■ ✺ Consumer and   Consommation et
    Corporate Affairs   corporations

    Legal Metrology   Métrologie Légale

Ottawa August 12, 1980

NOTICE OF APPROVAL – AVIS D'APPROBATION

FAIRBANKS ELECTRONIC DIGITAL INDICATOR MODEL 90/8801

MANUFACTURER: Colt Industries, Fairbanks Weighing Division
               St. Johnsbury, Vermont
               U.S.A.

APPARATUS: Digital electronic indicator which may be interfaced
with a compatible load cell system.

RATING:

Indicator Model	Capacity
90/8801	~~100,000~~ x 20 lbs. *20 000 increments*

APPROVED ACCESSORY: Ticket printer model 50-3600.

APPLICATION: The weighing of commodities in trade.

DESCRIPTION: The indicator is an electronic digital instrument
which can be interfaced to one or more electronic load cells.

        The functional keys and Operator features are:

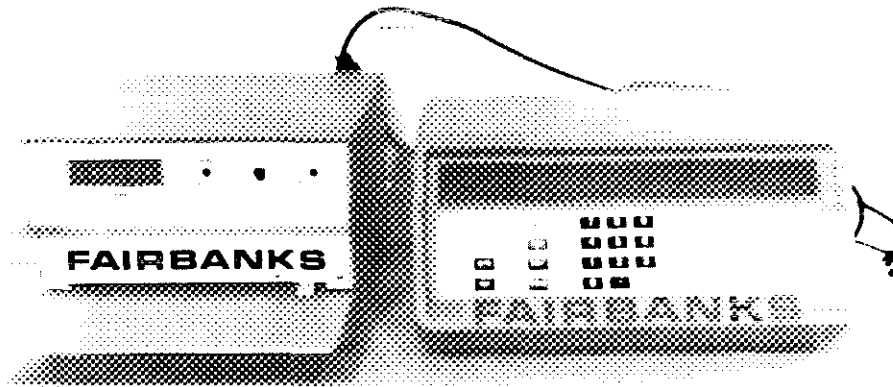Eight - seven segment neon digits for weight display.

Ten - fourteen segment alpha numeric display characters for function
displays.

Zero - fine zero control.

Lb/kg.

Test display check system - "Test" key initiates test sequence by
                            turning all display segments on and off.

DESCRIPTION: (Cont'd)

Auto Tare - Key causes weight on the scale to be automatically stored
           in the tare memory.

Tare - Key causes display to store value.

Net - Key causes display to read net weight.

Gross - Key causes display to read gross weight.

Ten(10) digit keys - 0-9 keys for entry.

Enter - Key causes displayed tare to be stored in memory.

Decimal Point - Key causes decimal point on display.

Print G-T-N - Key initiates printout of gross, tare & net weight data.

Print - Key initiates printout of displayed data.

1.   INDICATOR

      OPERATOR FEATURES

      The lower section of the front panel is a keyboard for entering
data and initiating functional commands. The brushed aluminum panel
has four groups of engraved plastic keys which project 0.13", each
key measuring 0.75" wide by 0.5" high, with 0.25" minimum space
between any two keys. At the left are three keys in a vertical row,
marked ZERO, LB/KG, and TEST. To their right are four keys in a
vertical row, marked AUTO TARE, TARE, NET, GROSS. Near the center,
twelve keys in three vertical rows of four each are marked with the
numbers 0 through 9, decimal point, and ENTER. At the right side
of the panel are two keys marked PRINT G-T-N and PRINT.

      At the rear panel, two parallel-wired connectors allow interface
of peripheral data display and printing devices and a third connector
interface the cable from the load cell circuit. A receptacle
for the AC power cord, and a circuit-protection fuse are located near
the lower center, and two pushbutton switches are to their left.
Switch S1 causes the display to read internal program codes, and S2
allows changing these codes; S2 is restricted from unauthorized access by
a lead/wire seal through a projecting stud which retains a steel plate.

2.   INDICATOR

      Detailed Description

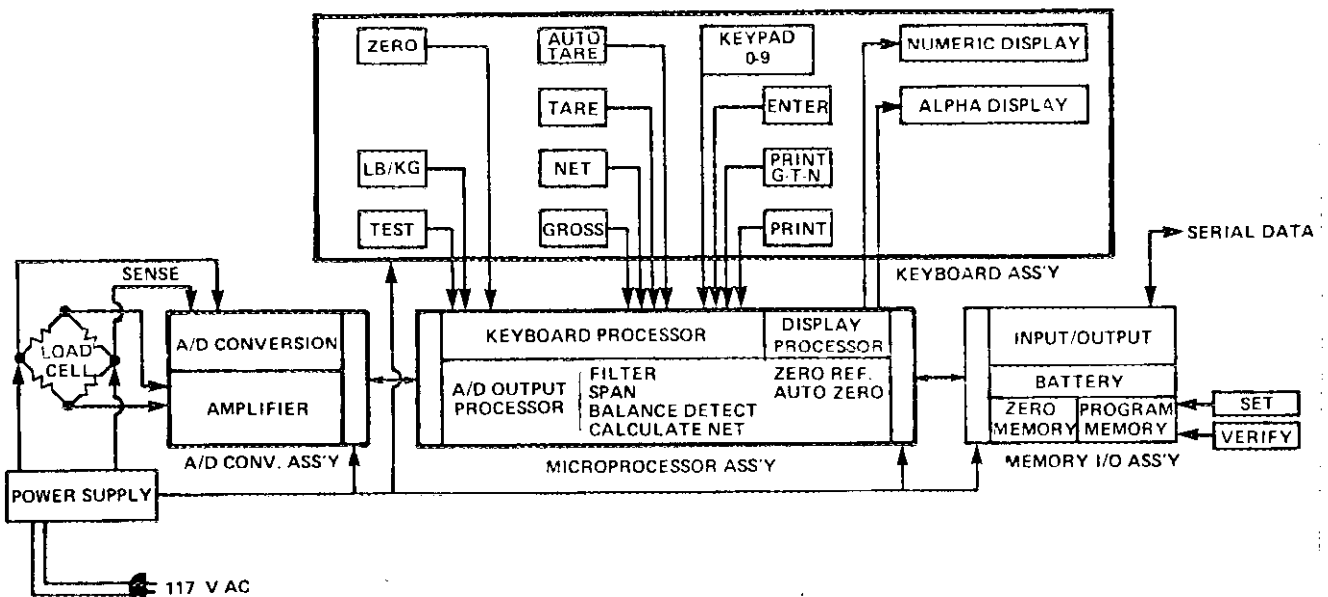   a)   Pictorial Block Diagram

FIGURE 3

b)   Weight Conversion Circuitry - Functional Description

The instrument converts analog weight information from the load cell circuit to digital data for display and output.

A 15VDC supply voltage from the instrument is applied to the resistance bridge of the load cell(s), resulting in a low voltage output transmitted back to the instrument. The instrument is calibrated at installation to identify the voltage output from the unloaded scale as zero reference. When the scale is loaded, compression of the load cell(s) deflects the strain gauge, changing its resistance and thereby changing the level of the output signal.

The instrument converts the analog signal from the load cell circuit to digital data by counting groups of internally-generated pulses which are gated to the counting circuit during time periods proportional to the analog signal level. Analog-to-digital conversion is performed in a shielded, sealed enclosure, and the output signal is applied to the microprocessor assembly. Analog-voltage weight data from the load cell circuit is applied to the A/D Converter, along with a "sense" reference which causes the converter circuit to compensate for low or fluctuating load cell supply voltage. A clock module emits a stream of pulses, which are made available to the conversion circuit. The analog weight signal is converted to time periods applied to the gating circuit, which allows groups of these pulses to the counter, representing weight.

Acting as the central processing unit, the microprocessor receives and processes function commands from the keyboard, providing display and output data according to programmed sequences from the program memory on the memory-input/output assembly.

The non-volatile memory circuits, protected from data loss by a standby battery power supply, provide reference to zero as calibrated at installation, and processor control commands. Certain functional commands may be field programmed, accessible by a rear panel "set" switch (S2); others are factory-set. All program instructions may be examined and verified at the front-panel display by a rear panel "verify" switch (SI).

Data output, formulated according to the American Standard Code for Information Interchange (ASCII), is available at two parallel-wired rear panel connectors, allowing interface of a printer and a remote display, typically.

b)   Continued

     Tare information, either entered at the keyboard or recalled
from memory, may be applied to the counting circuit as negative data,
resulting in calculable net weight. Key selection enables display/
output of gross, as derived from the load cell signal, tare, or net,
as calculated by subtracting tare from gross. Memory tare may be
established either from data entered at the keyboard at a previous
weighment, or by the auto tare circuit which commits the (empty
container) weight on the scale to memory.

     The display processor serially applies multiplied numeric data
(i.e. weight or keypad entry) to the numeric display, or alpha data
(i.e. units lb/kg, mode gross, tare, net) to the alpha display.
Digits or characters are serially updated at one millisecond intervals,
responding to the display processor with a "received/ready" feedback
signal.

     Numeric and alpha data is also supplied to the input/output
circuits for transmission to peripheral recording/readout devices in
ASCII format. A feedback signal from the peripheral indicates readiness
for data update.

     A power supply, operating from 117VAC line input, provides power
for the load cell, conversion, calculating, and display circuits.

3.   PRINTER

     Device Description

     General Function and Operator Features

     This device accepts weight information from instruments equivalent
to Fairbanks 90-8800-series and produces printed tickets.

     Information is printed according to sheet format programmed at
installation. Information is identified as "blocks" of data, called
data items, which are either transmitted (weight, units, mode/legend),
or printer-generated (time, date, consecutive number, identification
number). The printer may be formatted to accept or reject any data
items and print them in pre-programmed positions on the ticket sheet.
Up to 10 copies may be printed.

3.   Continued

      The printed characters are 0.14" high, 0.10" wide, composed of
dots in a 5-by-7 matrix. Up to 42 single-spaced lines of up to 59
characters per line may be printed in an area 7 1/2" by 7". Any
size sheet may be accomodated; a 1" margin is required on the inserted
side. The wide latitude in sheet size is accomplished by providing
a print table which indexes inward/outward, and an internal print
head which tranverses back and forth during the printing cycle.

      The brushed aluminum front panel has six digital thumbwheel
switches to the left called DATA PRESET, a PRINT BUSY indicator, a
PRINT command pushbutton, and a POWER indicator lamp. A ticket-edge
guide may be positioned at any point across the ticket slot, and
locked in place by a knurled screw. A movable pointer and one-eight-
inch marked scale are included along the lower right side of the
printer for setting the start position of the print table, and thereby
the margin space for the data item closest to the inserted edge of
the ticket.

      At the rear panel, two fuses are located to the left above the
power cord. The POWER switch is located in the top left corner. To
the right is a power outlet provided for auxiliary convenience, and
four setting pushbuttons for internally-generated CONSECUTIVE NUMBER,
date CALENDAR, time CLOCK and AM/PM. The input connector for the
interface cable to the instrument is at the upper right corner.

      The printer is constructed of paint-finished sheet aluminum,
with a cast aluminum base assembly. Figure 2 shows the relationship
of component assemblies.
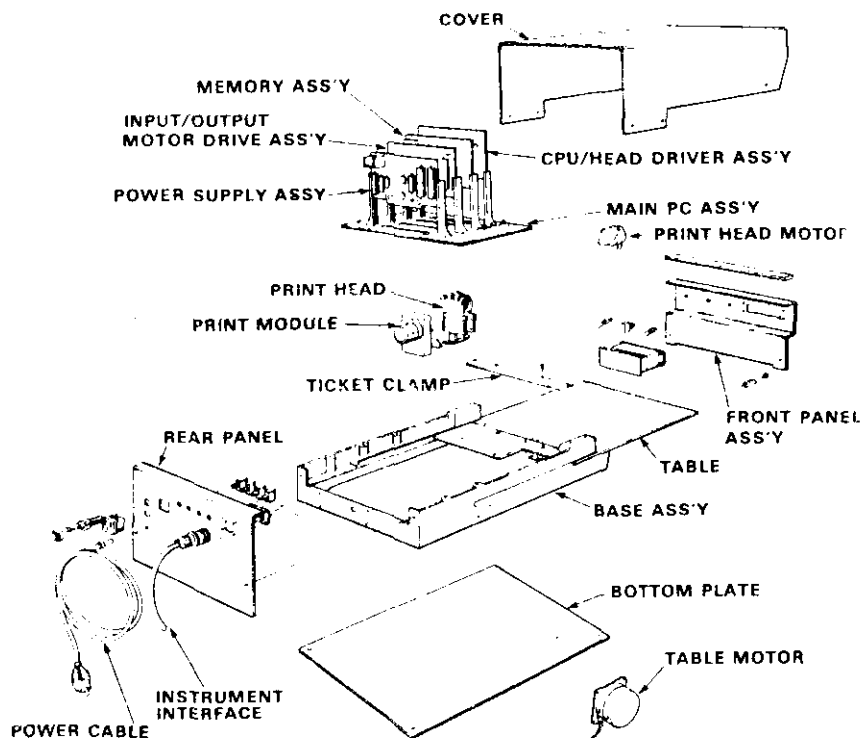
4. PRINTER

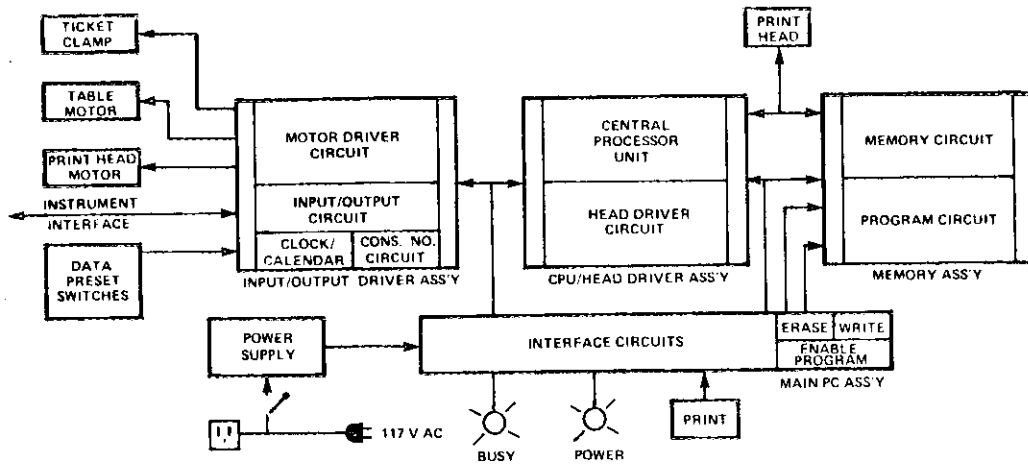### Detailed Description

a) Pictorial Blcok Diagram

FIGURE 3

b) Printing Function

A single print module is used, having seven solenoid-driven pins which travel downwards on impulse, striking the sheet through a replaceable inked ribbon. Movement of the print table, to which the sheet is clamped during the print cycle, is a function of character formation.

Printing of one character is accomplished by action of the seven printing pins which form the vertical of the character, as required. For each character, the table indexes inward one-eight inch, with the printing pins striking up to five times, as required, during the first one-tenth inch. The results is a matrix of dots, five in the horizontal axis and seven in the vertical axis, which are struck as required to form the character. Characters are formed to 0.1" wide, on eight-pitch spacing (eight character per linear inch). Linear spaces are in one-eight inch increments. One line of printed characters and spaces is formed by inward movement of the table, with the line starting at the point where the table is set by the margin index. The table is moved by a motor-driven toothed belt.

b)   Continued

In order to print multiple lines, the print module traverses
across the print area in one-twelfth inch increments, moved by a
stepper motor driven toothed belt. Any two adjacent lines of data
must be spaced on two increments (one-sixth inch) to avoid overprin-
ting; the twelve-per-inch spacing is provided to allow greater flexibi-
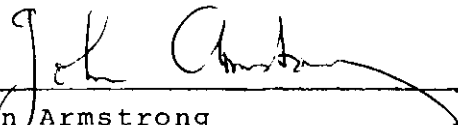lity in positioning various data items on the printed sheet.

c)   Print Command

Print command is initiated either at the Printer by the front-
panel PRINT button, or remotely at the instrument. Two types of data
items are printed, according to programmed format; those transmitted
from the instrument (weight, units, legend), and those generated in
the printer (date, time, consecutive number, identification code).
Both types of data items are presented to the printer controller
assembly, for selection as dictated by the format to which the page
will be printed.

NOTE: "Reprogrammed" switch marked S2 located at the rear of the
indicator must be sealed with lead and wire.

CONDITIONS OF APPROVAL: The sealing means is exempted from providing
ready access to other components and adjustments as per SGM3/10.

Approval is granted under the Weights and
Measures Act, S.C. 1970-71-72, Chapter 36, and the Weights and
Measures Regulations C.R.C. c., 1605 for use in Canada under the
general conditions of the said Regulations, and under any special
conditions listed above.

REFERENCE NO: G6922-F156-33

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Legal Metrology Branch