than or greater than (as defined by the user) the Setpoint 5 value.

10. If “SP AbA” or “SP Abr” is selected, the display will show “SPA2 x” where x equals 0 or 1. Enter 1 to enable the Setpoint Autozero feature or 0 to disable. If enabled, the instrument will automatically perform a zero operation before starting an auto batch cycle. Enable if the application uses a platform, disable if the application uses a hopper.
11. If “SP AbA” (Auto Batch mode) or “SP Abr” (Auto Batch with Repeat mode) was selected, the instrument will now prompt the user for the amount of time to delay between each ingredient, “d1” (DELAY 1), before starting the next batch.
Enter the amount of time (from 0-99 seconds).
12. In all but the checkweigh setpoint mode, the display will now show “d2 xx”, where “xx” is the delay 2 in seconds. The discharge output will turn off 2 seconds after the cause of any software inhibit is removed. If delay 2 is set to 0, the discharge output will turnoff when the STOP key is pressed. Enter the desired amount of delay, from 0 to 99 seconds.

NOTE: If 0 is selected, the instrument will wait for the next setpoint to be manually started by the operator pressing the START “ button.

13. If “SP Aba” or “SP Abr” was selected, then the display will show “print x”, where x is a 0 or 1.
0 = No print function is enabled.
1 = Print function enabled and the printer will automatically print at the end of the delay period.
14. The unit will return to the normal weight display.

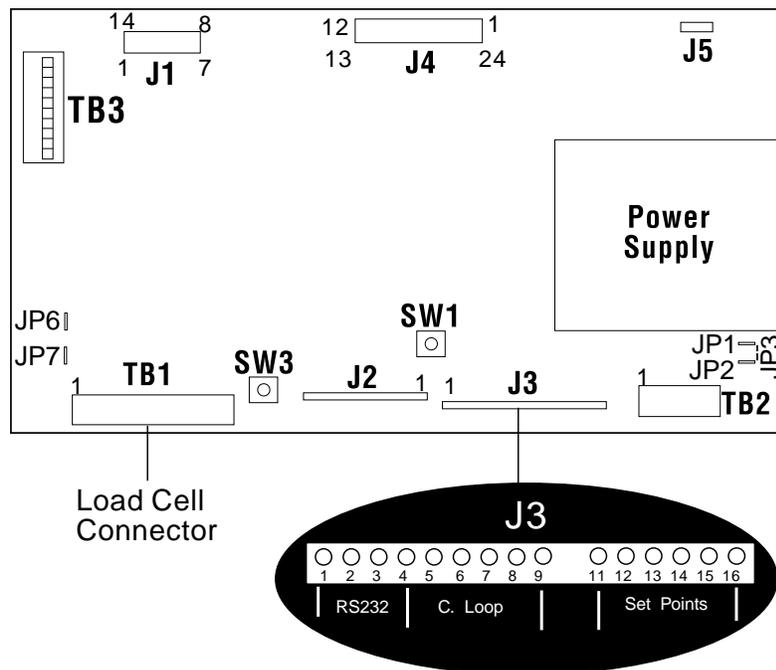
Programming Setpoint Values

1. Press FUNC, 1. The display will show “SP CAL” Enter the number of the setpoint you wish to program, 1 – 5. If paired setpoints are used (dribble is enabled), then enter 1 or 3 to program the setpoint value and 2 or 4 to program the dribble value. **Always enter 5 to program Setpoint Software Inhibit.**
2. The selected setpoint indicator will turn ON and the display will alternately flash between a legend and the current value programmed. The legend will be “SP” for setpoint, “DR” for dribble, or “SPi” for setpoint software inhibit, or “2b” for zeroband.
3. Enter a new value from the keypad or press ENTER to store the current value in memory.
4. If Preact is enabled, the instrument will now prompt the user to enter the Preact value to be used. There is a separate preact available for each output.
5. The unit will now return to normal weigh mode.

SETPOINT Outputs

The setpoint output terminal block, is located in the bottom of the instrument. The setpoint output cable is connected to J3 (pins 10-16) on the main PC Board, near the AC power connector.

The setpoint control cable will exit the instrument through the waterproof gland on the back (see Figure 2417, page 11). Refer to Appendix VII to identify setpoint outputs at



50514-2

TB3.

The setpoint terminal block is marked Setpoints 1, 2, 3, and 4, as well as a ground terminal. The open collector relay driver output is capable of driving DC loads up to a maximum of 60VDC @ 100mA.

FIGURE 2-1

G. Serial Output Operation and Programming

Each instrument has a serial output as a standard feature which may be configured for RS-232 or a 20mA current loop. The connector, located on the back of the instrument, is a water-proof, 9 pin circular connector. The connector is covered with a screw cap.

1. Programming Serial IO Interface

Refer to Appendix III for selected printer switch settings. Program the instrument to match the selected printer.

- a. To program the serial channel baud rate, etc., press FUNC, 3 to enter the IO calibration mode The display will show "CAL I0". Press the 7 key.
- b. The display will show "SELCH x", where x is the channel number. Enter the channel number you wish to setup, i.e., 1, 2, or 3.

Channel 1 is the first serial output channel (RS-232 or current loop). Channel 2 is the optional serial output channel (RS-232 or current loop). Channel 3 is the optional serial output channel (RS-485). To use the standard output, select channel 1. With the proper accessory installed, select channel 2 or 3.

- c. The display will show "b xxxx". This is the output baud rate. Using the UP or DOWN arrows, scroll through the baud rate choices, 300, 600,1200, 2400, 4800, 9600, or 19200 When the desired baud rate is displayed, press the ENTER key.
- d. The display will show "StOP x , where "x" is 1 or 2. This is the number of stop bits. Scroll through the choices with the UP or DOWN arrows and press ENTER when the desired choice is displayed.
- e. The display will show the parity, "odd", "EUEN" or "NONE". Scroll through the choices with the UP or DOWN arrows and Press ENTER when the desired choice is displayed.
- f. The display will now show" CHAr x ,where x is 7 or 8 This is the number of data bits per character. Scroll through the choice with the Up and Down arrow keys and press ENTER at the desired value.
- g. If Channel 1 is selected, the display will show "CtS x", where x = 0 or 1. Enter 0 if you wish the instrument to transmit when the CTS (Clear To Send) line is LOW (example: printer busy, active high), or if the CTS line is not used. Enter 1 if you wish the instrument to transmit when the CTS line is HIGH (example:

standard CTS operation or printer with busy, active low).

Serial Output Operation and Programming:

Clear to Send (CTS) Selection

Port 1 Only	CTS Value
50-3710	1
50-3715	1
50-3920 (Oki 182)	0
50-3921 (Oki 184T)	1
50-3925/SP2000/SP2200	0
PTR-3950/610	0
50-3960/295/590	0
Computer with CTS Handshake	1
Remote Display	0
20mA Current Loop	0

With ACC 146 Installed

Port 1 & Port 2	CTS Value
50-3715 50-3921	1
50-3715 PTR-3950	1
50-3715 50-3960	1
SP-2000	1
50-3960 50-3715	0
50-3960 50-3921	0
50-3960 PTR-3950	0
50-3921 50-3715	1
50-3921 50-3960	1
50-3921 PTR-3950	1
PTR-3950 50-3715	0
PTR-3950 50-3921	0
PTR-3950 50-3960	0

Switch settings on ACC-146: 1, 3, 5, and 8 ON.

- h. The instrument will now return to the normal weigh mode.

2. Programming the Serial IO Format

There are 3 channels available

Channel 1 - Standard Serial Port

Channel 2 - RS232 / 20mA CL

Channel 3 - RS422/485 Output

- a. Press FUNC, 3 to enter IO calibration mode. The display will show 'CAL IO'. Press the number of the IO channel you wish to format.

- b. The display will show “ENA x”. This is the ENABLE or DISABLE function. Select 0 to disable output or 1 to enable output. Press ENTER when the desired choice is displayed.

- c. **Selecting Output Device**

Use the **UP** and **DOWN** arrow keys to scroll through the available devices and press ENTER when the Appropriate devices is displayed. The available device are:

- 1) **“Pntr” = Printer**

- Data will be transmitted when the PRINT key is pressed or a remote print command is received. Computer commands without ID may be received in this mode. Refer to computer command section for further details.

- 2) **“CPtr P” = Computer - Polled**

- Computer commands without ID may be received in this mode. Refer to computer command section for further details.

- 3) **“CPtrPi” = Computer Polled with ID**

- Computer commands with ID may be received in this mode. Refer to computer command section for further details.

- 4) **“CPtr A” = Computer - Automatic**

- Data will be transmitted every display update. Computer commands with or without ID may be received in this mode. Refer to computer command section for further details.

- 5) **“dISPLY” = Remote Display**

- Data will automatically be transmitted every display update. Only commands that are specific to the Remote Display may be received over the serial port in this mode.

- 6.) **“P 2642” = PTR 2242 /2642/2742/2844 Label Barcode Printer.**

NOTE: If amount of data transmitted exceeds the time available between display updates, display updates will be lost and the system will appear to slow down. This can be corrected by decreasing the amount of data transmitted, increasing the baud rate, or slowing down the display update rate.

- d. **Select Output Format**

If data is being output to a computer or printer, you will be prompted to select what information to transmit. The display will show “tdi” for time, date and ID. Any combination of these three items may be selected.

Display

“tdi”

meaning

time, date, and ID

“di”	date and ID
“ti”	time and ID
“i”	ID only
“td”	time and date
“d”	date only
“t”	time only
“no tdi”	no time, date, or ID

Use the UP or DOWN arrows to scroll through the selections, Press ENTER to select.

The display will show “nEt” or Gtn’ If “nEt” is selected, the instrument will output NET weight only in the Net weigh mode If “Gtn” is selected, the instrument will output GROSS, TARE and NET weight in the Net weigh mode. The instrument only outputs GROSS weight in the Gross mode. Use UP or DOWN arrows to toggle between the choices. Press ENTER to select.

The display will show “CrLF” for carriage return and line feed or “Cr” for carriage return only at the end of each line. Use UP or DOWN arrows to toggle between the choices . Press ENTER to select.

For Label Printer ONLY, select “bar” / “no bar”. (bar = code 128 label, no bar = human readable label)

- e. When a computer format is chosen (at step C) , an option of enabling <STX> and <ETX> for computer commands must be set. The display prompt will show” St Et_x”, where x is a “1” or a “0”.

Select “1” to enable <STX> and <ETX> for computer commands.

This completes the output programming and the display will return to the weigh mode. All serial outputs are programmed the same. Switching from RS-232 to the current loop or RS-485 is controlled by hardware. Refer to Appendix II.

3. Serial Output Data Format

Refer to Appendix V.

4. Wiring Diagram For Data Output

Refer to Appendix IV.

H. Computer Commands

Note: The option of eliminating the <STX> and <ETX> can be selected. This is useful in “backwards compatibility” with the 5200 instruments. It is strongly recommended to use the <STX> and <ETX> when using RS485.

1. * The COMMAND FORMAT is <STX>[ID]CMD<CR><ETX> where:
 - [] = Optional parameters
 - ID = 1-3 Digit ID (1-255)
 - CMD = Command
 - <STX> = Start of Text char
 - <ETX> = End of Text char

- * All commands must be terminated by a <CR> and <ETX>. Upon receipt, the command will be executed.
- * The Command String (including the <CR> and <ETX>, and ID if required) may not be longer than 20 characters. IF the string is longer than 20 characters, the extra characters will be lost.
- * If a Scale ID other than 0 (Section 2, B-13) has been entered, the Command must be preceded by a 1-3 digit Scale ID or it will be ignored. If a Scale ID other than 0 has been entered and weight is outputted, the weight output string will be preceded by a Scale ID String.
- * Buffer will be cleared after command is executed.
- * Computer commands may be echoed and /or acknowledged. Refer to Subsection I, of this section for further information.

Example Command : <STX>12P<CR><ETX>
 Response : SCALE 12 <CR><LF>

Weight is output to all printer channels The following computer commands are supported. Refer to Appendix V (Data Format) for output string information.

PRINT <STX>P<CR><ETX>
 Weight is output to all printer channels

WEIGHT <STX>W[L/K]<CR><ETX>
 Weight is output to computer channel requesting data only L(LB)
 OR K(KG) can be used to request output in specific weight unit

ZERO <STX>Z<CR><ETX>
 Scale is zeroed IF no motion

NET <STX>N<CR><ETX>
 Scale is switched to net mode **IF** tare is enabled

GROSS <STX>G<CR><ETX>
 Scale is switched to gross mode

AUTOTARE <STX>A<CR><ETX>
 Scale is Autotare IF Autotare is enabled

START <STX>B<CR><ETX>
 Batch cycle is started

STOP <STX>S<CR><ETX>
 Batch cycle is stopped

DISCHARGE <STX>D<CR><ETX>

Discharge cycle starts IF enabled

ENTER ID <STX>EIXXXXXX<CR><ETX>
Product ID is entered into memory (XXXX =ID is desired)

RECALL ID <STX>RI<CR><ETX>
ID is output

ENTER TARE <STX>ETXXXXXX{L / K}<CR><ETX>
Tare is entered into memory. IF an illegal tare is used, it will be cleared. L(LB) OR K(KG) can be used to request output in a specific weight unit

RECALL TARE <STX>RT{L/K}<CR><ETX>
Tare is output.
L(LB) OR K(KG) can be used to request output in a specific weight unit

RECALL CONFIG <STX>RC<CR><ETX>
Config/Calibration parameters are output

ENTER SETPOINT <STX>ESM[x][NI][Dy][Py][Cy][Zy][Iz][Ay][T1xx][T2xx][Oy]<CR><ETX>

RECALL CONFIG <STX>RC<CR><ETX>
Model, Program Rev, Time, Date, Cap, Cal Data: Current
Zero _____ S _____ Diag Test 1 _____ 2 _____

Note: ONLY 7 variables can be entered at one time

C =Discharge/Dump
I =Setpoint Inhibit
A =Auto zero at batch start
O =Output (Autoprint)
T1 =Delay Timer1
T2 =Delay Timer2
M =Mode
x =0 (Setpoints disabled)
x =1 (Setpoint mode)
x =2 (Checkweigh mode)
x =3 (Batch mode)
x =4 (Autobatch mode)
x =5 (Autobatch repeat mode)
x =Anything else (Setpoints disabled)
N =number of ingredients
I =1,2,3,4
D =Dribble
P =Preact
Z =Zeroband

W =0(OFF) L(LOW) H(HIGH)
y =0(disable) 1(enable)

RECALL SETPOINT <STX>RSM<CR><ETX>
The setpoint mode is output

ENTER SETPOINT# <STX>ESN#<CR><ETX>
Where # =1,2,3,4, enables setpoint number

RECALL SETPOINT# <STX>RSN<CR><ETX>
The currently enabled setpoint is output

ENTER SETPOINT <STX>ES#xxxxxx[L/K]<CD><ETX>
Where # = 1,2,3,4

RECALL SETPOINT <STX>RS#[L/K]<CR><ETX>
IF # =A, the setpoint and preact information for all outputs is given.
IF # =1,2,3,4 the setpoint value is output. L(LB) OR K(KG) can be used to request output in specific weight units.

ENTER PRACT <STX>EP#xxxxxx[L/K]<CR><ETX>
Where # =1,2,3,4 . The preact is entered in current weight units. Any decimal point must be entered. L(LB) OR K(KG) can be used to select specific weight units.

RECALL PRACT <STX>RP#[L/K]<CR><ETX>
IF # = 1,2,3,4, the preact value is given. L(LB) OR K(KG) can be used to request output in specific weight units.

ENTER UNITS <STX>EUxx<CR><ETX>
xx=LB or KG

I. Computer Command Protocol

1. To program the Computer command protocol, press FUNC 3. The display will show "CAL IO" Press 0, ENTER.
2. The display will show "ECHO x", where x is 0 or 1. Select 0/1 to disable/enable retransmission of each command after CR is received. If the instrument is configured as Computer - Polled with ID, it will not retransmit the command unless the ID is valid.
3. The display will show "AC x", where x is 0 or 1. Select 0/1 to disable/enable transmission of acknowledgement that command was or was not successfully executed. If the command was carried out successfully, a ">" character will be transmitted as acknowledgement. If the command was not executed for whatever reason, a "?" will be transmitted as a failure indication.
4. The display will return to the normal weight display.

J. Programming the SMART 4-20mA

1. Install Accessory 148. See Appendix VI for instructions.
2. Place a 100 ohm, 0.1% sense resistor (Part #510381) in series with the loop. Place a DVM across the shunt resistor to monitor the current.
(4-20mA = 0.400 to 2.000V)

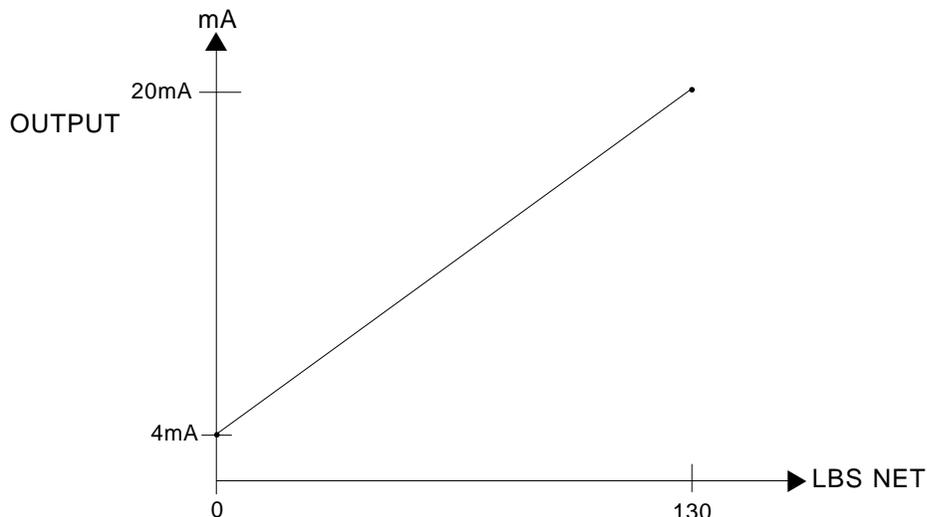
NOTE: The Accessory can be configured for voltage outputs by placing a shunt resistor at the output terminal block.

Example: To convert 4-20mA to 1-5VDC use a 250 Ohm resistor. To convert 0-20mA to 0- 10 VDC use a 500 Ohm resistor.

3. Press **FUNC**, **2** keys to enter the 4-20mA setup menu. The display will read 4-20 x', where x equals 0,1, or 2. Select "0" to disable the 4-20mA output. Select "1" to set the 4-20mA output to correspond to GROSS weight. Select "2" to set the 4-20mA output to correspond to NET weight. Press the **ENTER** key.
4. The display will now flash "LoLooP" for 1 second and then show "ACxxxx" (Analog Count), where "xxxx" is a number between 0 and 4095. This number corresponds to the Low Loop current calibration point, typically 4mA. Use the arrow keys to scroll UP or DOWN until the Analog output reaches the low loop current output equal to the desired value as monitored on the DVM. Press ENTER to store the value.
5. The display will now flash the weight that corresponds to the low loop current calibration. Enter a new weight with the keypad if desired, and then press ENTER.
6. Repeat steps 4 and 5 for the Hi Loop, typically 20mA calibration.
7. The display will now return to the normal weigh mode. As long as the instrument is monitoring the weight, the 4-20mA output will be updated every A/D cycle.

EXAMPLES:

- a. To calibrate the 4-20mA loop to correspond to 0-130 lb NET, a typical

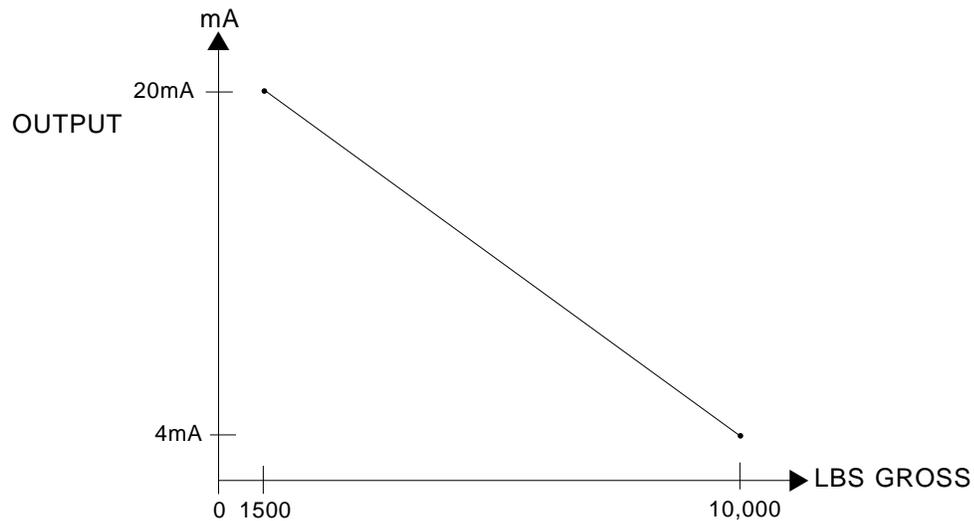


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calibration would be:

- at Step 3 - "4-20, 2" (Net Mode)
- at Step 4 - flash "LoLoop" then "AC 750" (4mA on DVM)
- at Step 5 - "LO Ld" "0 lb"
- at Step 4A - flash "HiLoop" then "AC 3800" (20 mA on DVM)
- at Step 5B - "Hi Ld" "130 lb"

b. To calibrate the 4-20mA loop to correspond to 10000 to 1500 lbs GROSS,



a typical calibration would be:

- at Step 3 - "4-20 1" (Gross Mode)
- at Step 4A - flash "LoLoop" then "AC 750" (4mA on DVM)
- at Step 5A - "LO Ld" "10000 lb"
- at Step 4B - flash "HiLoop" then "AC 3800" (20 mA on DVM)
- at Step 5B - "Hi Ld" "1500 lb"

**NOTE: If the instrument is not monitoring weight (Example: Entering a keyboard Tare)
The 4-20mA will hold at the last update until it returns to displaying weight.**

SECTION 3: INSTALLATION

A. Instrument Mounting Options

The H90-5200-A instrument is designed for bench mounting, wall mounting, or pillar mounting. Wall mounting plates are provided with each instrument.

1. Wall Mount

- a. Remove the four feet from the bottom of the instrument.
- b. Rotate the wall mounting plates 180 degrees, so they extend out to the sides of the instrument.
- c. Reinstall the foot screws through the mounting plates, into the bottom of the instrument and tighten.
- d. Mount the instrument on the wall with fasteners through the mounting plates into the wall. It is recommended that the water proof glands face downward when the instrument is wall mounted.
- e. Place the instrument front panel in the appropriate position, rotated 180 degrees from the normal bench mounting position.

2. Pillar Mount

The instrument can be mounted on a pillar attached to the platform. See Appendix VIII for more information.

SECTION 4: TROUBLESHOOTING

A. Troubleshooting

Use Appendix XII for viewing error codes. Should a problem occur, first unplug the H90-5200-A indicator. Wait a few seconds then repower while observing display. If problem is not resolved, call your local Fairbanks Service representative.

1. Perform a power-up test. Upon instrument power-up the H90-5200-A will perform the following tests:

a. RAM Test - The RAM test verifies the operation of the processors external memory device.

b. Display Test - The display will perform a warm-up sequence. This routine is designed to test that all display segment lines, digit lines, and annunciator LEDs, have no defects. This is a passive test and the user must observe the display throughout the test to check for any anomalies.

c. EEPROM Read -The processor will attempt to retrieve the stored scale programming data from the EEPROM. This data includes: deadload and span counts, grad size, capacity, security level, etc.

If the processor detects any out-of-range data, it will repeatedly request data from the EEPROM until the retrieved data is deemed valid. During this period, the display will flash "EE Err."

Very often the problem is with the data itself and not the actual hardware. The two most common causes are as follows:

- 1). A replacement board has just be installed in the instrument and this is a first-time power-up. Thus, the current EEPROM data might not be appropriate for the software in use.
- 2). You are using a new (or different) software program or revision level than used at the previous instrument power down. This result is that the new software might be trying to access data from the wrong areas of memory.

APPENDIX I: QUICK REFERENCE CHART

Front Panel Program Steps	Factory Setting	Prompt
1. Displays Program Revision Number		"P294-x"
2. Weight Units Selection lb, kg, lb/kg, or custom (no display unit)	lb/kg	"U"
2a. Primary Weight Units Selection (if lb/kg are selected in step 2)	lb	"PU"
3. Grad Size Selection 0.0001 to 50	0.01	"GSxxxx"
4. Balance/Motion Selection 0.5,1.0,2.0,3.0 divisions	2.0	"bALx.x"
5. AUTO ZERO TRACKING Selection OFF, 0.5,1.0, 3.0 divisions	1.0 divisions	"AO x.x"
6. Auto Zero Time Delay 1 to 6 sec	1 sec	"AOtd x"
7. ZERO LIMIT Selection +/- 2% or 100% of capacity	100%	"OL xxx"
8. AUTO TARE Selection 0 = disabled 1 = enabled	1	"AtArEx"
9. KEYBOARD TARE Selection 0 =disabled 1 enabled	1	"tArE x"
10. Display Update Rate Selection 0.1,0.3,0.5,0.8, 1.0 seconds	0.5	"SEC x.x"
11. Digital Filter Selection 0 (No filter), 1, 2, 3 or 4 (Mm to Max filter)	2	"FF x"
12. Scale ID for Polled Serial Communications 0 to 255	0	"id xxx"
13. Time/Date Format Selection: 12/24 Hours and US/International Date	12 US	"td xxxx"
14. Security Code Selection Any number up to 6 digits 0 =disabled	0	"S.CodE"
15. Security Level Selection 0 = all front panel programming enabled * 1 = limited front panel programming enabled 2 = no front panel programming enabled * Non-commercial applications only	0	"SL x"
16. Inhibit Switch Selection 0 = all switches are enabled 1 = one or more front panel switches are disabled	0	"inhS x"
17. Remote Switch 0 = disable, 1 = enable	0	"rS 0"
18. Remote Switch	≡	"rS 1"
19. Remote Switch	A	"rS 2"
20. Remote Switch	P	"rS3"

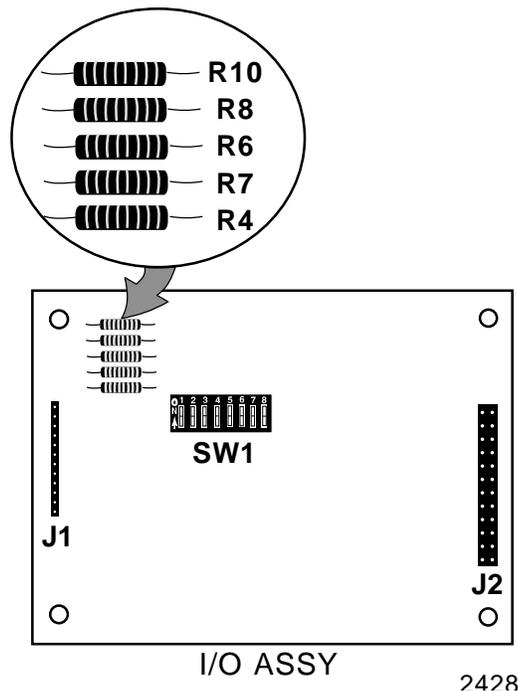
APPENDIX II: Serial Output Installation

The Standard Serial RS-232 output is factory installed at J3, pins 1-5 on the main PC board, with a shunt jumper placed on pins 8 and 9. To configure the instrument for 20mA current loop output, move the connector at J3 to pins 5-9 and move the shunt jumper from pins 8 and 9 to pins 2 and 3 (see Section 3, Figure 3-2).

Accessory 145: I/O board configured for 20mA current loop, serial output, used to output to a remote display or computer.

Accessory 146: I/O Board configured for RS-232 output to a printer or computer.

Accessory 147: I/O Board configured for RS-485 output to a computer.



The second serial output accessory (145,146,147) is mounted in the bottom of the instrument. Four weld-studs are provided for mounting the accessory board.

To install the accessory:

1. Unplug the AC power cord from its outlet.
2. Remove the four bolts holding the front panel to the instrument.
3. Lift the instrument front panel and carefully remove all cables from the main PC Board. Set the front panel aside.
4. Remove the hole plug from the accessory port on the back of the instrument.
5. Install the 9 pin accessory connector in the accessory port.

6. Install the four hex spacers on the four weld-studs in the bottom of the instrument.
7. Place the accessory PC Board on the weld-studs. The 24 pin connector should be toward the center of the instrument.
8. Install the four nuts on top of the weld-studs to hold the PC Board in place.
9. Connect the 24 pin ribbon cable from the accessory PC Board to J4 on the main PC Board.

NOTE: Pin 1 on the cable must go to pin 1 on the accessory board and on the instrument or damage will result. Make sure the cable exits towards the center of the main PCB.

10. Connect the Accessory output cable from the 9 pin connector to J1 on the I/O Accessory.
11. On the I/O Output board, set the slide switches at SW1 for the output desired. If the I/O Accessory is installed, the following switch settings on SW1 must be made to operate various pieces of equipment.

ACC 146 Settings (channel 2)

Device	Switch								Remarks
	1	2	3	4	5	6	7	8	
Printer1	1	0	1	0	1	0	0	1	50-3925, PTR-3950, 50-3921
RS-232	1	0	1	0	0	1	0	1	Citizens, 50-3960, 50-3715
Computer									
RS-232	1	0	1	0	0	1	0	1	

ACC 146 Settings (channel 2)

Remote Display or

Computer	0	0	1	1	0	0	0	1
Current Loop								

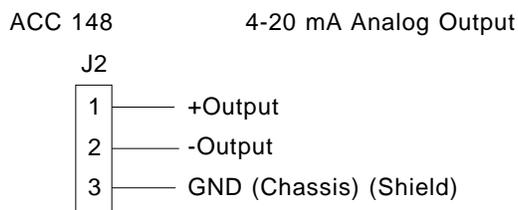
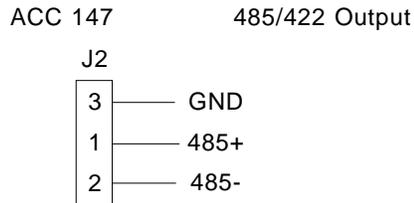
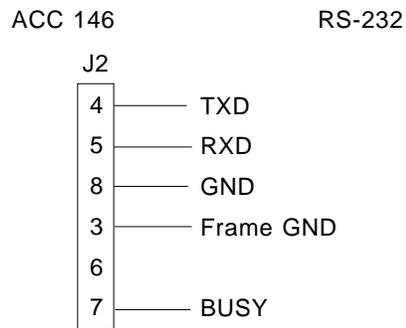
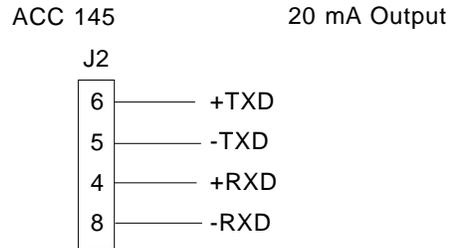
Computer

RS-485	0	0	1	0	0	0	0	1
ACC 147								

0=OFF 1=ON

Accessory Switch Configuration Chart

12. Re-connect all of the cables to the main PC Board.
13. Apply power and program the serial channel from the front panel. Verify output is functioning properly.
14. Re-install the front panel screws.



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APPENDIX III: Switch Settings for Selected Printers

The following printers are not manufactured by Fairbanks, but may be interfaced to the H90-5200-A series instrument. The switch settings are furnished to aid in setting-up these printers.

1. Interface to Okidata Model 182 Serial Printer (Fairbanks Model 50-3920)

Using the Printer Handbook included with the Printer, set the Printer internal switches per the following tables:

Switch on Printer Controller PCB

Function	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>
ASCII - US	ON	OFF	OFF					
11" Form Length				OFF	ON			
No Auto LF						OFF		
8 Bit Data							ON	
Not Used*								OFF

*Must remain in the OFF Position

Switch on Printer Serial Interface PCB

Function	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>
Busy Signal (SSD)	ON							
Baud Rate (1200)**		OFF	OFF	ON				
Not Used*					OFF			
Panty (8 Bit System)						ON		
Pin 20 Busy (DTR)							OFF	
Not Used*								OFF

*Must remain in the OFF Position

** Speed	Switch 2	Switch 3	Switch 4
9600	ON	ON	ON
4800	OFF	ON	ON
2400	ON	OFF	ON
1200	OFF	OFF	ON
600	ON	ON	OFF
300	OFF	ON	OFF
150	ON	OFF	OFF
110	OFF	OFF	OFF

1a. Interface to Okidata Model 184 Turbo Serial Printer (Fairbanks Model 50-3921)

Using the Printer Handbook included with the printer set the printer internal switches per the following table:

Switch block on Controller PCB/Switch									
Function	0	1	2	3	4	5	6	7	8
Ascii slashed 0		OFF	OFF	OFF					
Form Length:11 inches					OFF	ON			
Auto Line Feed: OFF							OFF		
Data Bits: 8								ON	
Front Panel: Enabled									OFF

Switch Block # 1 on Super Speed Serial Board/Switch #									
Function	1	2	3	4	5	6	7	8	
Parity: Odd	OFF								
Without Parity		ON							
Data Bits: 8			ON						
Protocol: Ready/Busy				ON					
Test Select: Circuit					ON				
Mode Select: Print						ON			
Busy Line; DTR “_”							ON		
Pin #20									ON

Switch Block # 2 on Super Speed Serial Board/Switch #									
Function	1	2	3	4	5	6	7	8	
2400 Baud**	OFF	OFF	ON						
DSR Input Signal:				OFF					
Inactive									
Buffer Threshold:					OFF				
256 Bytes									
Buffer Signal Timing:						ON			
200M5 (Mm)									
DTR Signal: Space							ON		
After Power On									
Not Used*								OFF	

*Must remain in OFF position

**Speed	Switch 2-1	Switch 2-2	Switch 2-3
19200	ON	ON	ON
9600	OFF	ON	ON
4800	ON	OFF	ON
2400	OFF	OFF	ON
1200	ON	ON	OFF
600	OFF	ON	OFF
300	ON	OFF	OFF
110	OFF	OFF	OFF

2. Interface to Citizens Printer (Fairbanks Model 50-3710)

The Citizen Tape Printer must have the following Model Number to be interfaced with any instrument in the H90-5200-A Series:

Model Number: CBM-510L-40RF117-CMON

Using the Manual included with the Citizen Tape Printer, set the Printer internal switches per the following tables:

Function	<u>Printer Switch 1</u>									
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>
7Bit Data	1	1								
8Bit Data	0	0								
Parity Check - Check			0							
Parity Check-No Check			1							
Even Parity				0						
Odd Parity				1						
Stop Bit Length					1					
RS-232						1				
TTL							0			
20mA Current Loop								0		
Right Home Position									0	
24 Column										0

0=OFF, 1=ON

Baud Rate	<u>Printer Switch 2</u>						
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
9600	OFF						
4800		OFF					
2400			OFF				
1200				ON			
600					OFF		
300						OFF	
150							OFF

NOTE: Only one switch can be ON at a time. The switch that is ON selects the baud rate. The chart shows the recommended setting for a baud rate of 1200.

3. 50-3715:

SW1: 6 ON all others OFF

SW2: 2,5,7 ON, all others OFF

4. Interface to Fairbanks Model 50-3925

Using the Printer Handbook included with the Printer set the Printer internal switches per the following table:

<u>50-3925 Switch Settings</u>			<u>Function</u>
SW1	1	0	Baud Rate
	2	1	2400 Baud
	3	1	
	4	1	Line Spacing
	5	1	8 Lines Per Inch
	6	0	Line Feed Select: CR CR LF
	7	1	Norm / Inv Print - Normal
	8	1	Busy Signal Polarity - High True
	9	1	TOF Busy - Busy Sent

1 = Closed, 0 = Open

5. Interface to Fairbanks Model PTR-3950

Using the Printer Handbook included with the Printer set the Printer internal switches per the following tables:

<u>50-3950 Switch Settings</u>			<u>Function</u>
SW 1	1	0	Baud Rate
	2	1	2400 Baud
	3	1	
	4	0	Line Spacing
	5	0	8 Lines Per Inch
	6	0	Line Feed Select: CR CR LF
	7	1	Norm / Inv Print - Normal
	8	1	Busy Signal Polarity - High True
SW 2	1	1	TOF Busy - Busy Sent
	2	0	Not Used
	3	0	Normal Print
	4	1	Auto Advance - enabled
	5	0	Auto Release - disabled
	6	0	Enhanced Print - disabled
	7	0	Auto Seek - disabled
	8	0	Self Test - disabled

1 = Closed, 0 = Open

6. Printer set-up for TMU 295

Use cable Acc 1264 (16157)

	<u>OPEN (OFF)</u>	<u>CLOSED (ON)</u>
Switch Settings DSW1 =	2,4,5,6,7,8,9,10	1,3

9600 baud, 8 characters, non parity, 1 stop bit, cts=0

7. Printer set-up for TMU 590

Use cable Acc 1264 (16157)

	<u>OPEN (OFF)</u>	<u>CLOSED (ON)</u>
Switch Settings DSW1 =	1,2,4,5,6,8	3,7
DSW2 =	1,2,3,4,5,6,7,8	NONE

9600 baud, 8 characters, non parity, 1 stop bit, cts=0

8. 50-3960 Ticket Printer Setup

50-3960 Switch Settings

SW1 = 12345678910
1110000000

9600, None, 8 Bits, Busy=0 Use cable Acc 1264 (3-93081-1)

9. PTR-2242 / 2642 / 2742 / 2844 = "P 2642" Setup:

9600 Baud
No Parity
8 Bits
1 Stop bit

Use Cable Acc-1269 (3-93212-2)

The printer must be connected to the 5200-A via cable ACC-1269 and have power ON before selecting the "P-2642" device. Once selected, choose tdi options, nEt or Gtn options, Cr/LF options then no bAr/bAr at which time the 5200-A will download data to the PTR-2642. There will be a short period when the 5200-A will blank, then return to the gross weigh mode.

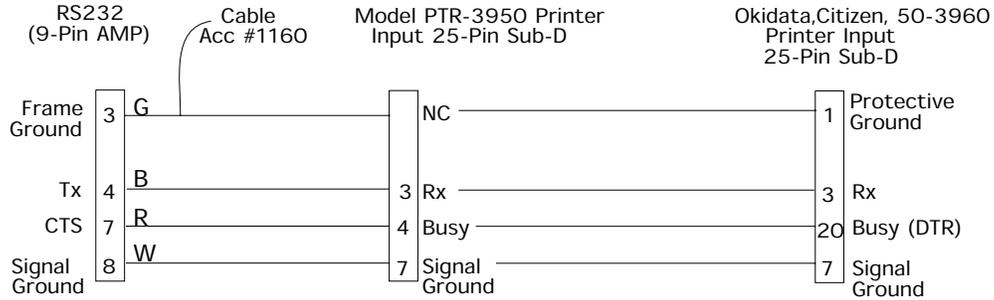
General Notes regarding the 5200A's outputs:

1. It is recommended to use a baud rate higher than 300 on com port 2. The 300 baud rate on that channel may affect the operation of the 5200-A.
2. If display (RMT-140X-A) (20mA) is on port 1, and a printer is interfaced to com port 2, the CTS setting of com port 1 must be set to 0.
3. If either the 50-3960 or PTR-3950 ticket printers are interfaced to the 5200-A indicator, and Autoprint is enabled in either AbA or Abr setpoint modes, a ticket must be inserted in the printer before the batch is started.
4. When setting up the 140X-A remote display, the remote may show "SUCCESS" and still not communicate. Check and compare settings manually in both the indicator and the remote display.
5. If SPon = 1, and using "SP" setpoint mode, any attached relays will be energized until the setpoint limits are reached. A brief contact may be made when power-up occurs or certain keys are pressed. Use caution when operating or testing.

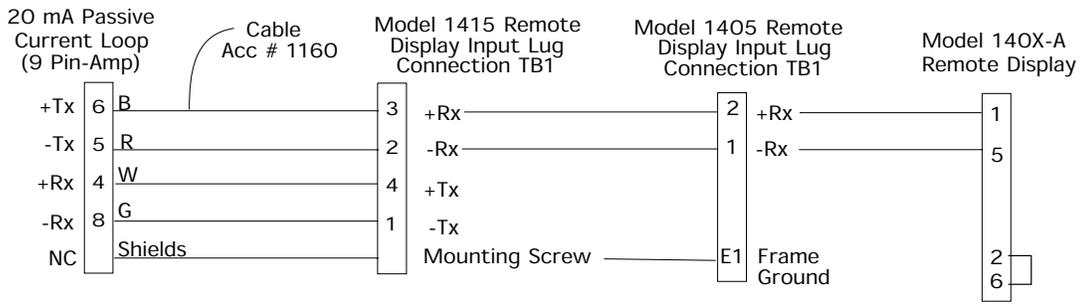
Appendix IV: WIRING DIAGRAM for SERIAL OUTPUTS

APPENDIX V: SERIAL OUTPUT DATA FORMAT

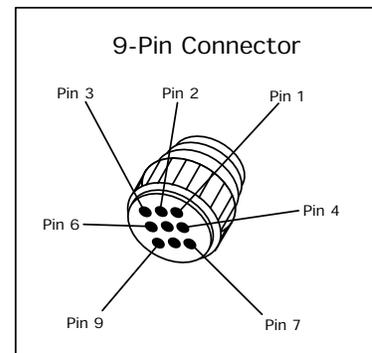
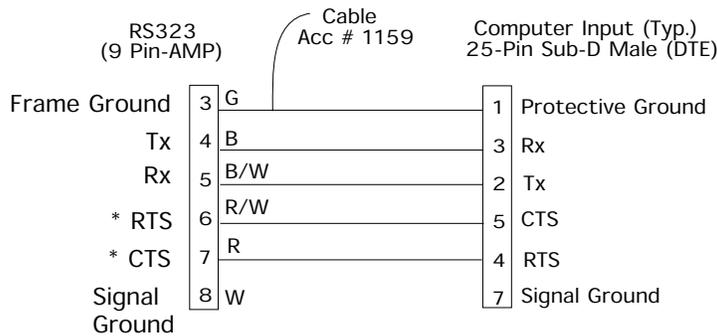
A. H90-5200-A to Model 50-3950, 50-3920 & 50-3921 (Okidata) or 50-3710, 50-3715 (Citizen) Printers



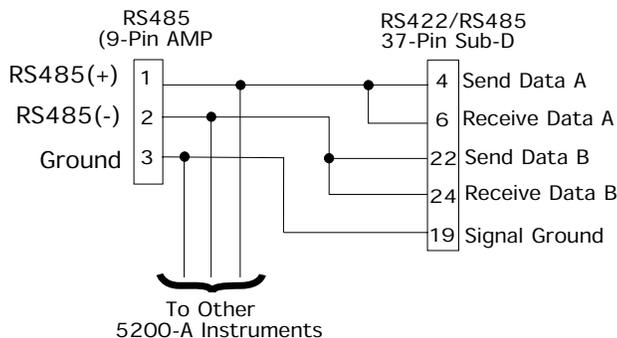
B. H90-5200-A Remote Displays



C. H90-5200-A to Computer (Typical)

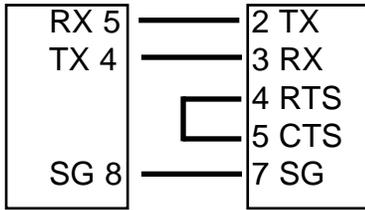


D. H90-5200-A to Computer using RS485/422



H90-5200-A
RS 232
(9 Pin AMP)

DB25
MALE



TM - U295	SW-1 = 1 & 3 ON (ON = Away from Numbers)
TM - U590	DSW-1 = 7 ON DSW-2 = ALL OFF (ON = Away from Numbers)
SP 2000	SW-2 = 3 ON (ON = Down) SW-1 & SW-3 = ALL OFF
SP2200	SW-1 = 2, 3, 8 ON (ON = Down) SW-2 & SW-3 = ALL OFF
610	SW-1 = 0 (Rotary Sw) SW-4 = 2, 4, & 6 ON (DIP SW) (ON = Towards Numbers)

	TM - U295	TM - U590	SP 2000	SP 2200	610
FUNC - 3 - 1	ENA = 1	-	-	-	-
	PNTR	-	-	-	-
	TDI*	-	-	-	-
	GTN*	-	-	-	-
	CRLF	-	-	-	-
FUNC - 3 - 7	SELCH1	-	-	-	-
	B = 9600	-	B = 2400	-	-
	STOP = 1	-	-	-	-
	P = NONE	-	-	-	-
	CHAR = 8	-	-	-	-
	CTS = 0	-	-	-	-
FUNC - 3 - 0	ECHO = 0	-	-	-	-
	AC = 0	-	-	-	-

* = Multiple Selections Available

NOTE: Horizontal dash indicates same setting as to the left

NOTES:

Character Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
String 0 Scale ID Note: 1.9.10	SP	S	C	A	L	E	SP	X	X	X	CR	LF				
String 1 Time Note:2	SP	Hour Ones	Hour Ones	:	Minute Tens	Minute Ones	A/P	M								
String 2 Date Note: 3	SP	M/D Tens	M/D Ones	-	D/M Tens	D/M Ones	-	Y Tens	Y Ones							
String 3 Notes: 4,9	CR	LF														
String 4 ID Notes: 5,9,11	SP	I	D	-	Y	Y	Y	Y	Y	Y	CR	LF				
String 5 Gross Notes:6,9,10,12	SP	X	X	X	X	X	X	X	SP	l/k	b/g	SP	G	R	CR	LF
String 6 Tare Notes: 7,9,10,12	SP	X	X	X	X	X	X	X	SP	l/k	b/g	SP	T	A	CR	LF
String 7 Net Notes: 8,9,10,12	SP	X	X	X	X	X	X	X	SP	l/k	b/g	SP	T	A	CR	LF
String 8 Note: 9	CR	LF														

1. String 0 only output if polled by ID from computer
2. String 1 only output if time (t) enabled.
3. String 2 only output if date (d) enabled.
4. String 3 only output if time (t) or date (d) enabled.
5. String 4 only output if ID (i) enabled.
6. String 5 only output for Gross display or Net display with Gross/Tare/Net print enabled.
7. String 6 only output for Net display and Gross/Tare/Net print enabled.
8. String 7 only output for Net display
9. LF only output if CR LF print mode selected.
10. X's indicate numeric data including decimal points. Leading zeroes are replaced with spaces.
11. Y's indicate alpha-numeric data.
12. Mode (Gross/Net) is output in upper case if no motion on scale (ie. GR) or lower case if motion on scale (ie. gr).

Remote Display Format

FIGURE- 3

Character Number	1	2	3	4	5	6	7	8	9	10	11
String 1	STX	y	y	SIGN	x	x	x	x	x	x	ETX

Notes: 1,2,3

NOTES:

1. yy denotes a display mode ID. The ID number = 40 for Gross Weight lbs, 41 for Net Weight lbs, 42 for Tare Weight lbs, 43 for Gross Weight kgs, 44 for Net Weight kgs, 45 for Tare Weight kgs
2. X's are 6 digits of weight data including decimal point Leading zeroes are replaced with spaces.
3. Sign: A "-"is output if the weight is negative and a space is output if the weight is positive.

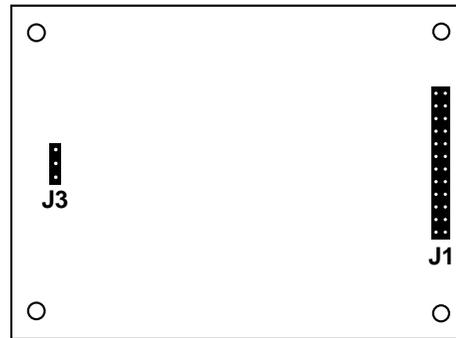
APPENDIX VI: WIRING DIAGRAM FOR SMART 4-20 OUTPUT ACCESSORY

Accessory 148

SMART 4-20mA analog output board used to output to a chart recorder or control system.

Four weld-studs are provided for mounting the accessory board.

To install the accessory:



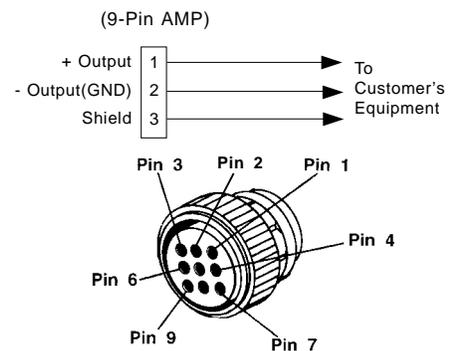
SMART 4-20mA ASSY

2429

1. Unplug the AC power cord from its outlet.
2. Remove the four bolts holding the front panel to the instrument.
3. Lift the instrument front panel and carefully remove all cables from the main PC Board. Set the front panel and set it aside.
4. Remove the hole plug from the accessory port on the back of the instrument.
5. Install the 9 pin accessory connector in the accessory port.
6. Install the four hex spacers on the four weld-studs in the bottom of the instrument.
7. Place the accessory PC Board on the weld-studs. The 24 pin connector should be toward the center of the instrument.
8. Install the four nuts on top of the weld-studs to hold the PC Board in place.
9. Connect the 24 pin ribbon cable from J1 on the accessory PC Board to J4 on the main PC Board.

NOTE: Pin 1 on the cable must go to pin 1 on the accessory board and on the instrument or damage may result. Make sure the cable exits towards the center of the main PCB.

10. Connect the Accessory output cable from the 9 pin connector to J3 on the 4-20 Analog Accessory.
11. Re-connect all of the cables to the main PC Board.
12. Apply power and calibrate the 4-20mA output to verify proper operation.
13. Re-install the front panel on the instrument. ≡



9-Pin Connector

2433

APPENDIX VII: SETPOINT OUTPUTS VS.

CALIBRATION

Note: TB3 is located in the bottom of the case

(Fast and Dribble Feeds)

Setpoint Output turns off when -

Setpoint Output	Setpoint Mode	Individual Batch Mode (Note 3)	Paired Batch Mode (Note 3) (Single Feed Only)
TB3-1 (SP1)	Weight exceeds absolute value of Setpoint 1 minus Preact 1	Weight exceeds absolute value of Setpoint 1 minus Preact 1	(Fast Feed) Weight exceeds absolute value of Setpoint 1 minus Setpoint 2 (Dribble) minus Preact 1
TB3-2 (SP2)	Weight exceeds absolute value of Setpoint 2 minus Preact 2	Weight exceeds absolute value of Setpoint 2 minus Preact 2	(Dribble Feed) Weight exceeds absolute value of Setpoint 1 minus Preact 2
TB3-3 (SP3)	Weight exceeds absolute value of Set point 3 minus Preact 3	Weight exceeds absolute value of Setpoint 3 minus Preact 3	(Fast Feed) Weight exceeds absolute value of Setpoint 3 minus Setpoint 4 (Dribble) minus Preact 3
TB3-4 (SP4) (Note 4)	Weight exceeds absolute value of Setpoint 4 minus Preact 4	Weight exceeds absolute value of Setpoint 4 minus Preact 4	(Dribble Feed) Weight exceeds absolute value of Setpoint 3 minus Preact 4
TB3-5 (GND) (Note 1)	GND	GND	GND

Notes:

1. TB3-5 = Ground for all setpoints.
2. TB3-6 is a connection to be used with Relay Accessory 149/151 only.
3. STOP and START keys active only in batching modes. TRIM key active only in manual batch mode.
4. If SP4 is used as the Zeroband output, it will turn off when the Gross weight exceeds the absolute value of Setpoint 4.

APPENDIX VIII: PILLAR ACCESSORY INSTALLATION

Pillar Accessory

The pillar accessory enables the instrument to be attached to a platform.

1. Attach the pillar assembly to the scale platform, using the directions in the appropriate SJ Manual.
2. Bring the load cell cable up through the pillar.
3. Remove the front panel of the instrument and disconnect all of the cable connected to the main PC Board.
4. Set the front panel aside.
5. Remove the four mounting bolts on the back of the instrument.
6. Carefully feed the load cell cable through the water proof gland on the back of the instrument.
7. Place the instrument on top of the pillar assembly. The load cell gland and the AC power cord will be inside the pillar.
8. Secure the instrument in place on top of the pillar by re-installing the four mounting bolts.
9. Connect the load cell cable to the connector, and plug the connector into the front panel.
10. Reconnect all of the other cables to the front panel. See Section 3, Figure 3-2 for details.
11. Reinstall the front panel on the instrument. Secure with the four front panel bolts. Tighten securely to ensure a watertight seal.

NOTE: When the instrument is mounted on the pillar; the front panel will be rotated one-half turn from the normal bench top orientation.

APPENDIX IX: ASCII CHARACTER CHART

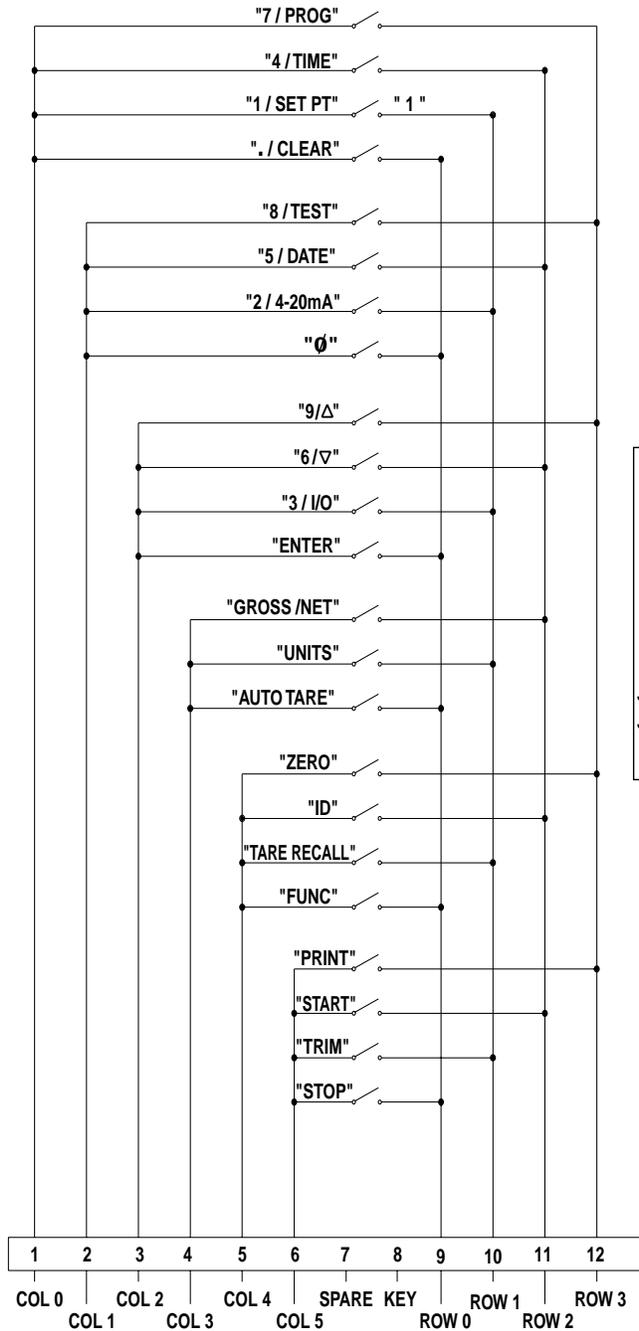
HEX	DEC	CHAR
00	0	NUL
01	1	SOH
02	2	STX
03	3	ETX
04	4	EOT
05	5	ENQ
06	6	ACK
07	7	BEL
08	8	BS
09	9	HT
0A	10	LF
0B	11	VT
0C	12	FF
0D	13	CR
0E	14	SO
0F	15	SI
10	16	DLE
11	17	DC1
12	18	DC2
13	19	DC3
14	20	DC4
15	21	NAK
16	22	SYN
17	23	ETB
18	24	CAN
19	25	EM
1A	26	SUB
1B	27	ESC
1C	28	FS
1D	29	GS
1E	30	RS
1F	31	US
20	32	SPACE
21	33	!
22	34	"
23	35	#
24	36	\$
25	37	%
26	38	&
27	39	5
28	40	(
29	41)
2A	42	*

HEX	DEC	CHAR
2B	43	+
2C	44	,
2D	45	-
2E	46	.
2F	47	/
30	48	0
31	49	1
32	50	2
33	51	3
34	52	4
35	53	5
36	54	6
37	55	7
38	56	8
39	57	9
3A	58	:
3B	59	;
3C	60	<
3D	61	=
3E	62	>
3F	63	?
40	64	@
41	65	A
42	66	B
43	67	C
44	68	D
45	69	E
46	70	F
47	71	G
48	72	H
49	73	I
4A	74	J
4B	75	K
4C	76	L
4D	77	M
4E	78	N
4F	79	O
50	80	P
51	81	Q
52	82	R
53	83	S
54	84	T
55	85	U

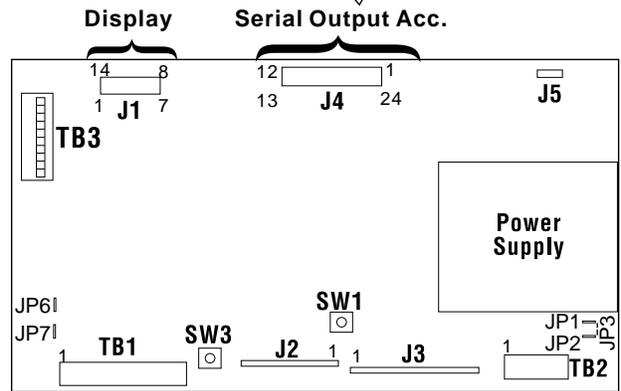
HEX	DEC	CHAR
56	86	V
57	87	W
58	88	X
59	89	Y
5A	90	Z
5B	91]
5C	92	\
5D	93	[
5E	94	^
5F	95	--
60	96	'
61	97	a
62	98	b
63	99	C
64	100	d
65	101	e
66	102	f
67	103	g
68	104	h
69	105	i
6A	106	j
6B	107	k
6C	108	l
6D	109	m
6E	110	n
6F	111	o
70	112	p
71	113	q
72	114	r
73	115	s
74	116	t
75	117	u
76	118	v
77	119	w
78	120	x
79	121	y
7A	122	z
7B	123	{
7C	124	
7D	125	}
7E	126	~
7F	127	DEL

Appendix X: KEYBOARD SCHEMATIC / WIRING DIAGRAM

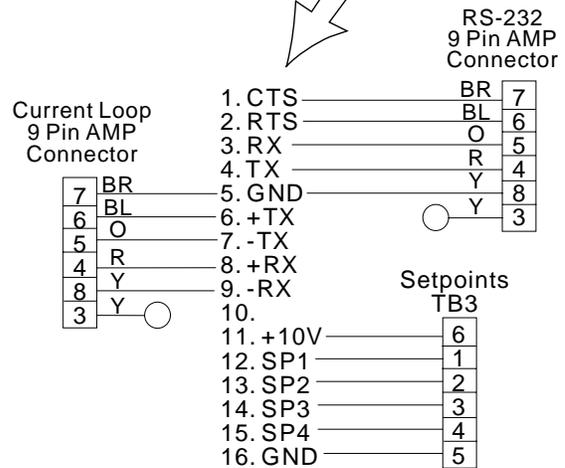
KEYPAD SCHEMATIC DIAGRAM



- 1. GND
 - 2. GND
 - 3. +5V
 - 4. +5V
 - 5. D3
 - 6. D2
 - 7. D4
 - 8. D1
 - 9. D5
 - 10. D0
 - 11. D6
 - 12. D7
 - 13. SDA
 - 14. SOL
 - 15. A15
 - 16. 10 INT
 - 17. A14
 - 18. A13
 - 19. +10V
 - 20. SLEEP
 - 21. I/O
 - 22. RD
 - 23. ALE
 - 24. WR
- Serial Accessories
- ACC 145 (20mA Serial)
 - or
 - ACC 146 (RS-232)
 - or
 - ACC 147 (RS485/422 Output)
 - or
 - ACC 148 (4-20 Analog)



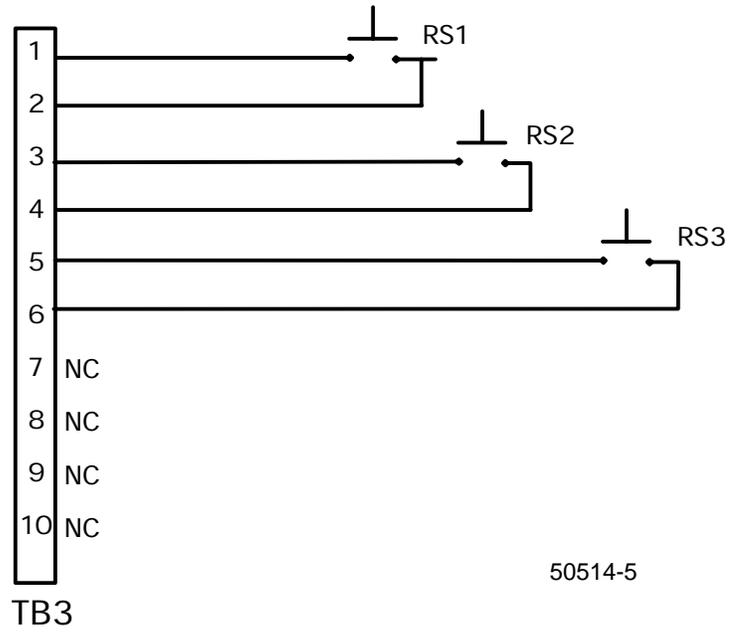
- Load Cell**
See Load Cell Wiring in Section 3.D
- Keyboard**
See Schematic
- Setpoint/ Serial I/O**
- Power**
1. AC
2. ACC
3. GND



50514-6

Appendix XI: REMOTE SWITCH

Remote Switch Diagram H90-5200-A



APPENDIX XII: SUMMARY OF ERROR MESSAGES

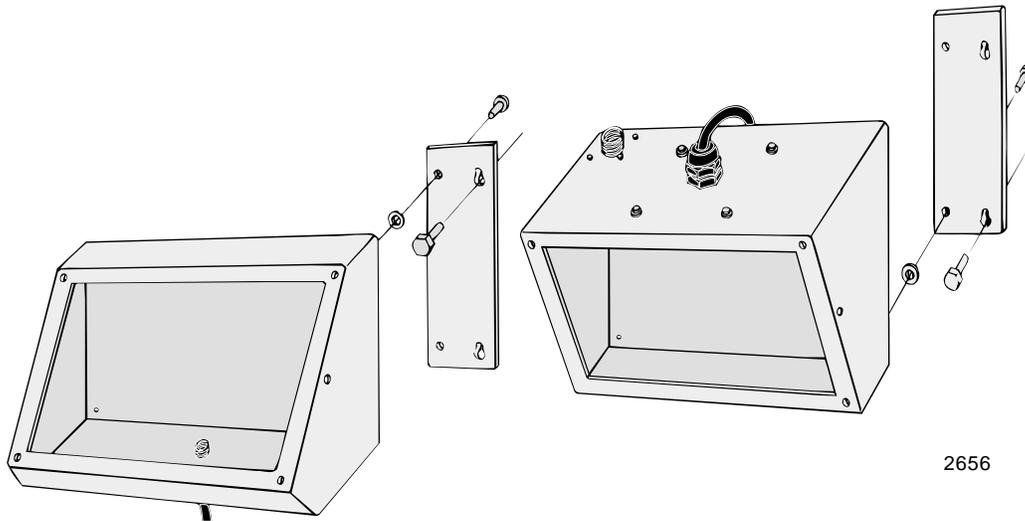
- “- OL - -” Overload - An error will occur if the gross weight on the platform exceeds the instrument's programmed capacity by 5 percent.
- “- UL - -” Underload -The weight signal from the platform to the instrument is less than the A/D converter's minimum required signal strength for a resolvable weight.
- “Error “ Key inhibited Error -This error message will be displayed if a key is pressed which had been inhibited by the “key inhibit” programming.
- “E1 L “ Error 1, Number of Graduations too Low - When changing the instrument's division size from the front panel an error will occur if the resulting number of scale graduations is less than 100. To correct this error, the scale division size must be reduced.
- “E1 H “ Error 1, Number of Divisions too High - When changing the instrument's division size from the front panel:
An error will occur if the resulting number of scale divisions exceed 10,000.
To correct this error, the instrument's division size must be increased.
- “E2L “ Error 2, Counts per Division too Low – When calibrating the instrument and:
the security level is at 0, an error will occur if the ratio of counts per division is less than 1.
if the security level is at 1 or 2, an error will occur if the ratio of counts per division is less than 3. In either instance, the error is the result of too few counts, or too large a division size. It may be corrected by reducing the scale division size.
- “E2H “ Error 2, Counts per Division too High – When calibrating the instrument and the resulting number of total counts exceeds 132,000 an error will occur. Total counts is the sum of the zero counts and the span counts. This error may be corrected by increasing the scales division size.
- “r PASS” RAM Test, Pass - The RAM test verifies the operation of the processor's external memory device.
- “r FAIL’ RAM Test, Fail – The RAM test verifies the operation of the processor's external memory device. This IC is located at U7 of the main PCB and should a failure occur, replace the IC and the battery backed Real Time Clock in U7 with a new “Clock Kit” (see “Parts List”).
- “E PASS” EEPROM Test, Pass - The EEPROM test verifies the operation of the processors external non-volatile memory device.
- “E Fail” EEPROM Test, Fail - The EEPROM test verifies the operation of the processors external non-volatile memory device. This IC is located at UI of the main PCB. The EEPROM is not a field serviceable component. In the event of an EEPROM failure, replace the main PC Board (see” Parts List”).
- “S tEst” Keypad Switch Test Enabled - In this mode, the user may verify the proper operation of the front panel keypad. Each key, when pressed, will generate a corresponding character on the instrument display.

APPENDIX XII: SUMMARY OF ERROR MESSAGES (con't)

START	C	1 SET PT	1	GROSS NET	G
TRIM	d	2 4-20mA	2	UNITS	U
STOP	E	3 I/O	3	AUTO TARE	A
ID		4 TIME	4	ZERO	=
TARE RECALL	t	5 DATE	5	PRINT	P
FUNC	F	6 ▼	6	RS 1	T
ZERO	0	7 PROG	7	RS2	+
		8 TEST	8	RS3	L
		9 ▲	9		
		■ CLEAR	.		
		ENTER	Exits the Switch Test Mode		

“Cxxxxx” Counts Display -The counts display will show a number from 1 to 132,000 that is preceded in the left-most display by the letter “C”. Counts refer to the internal resolution of the instrument’s A/D converter. The number of counts displayed is directly proportional to the current weight on the platform.

APPENDIX XIII: WALL MOUNTING BRACKET



The wall bracket that comes with the instrument is in two pieces. The parts envelope contains four nylon washers and four bolts. The instrument may be located above eye-level, with the front display oriented downward, or at or below eye-level, with the front display oriented upward.

To assemble the wall bracket and mount the instrument on the wall:

1. Locate the position on the wall where the instrument will be installed.
2. Remove the four rubber feet from the bottom of the instrument.
3. With the instrument oriented as it will be mounted on the wall, place one of the mounting bracket pieces against the back of the instrument. The slotted holes in the plate **MUST** be positioned with the slot up.
4. Install the bolts through the mounting plate. Place a nylon washer on the bolt so it will be between the instrument back and the mounting plate. Screw the bolt into the hole where the foot was removed.
5. Install the other mounting plate in the same manner.
6. Place the instrument against the wall where it will be mounted and mark out the positions of the four slotted holes on the wall.
7. Install a $\frac{1}{4}$ inch bolt/screw at the top of the slot, on each of the positions on the wall. Leave about $\frac{1}{2}$ inch of the bolt/screw exposed.
8. Place the instrument onto the wall hardware and let it drop down to engage the bolts/screws. **GENTLY** tighten the wall hardware. The instrument should be able to be removed by lifting it off the wall hardware.

APPENDIX XIV: PRINT SAMPLES

A. PTR 2242 / 2642 (2" x 4" Labels)

```

10:32AM 03-12-99
ID - 123456
  1.3 lb GR
  0.2 lb*TA
  1.1 lb NT
    
```

```

10:32AM 03-12-99
ID - 123456
  1.3 lb GR
    
```

```

ID - 123456

  1.2 lb NT
    
```

```

  1.2 lb GR
  0.2 lb*TA
  1.0 lb NT
    
```

```

10:33AM 03-12-99
  1.2 lb GR
  0.2 lb*TA
  1.0 lb NT
    
```

```

ID - 123456

  1.3 lb GR
    
```

B. Printers: 50-3920, 50-3921, 50-3715, 50-3960, and PTR-3950

```

12:53PM 12-30-98
ID-123456
  4.0 lb GR
  1.0 lb* TA
  3.0 lb NT
    
```

Sample print using GTN format with Time, Date and ID features enabled. (The * indicates a keyboard entered tare).

```

12:53PM 12-30-98
ID-123456
  3.0 lb NT
    
```

Sample print using NET format with Time, Date and ID features enabled. Please note that the NET format is the same as in GTN format without the Gross and Tare weights.

```

12:53PM 12-30-98
  4.0 lb GR
  1.0 lb* TA
  3.0 lb NT
    
```

Sample print using GTN format with Time and Date features enabled.

```

12:53PM
  4.0 lb GR
  1.0 lb* TA
  3.0 lb NT
    
```

Sample print using GTN format with Time feature enabled.

```

12-30-98
  4.0 lb GR
  1.0 lb* TA
  3.0 lb NT
    
```

Sample print using GTN format with Date feature enabled.

```

  1.8 lb S1
  1.6 lb S2
  3.0 lb S3
  2.4 lb S4
  8.8 lb TOTAL
    
```

Sample print showing a printed batch. As each individual setpoint (S1, S2, S3 or S4) is reached that line will print. The total prints after S4 has printed. This is only available in the Auto Batch and Auto Batch Repeat modes.