J-STAR INDUSTRIES, INC.

MODEL 10 AND MODEL 20
ELECTRONIC SCALE SYSTEMS

INSTALLATION INSTRUCTIONS
OPERATION MANUAL
AND
SERVICE PARTS

J-STAR INDUSTRIES, INC.
SCALE SYSTEMS
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MODEL 10 AND 20 INDICATOR SYSTEM

DESCRIPTION AND PRINCIPLE OF OPERATION

The Electronic Scale System, consisting of one or more load cells and an indicator, is a precision device which will provide many years of accurate weighing if used properly and treated with reasonable care.

The Electronic Scale System has been designed for use in severe environments and can be used outside with no additional protection. Operator interaction with the instrument is via a membrane switch keyboard which is an integral part of the front panel. Audible feedback is provided to verify switch closure. The liquid crystal displays allow excellent readability in direct sunlight.

The weight being measured by the indicator is displayed on the weight display and is visible from 20 feet. The weight display also presents messages (annunciators) which indicate the mode of operation and aid the operator in proper use of the instrument.

The indicator is designed to run from a 12 VDC power source, such as a truck battery. Pushbutton balance is accomplished from the front panel of the indicator and is remembered by the microprocessor as long as power is available at the indicator power connector. If power is lost and the balance value is no longer present, the operator is prompted by a flashing annunciator on the weight display.

The indicator has four main modes of operation; inventory mode which displays the weight above the balance value; load mode which displays the weight remaining until the preset is satisfied; net off mode which displays the weight added or removed since the last preset was entered; and remote zero which is used with an external pushbutton or relay to zero the weight display and allow loading or unloading without the preset feature. DON'T GIVE UP! This will be much clearer after the following examples.

Provisions have been included in the Model 20 for a remote display using a large LCD display and for a remote 12 VDC alarm on both Model 10 and 20.

OPERATING INSTRUCTIONS

Definitions:
Weighing Display: A large display located on the left-hand side of the indicator. Used to display weight and provide operator prompting with built in visual annunciators.

Preset Display: The smaller of the two displays located on the right-hand side of the indicator. Used to display the preset amount for loading and unloading entered using the number keys. (Model 20 only)

Keys or Switches: The areas of the front panel membrane switch which are pressed to modify the operation of the indicator.

Text Conventions:
Display Indications: Values or messages presented on either the weight or preset display will be enclosed in single quotes i.e., ' '

Annunciator Indications: Operation of annunciators will be described with the annun-
indicator capitalized and in single quotes, i.e. 'INV'.

Switch or Key Names: Front panel switches will be designated by capital letters and no quotes, i.e. INVENTORY.

Audible Key Feedback:
In general when a key is pressed the internal audible alarm will beep. In some cases, no beep will be heard when a key is pressed. This indicates that the key was not enabled when it was pressed. For instance, BALANCE will only produce a beep if it has been enabled by pressing INVENTORY first.

This beeper also functions as a local audible alarm for the preset amount.

Power On: (Model 10 illustrated)
1) To turn on the indicator press ON. The weight display will display the message 'HELLO'.

2) After an approximate 4 second warm up a beep will be heard. The weight display will indicate 'INV' and inventory weight will be displayed.

3) If the indicator is not zeroed, 'NO BAL' will flash and the weight display will indicate '—— — — — —' after the beep. To display inventory weight, the indicator must be zeroed. See Inventory and Balance Instructions (Page 8).

Power Off:
To turn off the indicator, press OFF. The main power to the indicator will be cut off, but a small amount will still be supplied for remembering the balance or 'zero' value.
Low Battery:
A low battery is indicated by a 'LOBAT' warning on the weight display. The balance switch is not functional if a low battery condition exists. (Less than 10½ volts).

Inventory and Balance
Pressing INVENTORY will cause the indicator to enter the inventory or weighing mode, but will also turn on the BALANCE switch. The BALANCE switch is protected against accidental use until it is turned on for 2 seconds by pressing the INVENTORY switch. If BALANCE is pressed within the 2 seconds allowed, the indicator will re-zero the inventory display and cause 'BAL' to flash for a short time.

To obtain a satisfactory balance value, the inventory display should be stable. Although the indicator may be balanced at any inventory weight, it is important to balance the indicator with the scale empty, and if a mobile application with the vehicle stopped and on level ground.

WEIGHING METHODS AND PROCEDURES

2) After the warm up period.

3) Press INVENTORY then BALANCE within 2 seconds. 'BAL' will be displayed for a short time.
4) Push clear to clear the display and enter the preset mode.

5) To load the first ingredient of 2000 lbs. key in 2000.

6) Push ENTER PRESET to preset the alarm at 2000 lbs. Display automatically returns to mode last used before clear was pushed. In this case the inventory mode.

7) Push LOAD/UNLOAD to enter load mode.

8) As first ingredient is added weight display counts down to zero. At zero the red warning light and the audible alarm come on.

9) Pushing ALARM OFF will turn off only the audible alarm.

10) To load the second ingredient of 3000 lbs. push CLEAR. All Alarms are turned off.

11) Then key in 3000.
12) Push ENTER PRESET to preset the alarm at 3000 lbs.

13) As second ingredient is added weight display counts down to zero. At zero the warnings turn on.

14) Loading is complete. To check total inventory push INVENTORY.

15) Push ALARM OFF to silence audible alarm. See above illustration.

16) Mix or process as required, leave indicator on.

17) To unload 1508 lbs. of mixture push CLEAR.

18) Key in 1508.

19) Push ENTER PRESET.

20) Push LOAD/UNLOAD switch, display rounds off to the nearest 10 lbs.
21) As mixture is dispensed, weight display counts down to zero. At zero, the warnings come on. BELL SYMBOL RED LIGHT

22) Repeat 16 through 21 until mixer is empty. Remaining inventory may be checked at anytime by pushing INVENTORY.

NET OFF MODE

The net off mode of operation causes the weight display to indicate the net change in the weight in the scale since the last ENTER PRESET. A negative value indicates that feed was removed and a positive value indicates that an ingredient was added.

To enter the net off mode, press and hold LOAD/UNLOAD for 2 seconds or press LOAD/UNLOAD twice.

In normal operation, the net off mode will be on for only 2 seconds and then revert to the load mode. Typically this mode will be utilized to avoid operator arithmetic, such as after an unloading operation to record the actual amount unloaded.

To illustrate using a Dispensing Application:

1) Push CLEAR.

2) Key in 2000 lbs.

3) Push ENTER PRESET. (Was previously in load mode so display returns to load mode.)

4) Unload feed, but operator over feeds by 40 lbs.

5) Push ALARM OFF and push LOAD/UNLOAD to view actual amount unloaded of 2040 lbs.

An internal option switch can be set to allow continuous net off operation. Contact your dealer for this adjustment. If this option has been selected, the load mode can be re-entered by pressing LOAD/UNLOAD. Continuous NET OFF operation causes the weight display to count up to the preset value amount instead of down to zero as in the LOAD MODE. Alarms are functional in the NET OFF MODE.
<table>
<thead>
<tr>
<th>SYSTEM</th>
<th>CIRCUIT CONDITION</th>
<th>CORRECTIVE ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Dead</td>
<td>Power Switch On</td>
<td>Check fuses. Replace blown fuse.</td>
</tr>
<tr>
<td>Inventory display is not stable. (Varies more</td>
<td></td>
<td>Check input cable for loose connections to ignition switch or battery.</td>
</tr>
<tr>
<td>than 5 counts when mixer is stationary)</td>
<td></td>
<td>(1) Remove junction box cable from bottom of indicator. If display is still not</td>
</tr>
<tr>
<td></td>
<td></td>
<td>stable, then indicator needs repair. (A number other than the correct weight will</td>
</tr>
<tr>
<td>System inaccurate, small error.</td>
<td>Power On</td>
<td>be displayed.) Contact your dealer or return to Butler for repair.</td>
</tr>
<tr>
<td>And Circuit Balanced</td>
<td></td>
<td>(2) If the indicator is stable, then disconnect load cells from junction box one</td>
</tr>
<tr>
<td>System inaccurate, 20% or more error.</td>
<td>Power Switch On</td>
<td>at a time until the defective load cell is located.</td>
</tr>
<tr>
<td>And Circuit Balanced</td>
<td></td>
<td>If all load cells check out O.K., then the junction box is defective. Check for</td>
</tr>
<tr>
<td></td>
<td></td>
<td>loose or dirty connections, if none, contact your dealer or return to Butler for</td>
</tr>
<tr>
<td></td>
<td></td>
<td>repair or replacement.</td>
</tr>
<tr>
<td></td>
<td>Check all load cell mounts for proper operation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If an error still exists, contact your dealer or Butler for calibration</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Check all load cell mounts for proper operation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If an error still exists, run a weight test to determine dead load cell or</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>use an ohmmeter to check load cell at cable. Red to black resistance should be</td>
</tr>
<tr>
<td></td>
<td></td>
<td>approximately equal to white to green. (700 OHMS ± 10% for Model CTH &amp; CT, 350</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OHMS ± 10% for all weighbeam and weigh axles. In addition red to green, green</td>
</tr>
<tr>
<td></td>
<td></td>
<td>to black, black to white and white to red should be approximately equal. (525</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OHMS ± 10% for Model CTH &amp; CT, 262 OHMS ± 10% for all weighbeam and weigh axles.</td>
</tr>
</tbody>
</table>
INSTALLATION REQUIREMENTS

Indicator Mounting:
Various mounting plates are available. The indicator is easily attached to the plate by hooking the top over the plate and securing with two bolts # 10x24 x 3/4 and nuts.

Power Connection:
The power cable should be connected directly to a vehicle battery or regulated power supply. The scale end of the power cable is connected to the indicator as shown in Figure 1. Connect +12 VDC to red wire and GROUND to white wire. The indicator is fused at 10 amps.

NOTE: For the indicator to remember the balance setting the 12 VDC power to the indicator must be uninterrupted. However, there is no need to be concerned with battery drain since the indicator uses very little power in the off condition.

Table 1: Power Cable Connections:

<table>
<thead>
<tr>
<th>Wire Color</th>
<th>Wire Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>Battery (+12 VDC)</td>
</tr>
<tr>
<td>White</td>
<td>GROUND</td>
</tr>
<tr>
<td>Black</td>
<td>Remote Alarm Out +</td>
</tr>
<tr>
<td>*Green</td>
<td>Remote Zero</td>
</tr>
</tbody>
</table>

*Green wire is optional. Contact your dealer if required.

Remote Alarm Connection:
If a remote 12 VDC alarm is to be used, connect the +12 VDC side of the alarm to the power cable black wire, and the GROUND side (or white wire) to the frame. The alarm output is fused for a maximum drain of 10 amps.

The remote alarm connection may be also used for motor control purposes when used with a relay.

Remote Zero Switch Connection:
If the remote zero is to be used, connect one side of a normally open momentary switch or relay contact to the power cable green wire, and the other side to frame or other GROUND connection. If your power cord does not contain a green wire and you desire to use this feature, contact your dealer for a special cord.

Load Cell Connection:
The indicator is designed to operate with strain gage load cells. The indicator will normally be supplied with a pre-assembled interconnection cable going to the load cell junction box. If a new cable is required or if a custom installation dictates that a cable be made on site, consult your Butler dealer for required parts.

To connect the load cells, plug the Butler supplied interconnect cable from the load cell junction box into connector located on the bottom of the scale. (See Figure 1)

Junction Box Connections:
Connect the cables from the load cells to the junction box terminals as follows:

Table 2: Load Cell Connections in Junction Box:

<table>
<thead>
<tr>
<th>Terminal Color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A) Red</td>
<td>+ Excitation</td>
</tr>
<tr>
<td>B) Black</td>
<td>- Excitation</td>
</tr>
<tr>
<td>C) White</td>
<td>+ Out</td>
</tr>
<tr>
<td>D) Green</td>
<td>- Out</td>
</tr>
<tr>
<td>E) Blue</td>
<td>Shield</td>
</tr>
</tbody>
</table>

SCHEMATIC DIAGRAM
## SETUP AND CALIBRATION

### TABLE 1: RANGE AND OUTPUT COUNTS SELECTION

**SEE FIG. 2**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>S6</td>
<td>00/10/01/11 S6</td>
<td></td>
<td>00/10/01/11</td>
</tr>
<tr>
<td>0000</td>
<td>.1600 LB</td>
<td>2 .5 1 2 5</td>
<td>1</td>
</tr>
<tr>
<td>1000</td>
<td>2000 LB</td>
<td>.5 1 2 5 1</td>
<td>2</td>
</tr>
<tr>
<td>0100</td>
<td>4000 LB</td>
<td>.5 1 2 5 1</td>
<td>1</td>
</tr>
<tr>
<td>1100</td>
<td>8000 LB</td>
<td>2 5 10 20 1</td>
<td>1</td>
</tr>
<tr>
<td>0010</td>
<td>16000 LB</td>
<td>10 20 50 10 1</td>
<td>1</td>
</tr>
<tr>
<td>1010</td>
<td>20000 LB</td>
<td>10 20 50 10 1</td>
<td>1</td>
</tr>
<tr>
<td>0110</td>
<td>40000 LB</td>
<td>10 20 50 10 1</td>
<td>1</td>
</tr>
<tr>
<td>1110</td>
<td>80000 LB</td>
<td>10 20 50 10 1</td>
<td>1</td>
</tr>
<tr>
<td>0001</td>
<td>800 KG</td>
<td>.2 .5 1 2 5</td>
<td>2</td>
</tr>
<tr>
<td>1001</td>
<td>1600 KG</td>
<td>.2 .5 1 2 5</td>
<td>2</td>
</tr>
<tr>
<td>0101</td>
<td>2000 KG</td>
<td>.5 1 2 5 0</td>
<td>5</td>
</tr>
<tr>
<td>1101</td>
<td>4000 KG</td>
<td>.5 1 2 5 0</td>
<td>5</td>
</tr>
<tr>
<td>0011</td>
<td>8000 KG</td>
<td>2 5 10 20 1</td>
<td>1</td>
</tr>
<tr>
<td>1011</td>
<td>16000 KG</td>
<td>2 5 10 20 1</td>
<td>1</td>
</tr>
<tr>
<td>0111</td>
<td>20000 KG</td>
<td>5 10 20 50 1</td>
<td>2</td>
</tr>
<tr>
<td>1111</td>
<td>40000 KG</td>
<td>5 10 20 50 1</td>
<td>2</td>
</tr>
</tbody>
</table>

**NOTE 1:** A “1” IN THE ABOVE TABLE SIGNIFIES AN INSTALLED JUMPER OR “ON” SWITCH. A “0” SIGNIFIES A MISSING JUMPER OR “OFF” SWITCH.

**NOTE 2:** CHANGING THE RANGE JUMPERS REQUIRES THAT SPAN RESISTORS BE CHANGED ALSO. HIGH PRECISION RESISTORS ARE REQUIRED - CONTACT J-STAR BEFORE ATTEMPTING.

### MODE SWITCHES

<table>
<thead>
<tr>
<th>Mode</th>
<th>Switch</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time constant filter</td>
<td>S1 and S2</td>
<td>Both off = 2 fast, S 1 on only = 4, S 2 on only = 8, Both on = 16 slow</td>
</tr>
<tr>
<td>Audible alarm</td>
<td>S3</td>
<td>No Hold, Hold</td>
</tr>
<tr>
<td>Inv.</td>
<td>S4</td>
<td>Off, Inv.</td>
</tr>
<tr>
<td>Inv.</td>
<td>S5</td>
<td>No Hold, Hold</td>
</tr>
<tr>
<td>Inv.</td>
<td>S6</td>
<td>LB, KG</td>
</tr>
</tbody>
</table>

### TEST MODE EXAMPLE

<table>
<thead>
<tr>
<th>Mode</th>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range of Indicator</td>
<td>r</td>
<td>40,000</td>
</tr>
<tr>
<td>Count by</td>
<td>cnt</td>
<td>10</td>
</tr>
<tr>
<td>P-F</td>
<td>P-F</td>
<td>4</td>
</tr>
<tr>
<td>Audible Alarm</td>
<td>A</td>
<td>ON</td>
</tr>
</tbody>
</table>

**Net Off**

- Off: No Hold
- On: Hold

**Audible alarm**

- On: Off
- Inv.

**Inv.**

- No Hold
- Hold

Load cell selection switch S14 is used to select 3 or 4 load cell system configuration. Use of switch may require recalibration of scale.
INDICATOR CALIBRATION PROCEDURE

WHAT TO DO:
Turn On Indicator
Balance Indicator
Put On Known Weight
Compare Readout With Known Weight

HOW TO DO IT:
Push ON
Allow warm up time 5 to 10 minutes (30 minutes in cold weather).
Push INVENTORY then BALANCE within 2 seconds.
This can be done by using Dead Weights or by comparison to a known good Platform

EXAMPLE: 6000# known weight
5850# readout
ERROR 150# If over .25% off it needs calibration.

Push CLEAR
Then key in known weight on keyboard which will appear on the LCD display then push calibration switch. Indicator will beep and flash CAL on upper portion of Display.

Push ENTER PRESET then LOAD/UNLOAD
A number will appear on display, this represents the error.

Turn calibration pot until the readout reads (0) zero.

Push calibration switch. Indicator will beep and flashing CAL will disappear and return to the normal weighing condition.

Model 20 is the same other than when keying in the known weight it will appear on the preset display.

Calibrated weight should appear on the main display ± ONE COUNT Calibration is now complete.

Unload scale and check for zero, if off more than one count run weight test and calibrate again.
SPECIFICATIONS

SYSTEM
Operating Characteristics
Load Range ........................................... up to 80,000 lbs. depending upon application
Accuracy ........................................... System ± .25% or ± .5% depending on load cell used
Power Requirements .................................. 10½ - 16 VDC
Temperature Range .................................. -20 to 140 degrees F

Remote Display Feature ................................ Model 20 Only
Remote Zero Feature .................................. Model 20 Only

JUNCTION BOX
Cable .................................................. 5/16” dia. x 15’ long (30’ long on Platform)
Capacity ............................................. 4 Load Cell Connectors
Weight .................................................. 2 pounds

LOAD CELLS
Operating Characteristics
Capacity ............................................. Depends on load cell
Overload Safety Factor ................................ 200% typical

REPAIR PARTS

ELECTRIC COMPONENTS

<table>
<thead>
<tr>
<th>KEY</th>
<th>SYMBOL</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>824186</td>
<td>Scale Indicator - Model 10 (standard version)</td>
</tr>
<tr>
<td></td>
<td>143899</td>
<td>Scale Indicator - Model 10 (used w/process controller)</td>
</tr>
<tr>
<td></td>
<td>824194</td>
<td>Scale Indicator - Model 20 (standard version)</td>
</tr>
<tr>
<td></td>
<td>143900</td>
<td>Scale Indicator - Model 20 (used w/process controller)</td>
</tr>
<tr>
<td>2</td>
<td>141880</td>
<td>Junction Box - OMP 30’</td>
</tr>
<tr>
<td></td>
<td>141879</td>
<td>Junction Box - OMP 15’</td>
</tr>
<tr>
<td>3</td>
<td>824190</td>
<td>Power Cord (old style 3 wire)</td>
</tr>
<tr>
<td></td>
<td>824461</td>
<td>Power Cord (new style 4 wire)</td>
</tr>
<tr>
<td>4</td>
<td>824352</td>
<td>Cable, Trailer Extension</td>
</tr>
<tr>
<td>5</td>
<td>824198</td>
<td>Remote Indicator - Model 20R</td>
</tr>
<tr>
<td>6</td>
<td>824232</td>
<td>Cable, 20’ Model 20R</td>
</tr>
<tr>
<td></td>
<td>141835</td>
<td>Duplex Kit, allows use of 5 to 8 Load Cells</td>
</tr>
</tbody>
</table>
LOAD CELLS

7
824303  CTH -- 11' Cable
824304  CTH -- 21' Cable
824180  CTH -- 11'
824181  CTH -- 21'

8
824324  2 1/8-DB-11' Long
824458  2 1/8-DB-11' (Short)
140708  2 1/8-DB-16' (Short)
143861  2 1/8-DB-16TC (Temperature Compensated Scales)

9
824322  1-DB-16' Cable (115 Stationary & Universal Scales)
143860  1-DB-16TC Cable (Temperature Compensated Scales)
824323  1-DB-5' Cable (115 Stationary & Universal Scales)

10
824353  2 1/2-DA-11' Axle ............... Not Shown
143862  2 1/4-DB-16TC (Temperature Compensated Scales)
143870  2 1/4-DB-21TC (Temperature Compensated Scales)