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Long Version - Version détaillée

S.WA-1164

Approval No. d'approbation

Ottawa, April 24, 1980

NOTICE OF APPROVAL – AVIS D'APPROBATION

ANALOGIC AN5315 INDUSTRIAL MICROCOMPUTER CONTROLLED LOAD CELL DIGITISER

Manufacturer: Analogic Corporation
Audubon Road
Wakefield, Massachusetts
U.S.A. 01880

Apparatus: Digital Electronic Indicator

Application: Industrial

Model Number: Model AN5315 - capacity 9000 x 1.0 lb or 4000 x 1.0 kg

- 5 full digit display. Internal Count Resolution is 40,000.
- Display Full Scale Increments are selectable by internal switch to be 1,000, 2,000, 3,000, 4,000, 5,000, 6,000, 7,000, 8,000, 9,000 or 10,000. The reason for 10,000 maximum display resolution is to meet the Center-of-Zero requirement, which is a 4-to-1 ratio of internal count to display increment resolution.
- Display Multipliers are internally selected to allow count-by increments of x1, x2, x5, or x10, which allows a full five-digit display.
- Overload blanking of the display occurs at gross full scale.
- Display is updated with each conversion, every 0.4 seconds and has a maximum display of 99990 (not considering decimal point location).
- Decimal Point position is jumper selectable to the left of each digit, or at the right of the least significant digit, or may be omitted completely.
- Resolution LB/KG: Set up Kg Count By: 0.1, 0.2, 0.5, 1, 2, 5, 10
  Lb Count By: 0.2, 0.5, 1.0, 2, 5, 10, 10*
  Set up LB Count BY: 0.1, 0.2, 0.5, 1.0, 1, 2, 5, 10
  Kg Count By: 0.1* 0.1, 0.2, .5, 1* 1, 2, 5

* = change in resolution

NOTE: This approval also applies to models sold by the following companies under their own model numbers and having minor cosmetic changes:

COMPANY NAME	MODEL NO.	CHANGES
Metro Equipment Corp.	MC 10K	Green colour housing with "Accu-weight" name plate.
Howe-Richardson Scale Co.	SSD-600	Gold-brown colour housing with: a) modified front panel layout of switches; b) switches are Push-button-knob type; c) front panel marked "Howe-Richardson" + "X-ACTRON II".

Approved Accessories: Any approved compatible printer.

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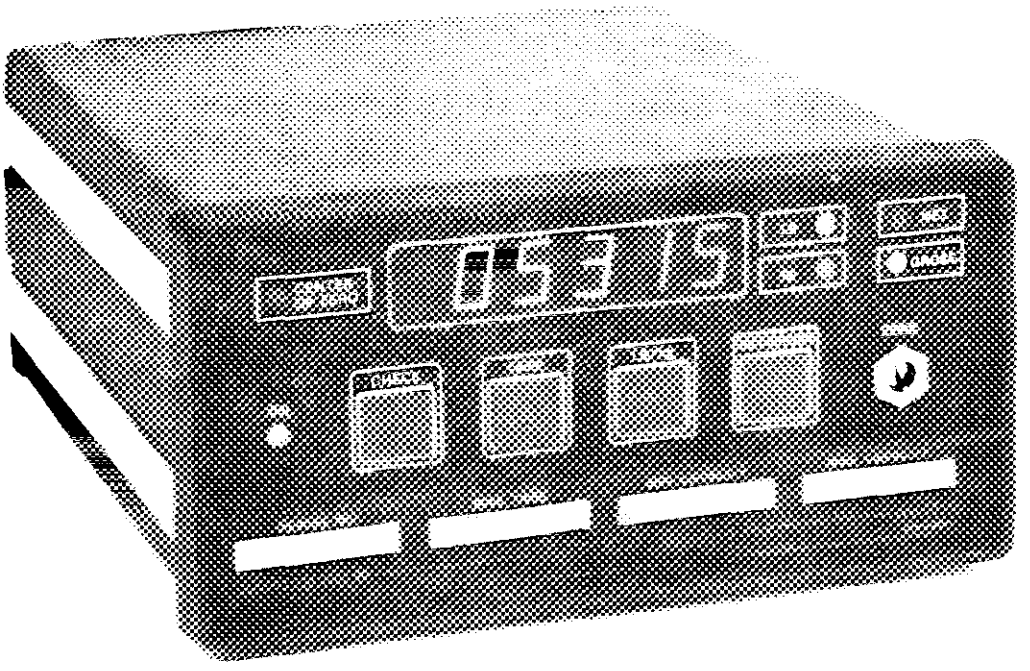

Device Description: The device is a micro-computer controlled load cell digitiser with up to 10,000 count display resolution.

The Functional and Operational Controls Are:

a) "Fine Zero"
b) "NET/GROSS"
c) "TARE"
d) "LB/Kg"
e) "CHECK" = to test all segments of the display.

Its features are:power on indication, center of zero indication within 1/4 display count of zero, water sealed front panel, BCD output, selectable 10v or 15v load cell excitation source with an output of 175 mA and short circuit proofed. It also has an internal selectable decimal point for any digit:

Component Identification - the main printed circuit board contains the microprocessor, the power transformer, the A/D converter, load cell excitation selection, coarse, medium and fine span adjustments, full scale display resolution, and countby selection. The display printed circuit board contains the display, operation mode indicators, decimal point selection, and front panel switch interface.

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Device Description (Cont'd):

The Option printed circuit board contains the Automatic Zero Track, Parallel BCD for Printer Interface, and the In-motion control.

Functional Block Diagram - as indicated in Figure 1, the major functional blocks comprising the AN5315 system include:

Load Cell Excitation
Sense Amplifier
Signal Amplifier and Zero Adjust
Integrating A/D Converter
Timing Control Logic (Guarded)
POL/EOC Logic
Microcomputer, Master Oscillator, and Counter
Front Panel and Setup
Display

The Option Card functions are indicated schematically by a single block interfacing with a bus-type structure of data and control signals. The display, status, and control functions included in the Display and Front Panel are instrumented through the microcomputer (Z3), and are interfaced to that computer by the bus structure.

The Functional Description

1. Front End Analog Signal Conditioning

a) The analog front end functions are performed in the blocks identified in Figure 1 as the Load Cell Excitation, Sense Amplifier, Signal Amplifier, and Zero Offset. The analog circuits, including the A/D Converter and analog-sourcing power supply, are guarded and isolated from the digital processing section of the instrument. Connections to the digital circuit are accomplished by transformer coupling.

b) The Load Cell Excitation block supplies 10 or 15 volts dc to drive the load cell system. Up to four 350-ohm load cell bridges may be driven by this block, and the user may select either 10 or 15 volts (nominal) for all the connected cells by internal switch selection.

c) The Sense Amplifier block senses the voltage levels developed at the load cell and, in turn, generates reference voltages of ±2 volts (nominal) for use by the A/D Converter. The gain of the Sense Amplifier block is switch selected for the 10 or 15 volts selected as the excitation voltage.

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Device Description (Cont'd):

d) The Signal Amplifier block receives the load cell signal output and the offset voltage (from the Zero Offset block) and scales the combined voltages according to the SPAN gain calibration.

e) The Zero Offset block develops a calibrated voltage to compensate for the user application deadload. The offset voltage is obtained from the sense amplifier so that it will "track" the changes in load cell excitation at the load cell. Offset values are jumper and switch selected, and potentiometer adjusted by setup in the main assembly, as well as fine-tuned by front-panel-mounted potentiometer control.

2. A/D Converter

a) The A/D Converter is a dual-slope ratiometric integrating type. It uses the input signal to charge a capacitor, and a reference signal of opposite polarity to discharge the capacitor. Hence, the name "dual slope". When the charge time is constant, the discharge time, at a rate determined by the reference, is proportional to the ratio of signal to reference. The program in the microcomputer Z3 digitizes the discharge interval for the readout value.

b) The Floating A/D Timing and Control block generates the timing signals for the A/D Converter in response to the RESET and ADVANCE timing signals transmitted by the Micro-computer and Digital Logic blocks.

3. Microcomputer and Digital Processing

a) The digital processing subsystem of the AN5315 includes the functional blocks labeled Microcomputer (Z3), Master Oscillator, Counter, Polarity/EOC Sense, and A/D Timing and Control. Along with the Front Panel, Display, and Option Board, these units are powered by the non-isolated outputs of the Power Supply Block.

b) The Microcomputer is programmed to perform the following:

1) Generate A/D timing signals RESET and ADVANCE to start the conversion cycle, and to determine the start of ø1, ø2, and AZ.

2) Digitize the time interval of ø2 with respect to an internal full scale count of 40,000.

3) Check for In-Motion (active if ZT or D2 option is installed).

4) Acquire the gross zero-tracked value as a Tare (if front-panel commanded).

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3. Microcomputer and Digital Processing (Cont'd):

b) 5) Check for Center-of-Zero display, and actuate if required.

6) Translate internal counts to display increments.

7) Perform the LB/Kg translation.

8) Adjust display increments for Count-by selection, Digital Offset, and NET/GROSS setup.

9) Convert data to BCD format and update the output ports.

c) The Master Oscillator provides a real-time synchronization for the microcomputer.

d) The A/D Timing and Control block translates the RESET and ADVANCE control signals from the microcomputer into transformer driving signals coupled to the floating A/D Timing Control.

e) The Front Panel control block contains the switches that select computer modes of NET/GROSS, LB/Kg conversion, and TARE acquisition. It also contains the CHECK control switch that causes all segments of the data and status display to be lighted.

f) The front panel Display block contains the display digits and polarity sign in the main display and LED indicators for the status of LB/Kg, NET/GROSS selection, Center-of-Zero indication, and an indication of power on.

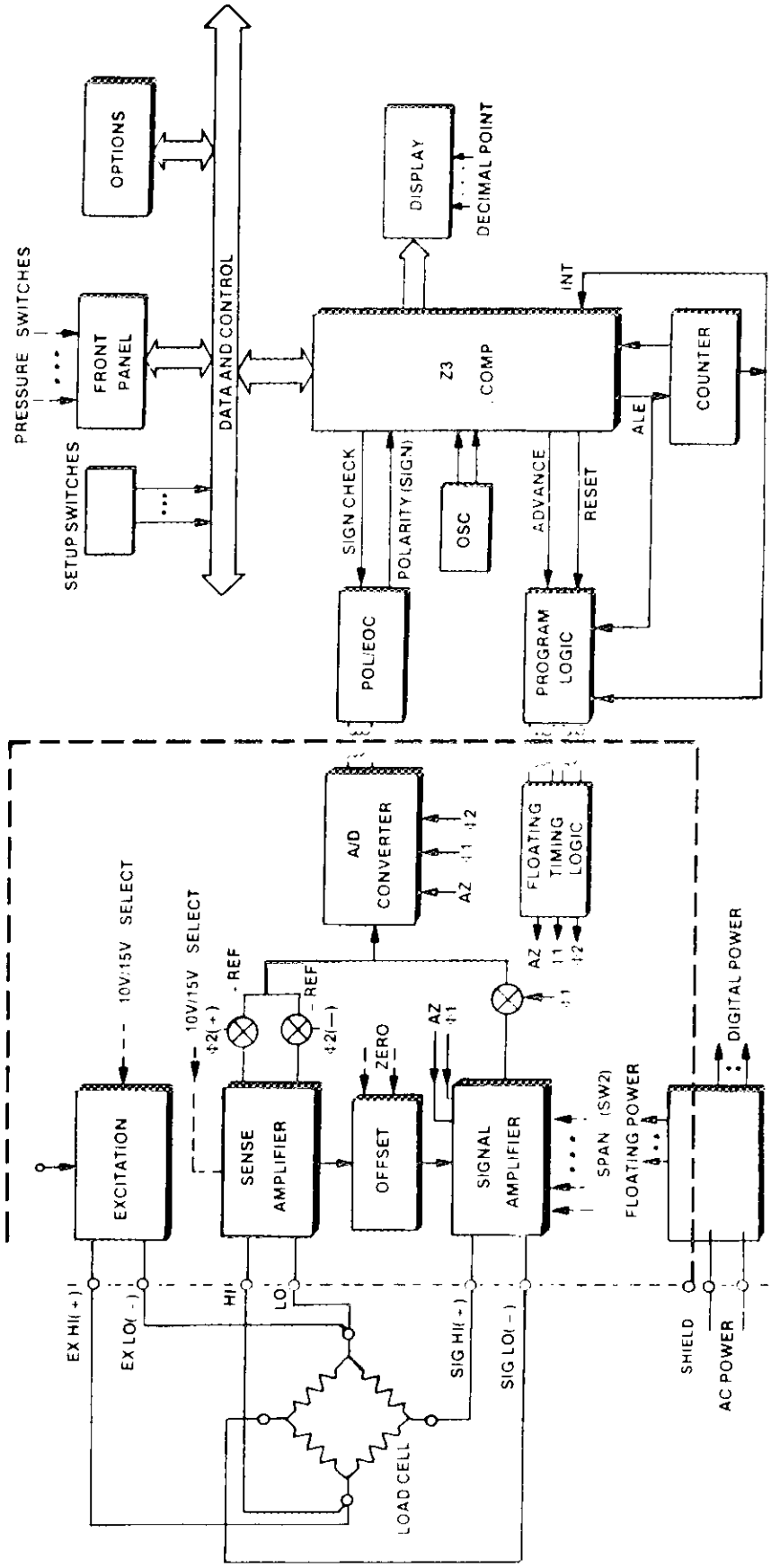
Device Options or Variations:

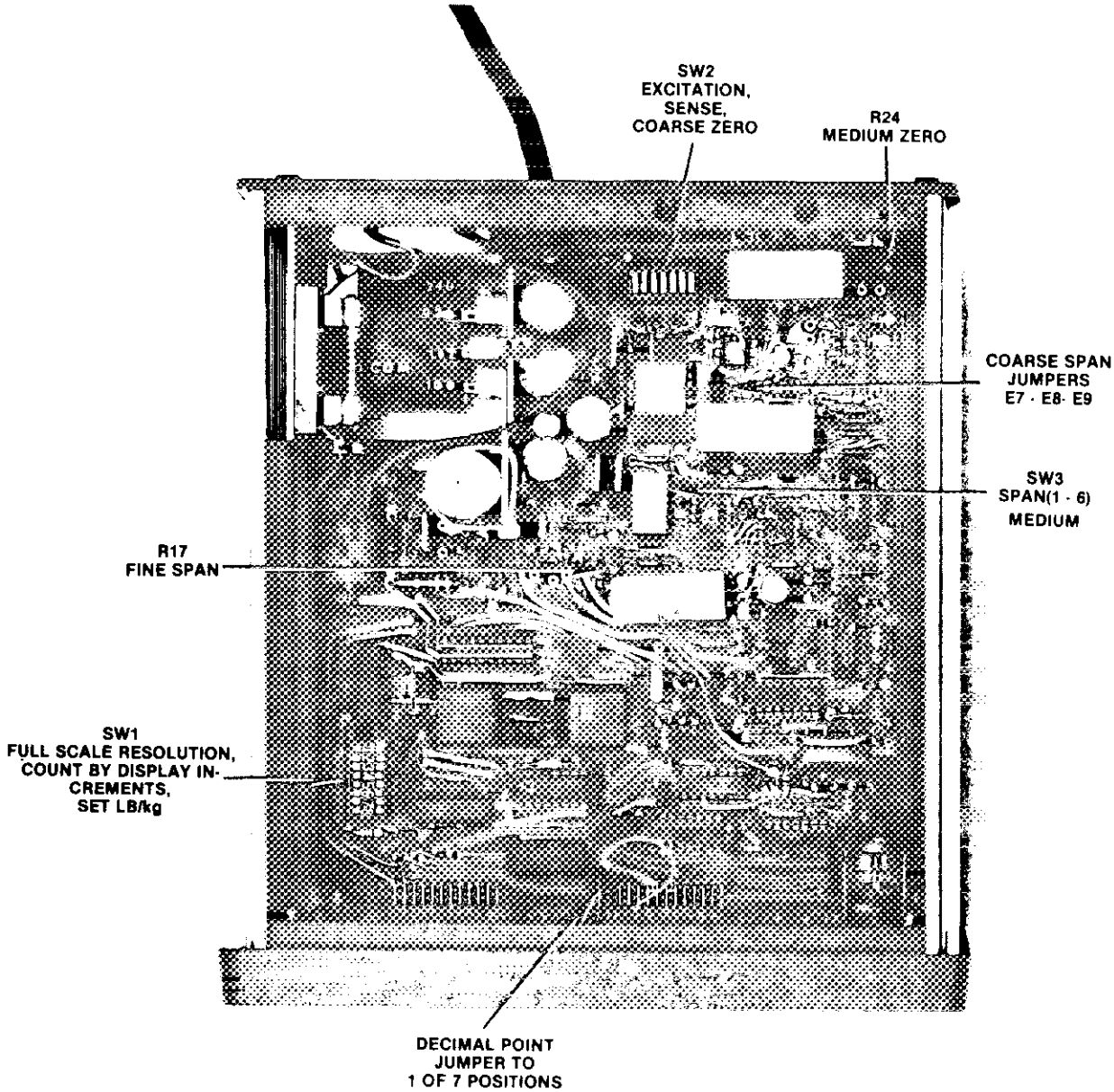
A) Automatic Zero Tracking
B) 5 digit BCD output of display
C) Printer interface with selectable motion detector range.

Zero Track Option:

General Setup Information

The setup procedure for the Zero Track Option establishes the display increment (delta) band within which the AN5315 will automatically zero out minor changes to the load cell system "dead weight". In other words, the AN5315 is programmed to assume that such relatively small weight values are changes to the dead weight and should not be included in the next live weight value. The setup is accomplished by binary-related switch selections of a number of increments from 0.5 to 7.5 for the delta band.


OPTIONS
DISPLAY
DECIMAL POINT
PRESSURE SWITCHES
FRONT PANEL
DATA AND CONTROL
Z3 COMP
INT
COUNTER
ALE
SETUP SWITCHES
SIGN CHECK
POLARITY (SIGN)
OSC
ADVANCE
RESET
POL/EOC
PROGRAM LOGIC
A/D CONVERTER
FLOATING TIMING LOGIC
10V/15V SELECT
+REF
-REF
+Σ(+)
+Σ(−)
ZERO
AZ
I1
I2
EXCITATION
SENSE AMPLIFIER
OFFSET
SIGNAL AMPLIFIER
SPAN (SW2)
FLOATING POWER
DIGITAL POWER
EX HI(+)
EX LO(−)
HI
LO
SIG HI(+)
SIG LO(−)
LOAD CELL
SHIELD
AC POWER


SW2
EXCITATION,
SENSE,
COARSE ZERO
R24
MEDIUM ZERO
COARSE SPAN
JUMPERS
E7 · E8· E9
SW3
SPAN(1 · 6)
MEDIUM
R17
FINE SPAN
SW1
FULL SCALE RESOLUTION,
COUNT BY DISPLAY IN-
CREMENTS,
SET LB/kg
DECIMAL POINT
JUMPER TO
1 OF 7 POSITIONS

Zero Track Option:

General Setup Information (Cont'd)

The maximum zero-track adjustments that can accumulate are limited to ±2% of the full scale range.

Changing the "zero" by the zero track value (within the preset band) occurs only if two successive weight conversions are within the in-motion band. Otherwise, a Zero Track Value merely may be a low value taken "on the fly" while the load was being changed, and would be an incorrect adjustment to zero if allowed to be effective. Also, an In-Motion performance feature is included when the Zero Track Option is installed. The setup for this feature selects the number of increments within which the difference between two successive conversions will be interpreted as being In-Motion. The selection is made by binary-related switches of increments from 0 through 15.

The Zero Track Option may be disabled by binary switch selection of SW2 for a zero delta band value.

Printer Interface Option

The Printer Interface Option provides for active terminals in the BCD Output connector for initiating a print operation. The print request is not accepted unless the weighing is valid, that is, the value is not In-Motion, not a negative gross, not Overload, and the output ports are stable (not in the interval of being updated). The Print Request must be commanded again if the previous one has not been accepted.

Segment Test: Push front panel switch marked "CHECK".

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

Provision for Sealing:

Sealing the top cover of the instrument prevents access to the span and coarse zero adjustments. Sealing of the instrument is accomplished by use of top panel fillister head screws with holes drilled to allow securing the lead wire seal or passing the lead wire seal through the top cover mounting screw hole and through the rear panel BCD mounting connector hole.

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-A261

John Armstrong - Chief
Weights and Measures Division
Legal Metrology Branch