Consumer and Corporate Affairs
Consommation et corporations

Legal Metrology
Métrologie Légale

S.WA-1149

Approval No. d'approbation

Ottawa, December 19, 1979

NOTICE OF APPROVAL — AVIS D'APPROBATION

TEC Model SL41-30 - and SL42-15

Note: This long form of approval has been written to include also the scales as listed on S.WA-1151.

Manufacturer: Tokyo Electric Canada Ltd.,
9 Meteor Drive
Rexdale, Ontario
M9W 1A3

Apparatus: Digital computing and checkstand scales.

Rating: Scale capacity

Computing Scales

Model	Capacity	Load Cell
SL-41-30 WK	30 x .01 lb	Aluminum
SL-42-15 WK	15 x .005 kg	Aluminum

Checkstand Scales

Model	Capacity	Load Cell
SL41-30	30 x .01 lb	Aluminum
SL42-15	15 x .005 kg	Aluminum

The model No. on checkstand scales is suffixed with letters to designate the ECR to which it is interfaced.

Suffix NF indicates TEC ECR.
Suffix NH indicates NCR ECR.

Description: These are fully electronic load cell scales that use a micro-processor system to compute weight, price per lb(kg) and total price. These are displayed on gas discharge indicators.

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Description (Cont'd):

The scale controls on the computing scales are located on a remote keyboard and are as follows:

1) Keys numbered from 0 to 9; used to set unit prices and tare weight.

2) "C" key; used to clear unit price entries or remove from Pre-Pak mode.

3) "S" key; used to lock in tare and unit price for pre-packaging.

4) "T" key; used for setting platter tare.

5) "P" key; used for entering keyboard tare.

6) "$\frac{1}{2}$&$\frac{1}{4}$" key; option that are used for $\frac{1}{4}$ and $\frac{1}{2}$ lb. pricing, on metric scales will indicate 100 g. pricing.

7) "ZERO" button; is recessed into the keyboard and is used to zero the scale.

The display pod on computing scales in addition to the weight, unit price and total price is fitted with indicators as follows:

1) Net or Tare; indicates Tare is being used.

2) Pre-Pack; indicates scale is in pre-pak mode.

3) Zero; indicates the scale is at zero.

4) Overweight; indicates by blanking of weight, unit price and total displays.

The display for checkstand scales are post mounted and in addition to the Net weight display are fitted with an LED to indicate centre of zero.

Functional Description: The following is a functional description of the the SL41-30 and SL42-15 scales, as shown in the Flow Diagram, Figure 3.

1. POWER SUPPLY

The power supply converts the 120V, 60Hz AC to the following D.C. Voltages to power the logic circuitry within the scale.

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+ 60V DC for the display
+  5V DC for the CPU and ADC logic
-  5.6V DC for the differential amplifier
+ 15V DC for the differential amplifier
- 15V DC for the differential amplifier
  10V AC for the display filaments
  10.6V AC for load cell reference voltage
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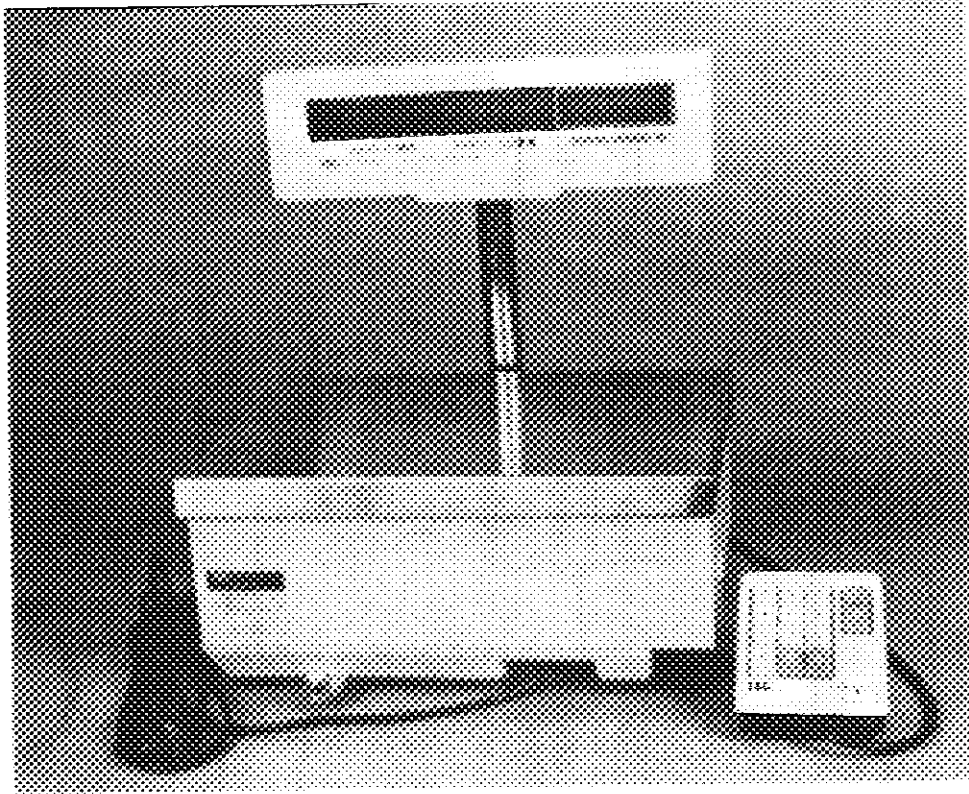
Model SL41-30 WK   or SL42-15 WK

FIGURE 1.
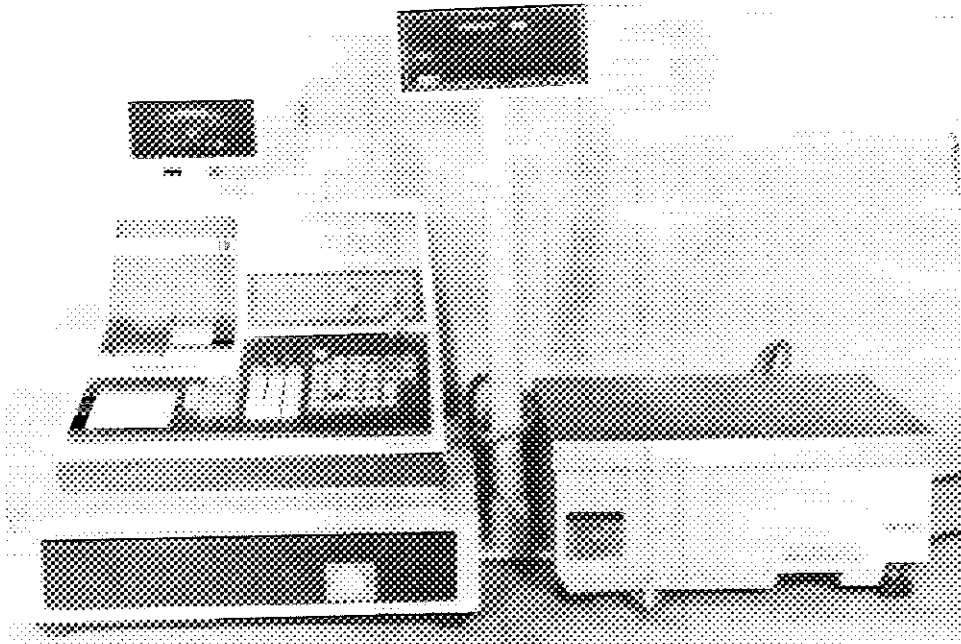
Model SL41-30 NF with a Tec ECR.

FIGURE 2.

TEC SL40 SERIES LOAD CELL SCALE

BLOCK DIAGRAM

FIGURE 1

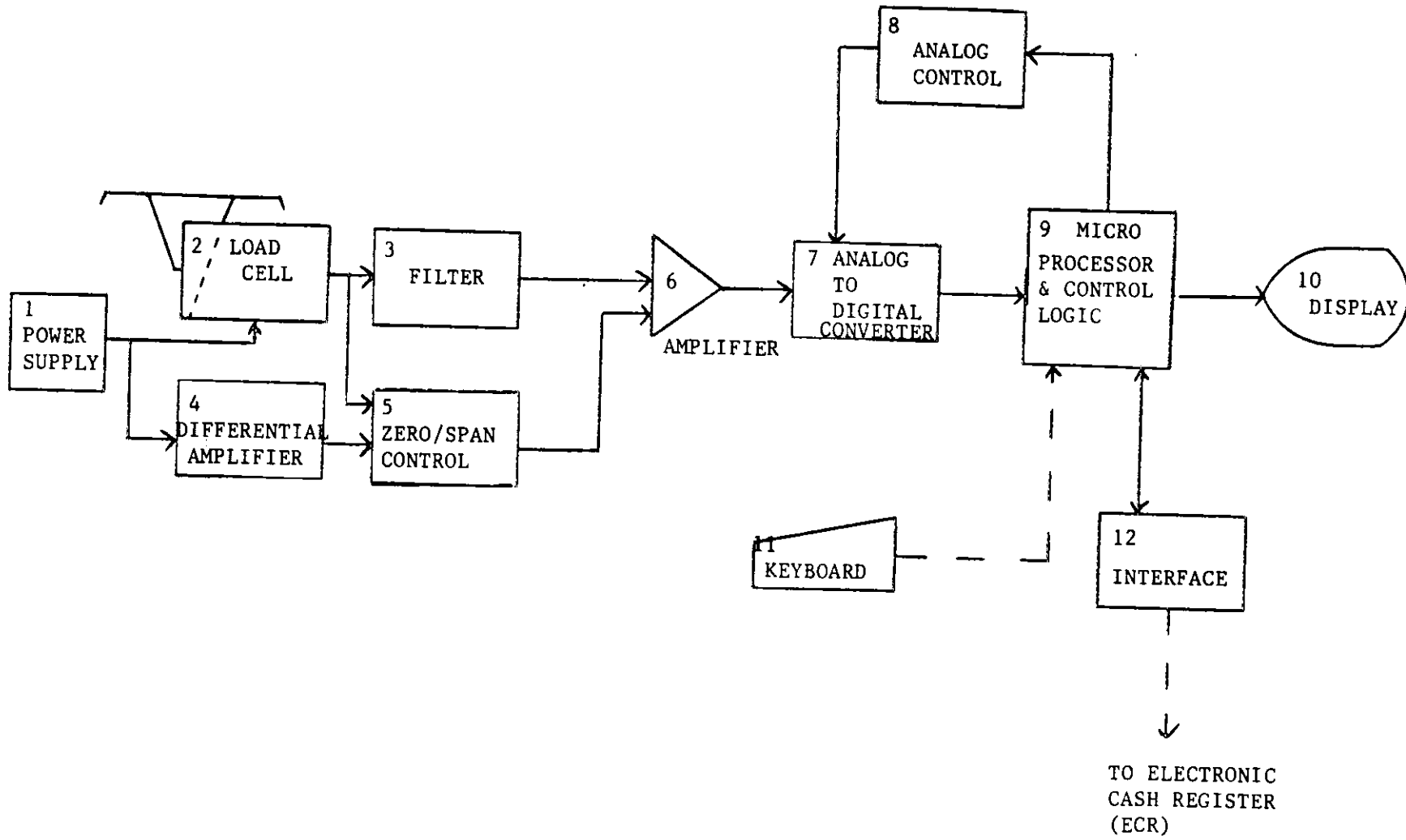- 4 -

Functional Description (Cont'd):

2. LOAD CELL

The load cell is aluminum and of the cantilever type.

3. LOW PASS FILTER

The low pass filter suppreses interference from vibration
and RF. The cut-off frequency of the filter is approximately
5Hz and allows DC to pass with a gain of 1.

4. DIFFERENTIAL AMPLIFIER

The differential amplifier (reference amplifier) senses the
excitation voltage output of the load cell and converts it to a
single ended output with respect to ground.

5. SPAN AND ZERO CONTROL

The span adjustments are made on a coarse span potentiometer
VR1 and a fine span potentiometer VR2. The Zero adjustment is
made with potentiometer VR3. Access to these potentiometers is
through an access hole in the housing of the scale.

6. AMPLIFIER

The amplifier provides a gain of 200 to the input signal,
thus providing an output to the A to D converter from -1.78 volts
to +1.22 volts which corresponds to a Zero and Capacity load
respectively.

7. ANALOG TO DIGITAL CONVERTER

The A to D converter converts the DC voltage from the amplifier
to a digital indication with a 0 to 4000 count resolution. Each
increment of digital quantity corresponds to .1 milli volts of
analog input. The conversion timing is controlled using a 200 K Hz
clock pulse from the CPU. The data output to the CPU is in the form
of 4 bit parallel digital serial information

8. ANALOG CONTROL

The analog control provides the timing synchronization between
the analog and digital electronic sections

Functional Description (Cont'd):

9. MICRO PROCESSOR & CONTROL LOGIC

The micro processor and control logic functions can be broken down into three main classifications:

1. Execution of commands as read from ROM memory.

2. Transaction of data with memory and I/O components.

3. Control the display and keyboard.

This section via execution of commands from ROM will monitor the ADC output, the keyboard output if present, and the interface for interrupts requesting data if an ECR is present. This section will also format output data for the display, and an ECR if present. Control and timing signals are provided to the ADC section to provide synchronization.

10. DISPLAY

The display is mounted on a post affixed to the back of the scale on the WK model. On the NH and NF models, the display is post mounted, but affixed to the checkout stand in a position allowing readout by the cashier and customer.

The WK model displays the net weight, price per pound and total price. In addition, there are three L.E.D.'s to indicate zero, prepack and net weight. The display is double sided to permit viewing by the cashier and consumer.

The display on the NH and NF models with the ECR interface, provide net weight display and one L.E.D. to indicate zero.

11. KEYBOARD

The keyboard is a separate unit connected to the scale by a cable. On the WK models a full description of it is listed in the scale description on page 1.

12. INTERFACE

All scales have an interface board that will be monitored by the micro processor. In the WK model, the data output to the micro processor will be interpreted in such a way as to cause the micro processor to scan the keyboard for input data.

In the NH and NF models, the interface is monitored by the micro processor for a data request from the ECR. Upon receipt of the request, the micro processor provides the weight data to the interface which in turn, provides the data to the ECR in the format appropriate to the ECR in use.

Functional Description (Cont'd):

KG/LB CONVERSION

Conversion is carried out by changing the position of switch
1 of dipswitch SW1 on the CPU board.

NOTE: If the scale is being permanently converted the mask on the
       weight display will have to be changed to reflect the new
       unit of measurement.

Testing: The displays can be verified with the "OFF/ON" switch, when
       first switched ON the indicators will cycle through a complete
       display and all indicator lights will light.

The span and Zero adjustments located behind a hole on the
side of the scale and the scale housing are to be sealed to prevent
unauthorized access to scale adjustments. Lead and wire or tamper-
proof paper seals will be used.

Special conditions: The devices are exempt from SGM1/12.

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.

File No. G6922-T280

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John Buchanan
Acting Chief
Weights and Measures Division
Legal Metrology Branch