# VT300
# Weighbridge Indicator
## Technical Manual


**Revision A4, September 2006**

**Doc # TM-VT300-EN**

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# Safety Instructions

The following instructions serve as a general guide for the safe operation and maintenance of the VT300.

## *Safety Symbols*

This symbol indicates potential safety hazards regarding product operation or maintenance to operator or service personnel.

## *General Safety Practices*

Do not touch or tamper with the power supply when the power cord is connected. Line voltages may be present even when the product is powered off or a fuse is blown.

Before working on equipment connected to power lines or to other devices, remove jewelry or any other metallic object that may come into contact with energized parts.

The product is intended to be grounded during normal use. Grounding is provided by connecting the mains plug to a wall socket with a protective earth terminal. The earth lug provided on the product should be connected to the protective earth at all times, by a wire with a diameter of 18AWG or wider.

Always connect the ground first and disconnect it last. Do not connect data cables to ungrounded equipment. Make sure that all other cables are disconnected before disconnecting the ground.

## *Special Safety Warnings*

Welding on or in the vicinity of the equipment is strictly prohibited.

Use reliable lightening conductors to prevent static loads caused by thunderstorms.

## Connection of AC Mains

Make sure that the electrical installation complies with local codes. Always connect the AC plug to a wall socket with a protective ground.

The maximum permissible current capability of the branch distribution circuit that supplies power to the product is 16A. The circuit breaker in the building installation should have high breaking capacity and must operate at short-circuit current exceeding 35A.

Always connect the power cord first to the equipment and then to the wall socket. If the power cord cannot be readily disconnected in case of emergency, make sure that a readily accessible circuit breaker or emergency switch is installed in the building.

## Operating Environment

| | |
|---|---|
| **Ambient Temperature** | Storage temperature: -10C to +70C (14F to 158F).<br>Operating temperature: -10C to +40C (14F to 104F). |
| **Humidity** | 40% to 90% RH (non condensing). |
| **Vibration** | Severe vibration can affect the accuracy of weighing and damage components. |
| **Air** | The air surrounding the product should be dust-free and should not contain corrosive gasses or other materials that could adversely effect the product. |
| **Electromagnetic Fields** | Heavy electrical equipment should not be installed near to the weighing apparatus. |
| **Incoming and Outgoing Signals** | Relays and contacts connected to the equipment must have reliable and effective interference suppression. This also applies to other equipment within 3 meters of the equipment. |

# Declaration of Conformity

## *Non-Automatic Weighing Instrument (III)*

| | |
|---|---|
| **Manufacturer** | Vishay Transducers |
| **Type/Model** | VT300 |
| **EC Type Approval Certificate Number** | DK 0199.62 |

Corresponds to the production model described in the EC Type Approval Certificate and to the requirements of the Council Directive 90/384/EEC as amended and to the requirements of the following EC Directives:

EN 45501:1994, The Metrological Aspects of Non-Automatic Weighing Machines.

EN 55022:1987, Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment.

EN 60950:1992, Safety of Information Technology Equipment.

| | |
|---|---|
| **Date** | April 30, 2004 |
| **Signature** | Benny Shaya, Director R&D/Operations Instruments<br>Being the responsible person employed and appointed by Vishay Transducers. |

# About this Document

This document provides technical information for the VT300 Weighbridge Indicator. It is intended for technical staff, and explains how to install, set up and configure the indicator, as well as troubleshoot and service it.

For information on how to use the product, see the *VT300 User's Guide*.

## *Chapters and Their Contents*

## *Style Conventions*

| | |
|---|---|
| Verdana | Regular text. |
| **Arial Bold** | Commands, keys and other parts of the user interface. |
| *Arial Italics* | Names of classes, methods, arguments, exceptions, properties, etc. Also used for special terms, the first time they appear. |
| Monospace | Text displayed on the LCD or on a computer attached to the product. |
|  | **Notes,** which offer an additional explanation or a hint on how to overcome a common problem. |
|  | **Warnings**, which indicate potential safety hazards regarding product operation or maintenance to operator or service personnel. |

# 1 Technical Specifications

## 1.1 General

| | |
|---|---|
| **CPU** | MCU 89C51RD, 64KB Flash ROM, 1KB RAM, 64KB serial EEPROM, real-time clock. |
| **Communication** | • Serial port 1: RS232C Full duplex, 2400 baud, 1 start, 7 data bits/even parity or 8 data bits/no parity.<br>• Serial port 2: (optional): RS232 or RS485 half duplex, 2400-57600 baud, no or even parity, 7 or 8 data bits. |
| **Display** | 16 character LCD display (14.5mm height). |
| **Annunciators** | Net, no motion, minus sign, zero, range 1 and 2. |
| **Keyboard** | 27-key membrane type with tactile feedback. |
| **Approvals** | EU type approval, 10,000 divisions, 0199.62. |
| **Accuracy class** | III. |
| **Resolution** | Selectable up to 990.000dd (in accordance with regulations). |
| **Max tare effect** | Full scale (100%). |
| **Auto zero track** | Off or 0.5dd, setup-selectable. |
| **Weight digits** | 4, 5 or 6. |
| **Weight steps** | 1, 2, 5, 10, 20, 50, 100, 200. |
| **Digital filter** | FIR automatically adjusted to conversion speed, plus post filtering (rolling average of 1, 2, 4, 8, 16, 32 samples). |
| **Calibration methods** | Dead load, span and scale parameters via keyboard commands. Calibration can be performed either by weighing or by entering load cell mV values. |
| **Self diagnostics** | Hardware and software – MCU watchdog.<br>Memory failure and I/O failure – program check. |

## 1.2 Analog Input

A second analog input may be added as an option, if no analog output is needed. The same specifications apply.

| | |
|---|---|
| **Load cell excitation** | ±5V switched polarity or +5VDC with sense. |
| **Connection** | 6-wire technique. Max 10 load cells, 350Ohm each. |
| **Signal range** | -0.25 to 1.75mV (Gain=10), -0.25 to 3.75mV (Gain=20). |
| **Sensitivity** | • Approved scales: min 0.4µV / digit (VSI).<br>• Non-approved scales: min 0.1µV / digit. |
| **Input amplifier** | Input noise 0.3µVp-p, input bias current 10nA typical. |
| **A/D Converter** | Sigma delta 550.000 internal counts max. Conversion speed: 3, 7, 14, 28, 57, 70Hz (selectable). |
| **Linearity** | Within 0.002% of full scale. |
| **Span temp coefficient** | ≤ 2ppm/°C. |
| **Zero temp coefficient** | ≤ 2ppm/°C. |
| **Long-term stability** | 0.005% of full scale per year. |

## 1.3 Analog Output (Optional)

If no analog output is needed, a second analog input may be added (see 1.2 above). Analog Output is Powered by an external 24VDC (See section 7.1.2 for specification).

| | |
|---|---|
| **Current or voltage** | Selected via jumper JP1 on printed circuit board 761 (see section 7.4.1). |
| **Current output** | 0-20mA or 4-20mA. Max load resistance 1KΩ (line + termination). |
| **Voltage output** | 0.02-10V. Min load resistance 1KΩ. |
| **Resolution** | • Internal: 16 bits.<br>• External: 16 bits, or in accordance with regulation. |
| **Linearity** | Better than 0.01% of FSR. |
| **Thermal stability** | 50ppm/°C typical. |
| **Short-circuit protection** | 25mA indefinite duration. |

## 1.4 Digital Input

| | |
|---|---|
| **Input voltage** | 9-24VDC, positive common, optoisolated to 2.5kV. |
| **Input resistance** | 3.3KΩ. |
| **On delay** | 2msec max. |
| **Off delay** | 2msec max. |

## 1.5 Digital Outputs

| | |
|---|---|
| **Output voltage** | 24VDC ±10% transistor (source) darlington, positive common. |
| **Max current** | 100mA, leakage current 100µA. |
| **Max off-state voltage** | 30VDC. |
| **On delay** | 2msec max. |
| **Off delay** | 2msec. |

# 2 Installation

## 2.1 Site Requirements

The mounting location must be a stable surface, free of vibrations, heat or humidity. Avoid direct sunlight on the front of the instrument. The unit should be placed at the correct height to allow easy reading of the display and convenient keyboard operation.

## 2.2 Mounting the Indicator

### 2.2.1 Desktop Model (Aluminum Enclosure)

All connections to the instrument are made through the rear panel connectors. Strain-relief clamps should be used. The shield should be connected to the metal frame of the connector. The rear of the VT300 desktop model is shown in Figure 1.


*Figure 1 – Desktop model, front and rear view*

### 2.2.2 Wall-Mount Model (Stainless Steel Enclosure)

Front and rear views of the unit are shown in Figure 2.


*Figure 2 - Wall-mount model, front and rear views*

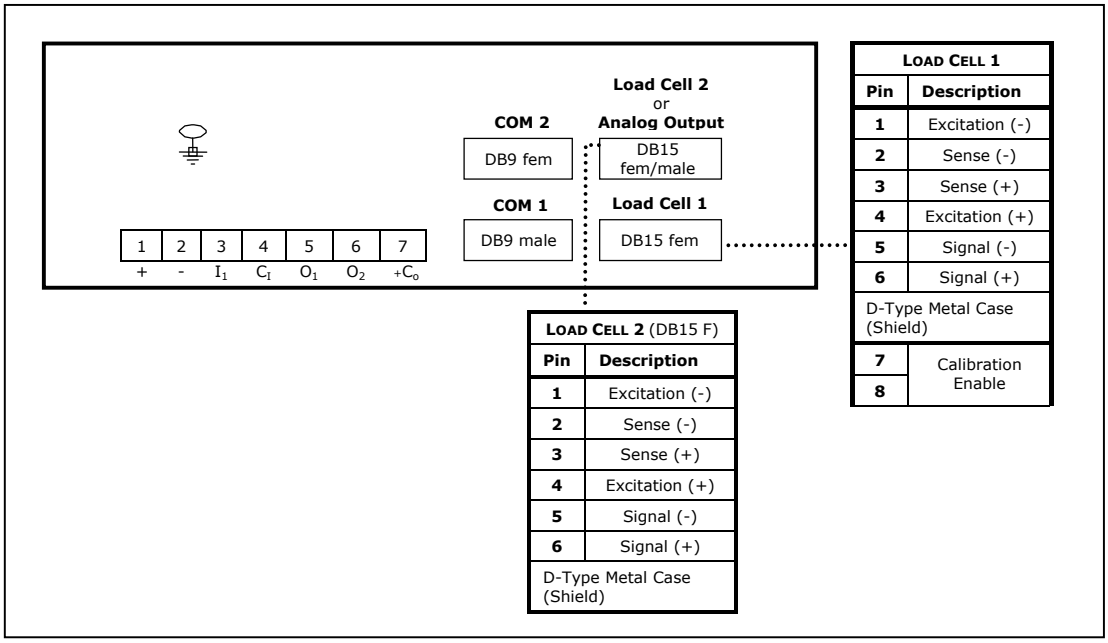
➔ **To connect the indicator to the stainless steel wall-mount:**

1. Remove the rear panel and lift it carefully.
2. Insert the cables via the cable glands. Strip and connect the cables, as detailed in sections 2.3, 2.4 and 2.5.
3. Connect the cable shield, either between the plastic and the metal case of the cable glands, or to the screws supporting the PCBs.
4. Re-install the rear panel.

# 2.3 Connecting Load Cells

## 2.3.1 Desktop Model (Aluminum Enclosure)

Use 6 x 0.5mm$^2$ shielded cable for load cell connections. Connect the load cells according to the diagram below.




| LOAD CELL 1 | |
|---|---|
| **Pin** | **Description** |
| **1** | Excitation (-) |
| **2** | Sense (-) |
| **3** | Sense (+) |
| **4** | Excitation (+) |
| **5** | Signal (-) |
| **6** | Signal (+) |
| D-Type Metal Case (Shield) | |
| **7** | Calibration Enable |
| **8** | |

| LOAD CELL 2 (DB15 F) | |
|---|---|
| **Pin** | **Description** |
| **1** | Excitation (-) |
| **2** | Sense (-) |
| **3** | Sense (+) |
| **4** | Excitation (+) |
| **5** | Signal (-) |
| **6** | Signal (+) |
| D-Type Metal Case (Shield) | |

*Figure 3 – Load cell connection diagram for desktop model*

## 2.3.2 Wall-Mount Model (Stainless Steel)

Use 6 x 0.5mm$^2$ shielded cable for load cell connections. Connect the load cells according to the diagram below.

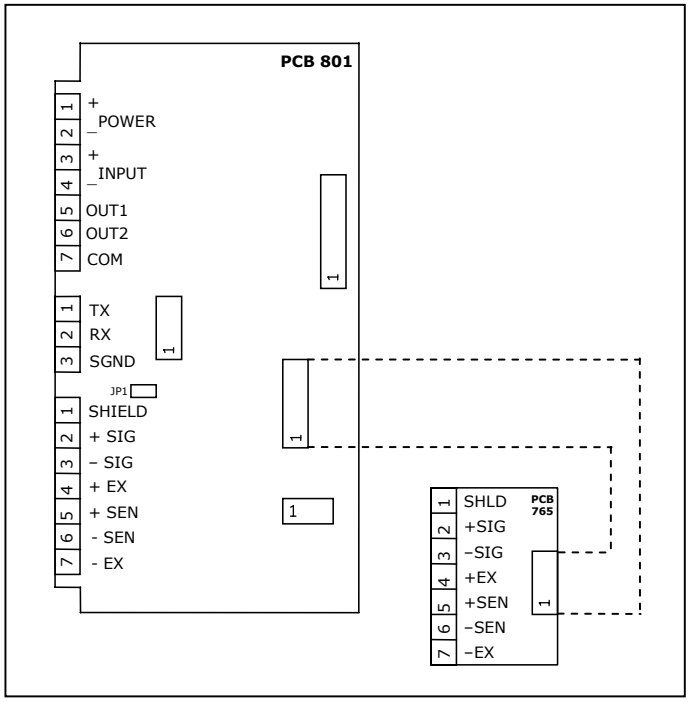



*Figure 4 – Load cell connection diagram for wall-mount model*

## 2.3.3 Load Cell Operating Parameters

The load cell utilization ranges are listed in the table below.

| | |
|---|---|
| **Excitation** | 5VDC, fixed or alternating polarity (setup-selectable) for 10 load cells of 350Ω each. |
| **Gain / input ranges** | • For load cell output of 10mV, gain permitted is between -0.25 and 1.75mV/V.<br>• For load cell output of 20mV, gain permitted is between -0.25 and 3.75mV/V.<br>The load cells must be chosen so that the input signal to the controller is at least 0.4µV per scale increment. For load cell output less than 0.4µV/digit, the controller will still be stable but the full temperature range accuracy is not guaranteed. |

Do not run signal cables together with power cables. Connect the shielding only where indicated in the drawing. Never use a Megger to check wiring. Never use plastic insulating tape on load cell connections.

# 2.4 Serial Connections

- For RS232C connection, use 3 x 0.34mm$^2$ shielded cable.
- For RS485 connection, use 2 x 0.34mm$^2$ shielded twisted pair cable.

## 2.4.1 Printer and PC Cables

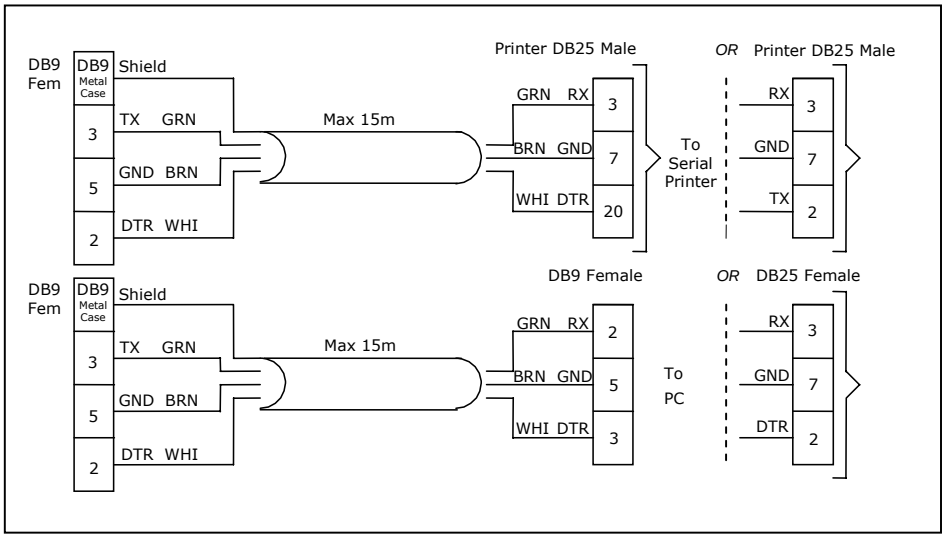



*Figure 5 – Printer and PC cables connection diagram*

Only the aluminum enclosure has a DB9 connector. The steel enclosure has a screw terminal on the internal card, to which you should attach the individual wires.

## 2.4.2 RS485 Cable Connections

The terminal block on the RS485 board enables connecting two pairs of wires (A, B):

- One wire pair for connecting the incoming cable.
- A second wire pair for a daisy-chain connection to the next unit on the RS485 bus.

The RS485 cabling configuration is illustrated in Figure 6 below.

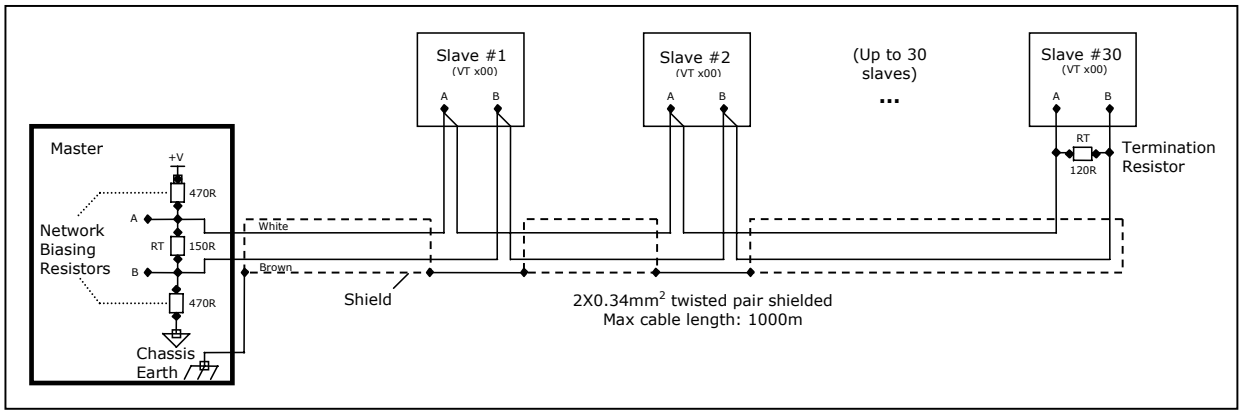



*Figure 6 – RS485 cable connection diagram*

# 2.5 Connecting Power

VT300 indicators are powered by 85-265VAC, via an internal power supply board. The mains power cable is supplied with the instrument.

Power should be isolated from other data processing equipment.

Verify that the AC power socket outlet is properly protected. For optimum EMC performance, keep the length of cable shielding inside the enclosure as short as possible.

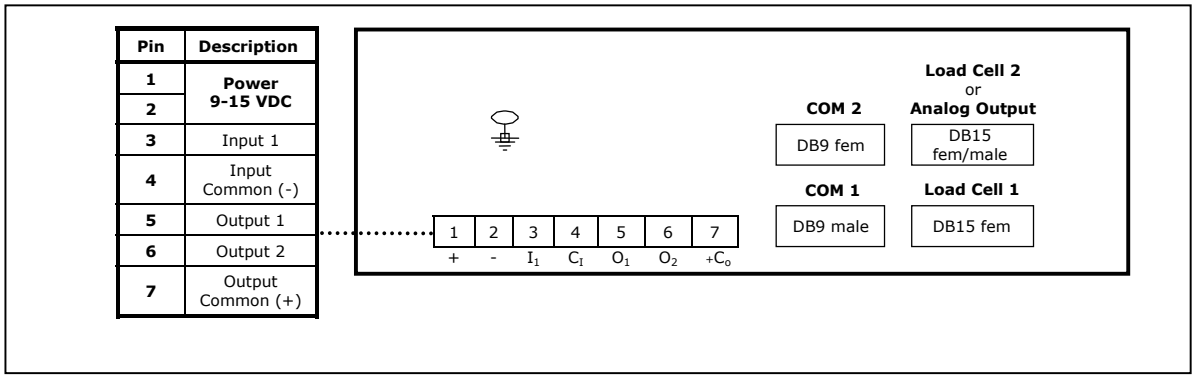
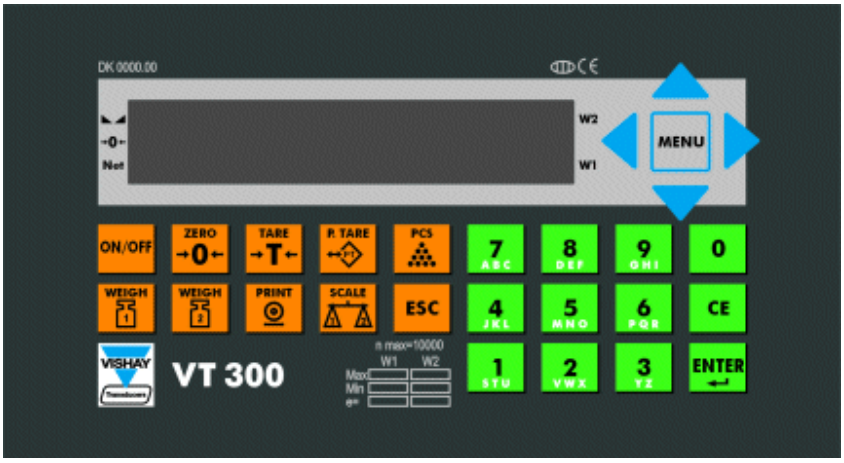



*Figure 7 – Power cable connection diagram*

# 3 Display, Keys and Menus




The VT300 front panel can be divided into four areas:

- A sixteen-character dot matrix display shows weight information, status information, and the names of menus and functions.
- The function keypad, with ten orange keys, allows you to turn the unit on and off and perform the most common operations.
- A navigation area (to the right of the display) allows you to access and navigate the menu, which contains more advanced operations.
- An alphanumeric keypad, with 12 green keys, allows you to enter numbers and letters.

## 3.1 The Display

The VT300 has an LCD display. There are three status annunciators on the left of the display and two more on the right of the display. Small dots (*status annunciators*) may appear next to one or more of these, to show status information such as whether the scale has been tared or not.

### 3.1.1 Status Annunciators

There are several icons at the left of the display. A dot shows up next to these to indicate the current status of the scale or indicator. Status annunciators are often important to understand what is being shown on the display.

| | | |
|---|---|---|
| ◣◢ | **Stable** | Active – the scale is stable (necessary for **ZERO**, **T** and **PRINT**).<br>Inactive – the scale is not stable. |
| -0- | **Center of Zero** | Active – the current weight is at center of zero (or at manual zero).<br>Inactive – the scale is above or below center of zero. |
| NET | **Net Weight** | Active – the display is showing net weight.<br>Inactive – the display is showing gross weight. |
| **S1** | **Scale 1** | Appears on the right of the display to show that the indicator is set to scale 1. |
| **S2** | **Scale 2** | Appears on the right of the display to show that the indicator is set to scale 2. |
| **S0** | **Sum of Scales** | Appears on the right of the display to indicate that the display shows the sum of the weight on scales 1 and 2. |
| **W1** | | The scale is currently in weight range 1. |
| **W2** | | The scale is currently in weight range 2. |

### 3.1.2 Common Messages Shown on the Display

| Message type | Meaning |
|---|---|
| `352.0` | **Weight of the item** on the scale. |
| `24509` | **Approximate number of units** on the scale. |
| `319.0`<br>(NET active) | **Net weight**, or number of units calculated after subtracting the container's weight. |
| `OVER RANGE` | **Over range.** The item on the scale weighs more than the maximum capacity of the scale, or the load cell signal is too high. |
| `UNDER RANGE` | **Under range.** The item on the scale weighs less than the minimum capacity of the scale, or the load cell signal is too low. |
| `E15: PWRUP ZERO` | **An error has occurred** (see section 10.1.1). In some cases, you can ignore the error and continue working by pressing **ESC**. |
| `xxxxxx` | **Software model number**, shown during the power-up sequence. |
| `xxxxxx` | **Software version issue date**, shown during the power-up sequence. |
| `ZERO SCALE` | **Automatic zeroing**, performed at the end of the power-up sequence. |

Other types of messages may be shown when you perform specific operations, such as editing the tare value or displaying battery status.

# 3.2 Front Panel Keys

The keys on the VT300 front panel can serve two functions:

- Performing common operations and accessing the menu.
- Entering alphanumeric information.

## 3.2.1 Using Keys to Perform Operations

| Key | Description | Related operations | Refer to |
|---|---|---|---|
|   | Press to zero the scale*. Only works within the zero range. | Manual zeroing | User's Guide, section 3.1 |
|   | Press once to tare the scale*. Press again to view gross weight. | Taring using current weight | User's Guide, section 3.2 |
|   | Press to enter a preset tare. Enter the tare value using the alphanumeric keypad and press **ENTER**. To cancel and view gross weight, press **ESC**. | Preset tare | User's Guide, section 3.3 |
|   | When you press this key, the current weight* is printed to the printer, output to an attached computer, and added to the accumulated total. | Printing | Section 6.2.1 |
|   | Press to switch between Weighing Mode and Counting Mode. | Counting pieces, weighing | User's Guide, chapters 4, 6 |
|   | Press to turn the indicator on, or to switch it off when it is running. | Starting the indicator | - |
|   | Press to perform a first weighing of a vehicle with unknown tare. | Weighing, printing | User's Guide, section 5.1.2 |
|   | Press to weigh a vehicle with known tare, or to perform a second weighing. | Weighing, printing | User's Guide, chapter 5 |
|   | Toggles between scale 1, scale 2 and the sum of both scales (if two scales are connected). | Two-scale operation | - |
|   | Enters the menu. The arrows around this button allow you to navigate the menu. | | Section 3.3 |
|   | Cancels the current operation, exits a menu or exits a mode. | - | - |

* If the scale is not stable, the current weight cannot be used for this operation.

### 3.2.2 Using Keys to Enter Information

| Key | Description |
|---|---|
| 0-9 | Press a key to enter a digit. When you enter a second digit, the first digit moves to the left and the new digit takes its place. If you make a mistake, press **CE** to clear the display.<br>Press a key twice or more, quickly, to toggle the letters assigned to that key. For example, to enter the letter 'b', press **7 / abc** three times quickly (the first time shows the number 7). To enter 'c', press **7 / abc** four times. |
|  | Confirms the current operation or the information entered. |
|  | Clears the characters entered. |

## 3.3 The Menu

The menu, accessed by pressing the **MENU** key (  ), allows you to perform advanced operations like high-resolution weighing, printing and viewing alibi memory.

This subchapter explains how to use the menu and provides a summary of its functions. All operations are explained in more detail further in this document.

### 3.3.1 Using the Menu

➔ **To access a function on the menu:**

1. Press the **MENU** button, located to the right of the display.
2. Use the ▲ and ▼ arrows to scroll through the menu options.
3. Press **ENTER** to drill down into a submenu. You can then use the ▲ and ▼ arrows to scroll through the menu or submenu options.
4. Press **ESC** to return to a higher menu or submenu level.
5. When you reach the desired menu option, press **ENTER** to confirm.

## 3.3.2 Menu Structure and Options Summary

### *Main Menu*

| Menu option | Description | Refer to |
|---|---|---|
| **WEIGH** | Weighing options. | Section 3.3.2, MAIN > WEIGH |
| **VFILE** | V-File and weighbridge options. | Section 3.3.2, MAIN > VFILE |
| **TFILE** | Accumulated total options. | Section 3.3.2, MAIN > TFILE |
| **MISC** | Viewing calibration lock, viewing battery status, switching weight display to high resolution. | Section 3.3.2, MAIN > MISC |
| **SYSTEM** | Editing date, setting PINs, general parameters, calibration, analog output settings, communication settings, ticket customization, weighbridge customization, tilt switch settings, setpoint settings, test operations. | Section 3.3.2, MAIN > SYSTEM |

### *Main > WEIGH*

| Menu option | Submenu option | Description | Refer to |
|---|---|---|---|
| **BATCH WEIGH** | - | Prints a series of truck weighings as a unified ticket. | Section 9.2 |
| **PCS CNT** | - | Switches to Counting Mode. | User's Guide, chapter 6 |
| **SETP** | - | Shows setpoint values and allows editing. | Section 7.3.1 |
| **COPY** | - | Copies last weighing ticket. | User's Guide, section 7.1.1 |
| **ALIBI** | **VIEW** | Shows or prints specific alibi memory records. | User's Guide, section 8.1 |
| | **PRINT** | Prints entire alibi memory. | User's Guide, section 8.2 |
| | **CSUM** | Alibi memory functions. | User's Guide, section 8.3 |

## *Main > VFILE*

| Menu options | Submenu options | Description | Refer to |
|---|---|---|---|
| **PRINT** | **TARE** | Prints all truck tare values. | User's Guide, section 9.2.1 |
| | **FIRST** | Prints all first weighings. | User's Guide, section 9.2.2 |
| | **ALL** | Prints the entire V-File. | User's Guide, section 9.2.3 |
| | **SELECT** | Prints a record for a specific truck. | User's Guide, section 9.2.4 |
| **EDIT TARE** | **-** | Creates a new vehicle record. | User's Guide, section 9.1 |
| **CSUM** | **-** | Checks V-File memory. | User's Guide, section 9.3 |
| **DEL** | **TARE** | Deletes all truck tare values. | User's Guide, section 9.4 |
| | **FIRST** | Deletes all first weighings. | User's Guide, section 9.4 |
| | **ALL** | Deletes the entire V-File. | User's Guide, section 9.4 |
| | **SELECT** | Deletes a record for a specific truck. | User's Guide, section 9.4 |
| **SIZE** | | Shows the number of records stored in the V-File, and space available. | User's Guide, section 9.5 |

## *Main > TFILE*

| Menu option | Description | Refer to |
|---|---|---|
| **STOT** | Subtotal of net weights. Press **PRINT** to print, **CE** to reset. | User's Guide, section 4.3.2 |
| **TOTAL** | Accumulated total of net weights. Press **PRINT** to print, **CE** to reset. | User's Guide, section 4.3.2 |

### *Main > MISC*

| Menu option | Description | Refer to |
|---|---|---|
| **INFO** | Displays the indicator model and serial number. | - |
| **1OIML** | Displays the audit trail counter for scale 1. | Section 4.5.3 |
| **2OIML** | Displays the audit trail counter for scale 2. | Section 4.5.3 |
| **BATTERY** | Displays remaining battery capacity as % of max capacity. | Section 8.1.4 |
| **HIGH RES** | Increases the weight display resolution 10 times. | User Guide, section 4.2 |

### *Main > SYSTEM*

| Menu option | Submenu option | Description | Refer to |
|---|---|---|---|
| **SYSTEM** | **DATE** | Allows editing date, time and serial print number (user password protected). | Section 8.1.2 |
| **PIN** | **PIN SYS** | Setting and changing system password. | Section 8.1.1 |
| | **PIN OPER** | Setting and changing operator password. | Section 8.1.1 |
| **PRP** | | Contains one parameter: **S.EMPTY**. | Chapter 5 |
| **1CAL** | **PAR** | Scale 1 parameters, including number of display digits, position of decimal points, A/D gain, zero range. | Section 5.2 |
| | **ZERO** | Dead-load calibration (standard or electronic) for scale 1. | Sections 4.2.1, 4.3.2 |
| | **SPAN** | Maximum weight calibration (standard or electronic) for scale 1. | Sections 4.2.2, 4.3.3 |
| | **INIT** | Resets calibration parameters for scale 1. | Section 8.1.3 |
| | **WRITE** | Stores scale 1 calibration parameters in persistent memory. | Section 4.4 |
| **2CAL** | **PAR** | Scale 2 parameters. | Section 5.2 |
| | **ZERO** | Dead-load calibration for scale 2. | Sections 4.2.1, 4.3.2 |
| | **SPAN** | Maximum weight calibration for scale 2. | Sections 4.2.2, 4.3.3 |
| | **INIT** | Resets calibration parameters for scale 2. | Section 8.1.3 |
| | **WRITE** | Stores scale 2 calibration parameters in persistent memory. | Section 4.4 |

## *Main > SYSTEM (cont.)*

| Menu option | Submenu option | Description | Refer to |
|---|---|---|---|
| **D/A CAL** | **-** | Analog output parameters, including current/voltage, net/gross, resolution. | Section 7.4.2 |
| **SET** | **OPER** | Operational parameters, including data format, display brightness, custom print formats enable/disable, totalizer enable/disable. | Section 5.3 |
| | **1COM** | Output format and parameters for communication port 1. | Section 6.2.1 |
| | **2COM** | Output format and parameters for communication port 2. | Section 6.2.2 |
| | **INIT** | Resets all parameters in the **SET** menu. | Section 8.1.3 |
| | **FORM (DOWNLOAD, DEFAULT)** | Downloads custom ticket formats and resets ticket formats to default. | Section 6.5 |
| | **REFR (EDIT)** | Allows viewing and editing weighbridge descriptions. | Section 9.1 |
| | **TILT** | Tilt switch settings. | Section 7.5 |
| | **SETP** | Allows viewing and editing setpoint values (both setpoints). | Section 7.3.1 |
| | **LOCK KEY** | Allows locking and unlocking keys on the keypad. | Section 8.1.8 |
| **TEST** | **A/D** | Shows A/D converter count. | Section 8.1.7 |
| | **CVM** | Shows load cell mV output. | Section 8.1.6 |
| | **I/O** | Tests outputs and digital input. | Section 8.2.3 |
| | **KBD** | Tests keypad. | Section 8.2.2 |
| | **LCD** | Tests display. | Section 8.2.2 |
| | **MEM** | Tests ROM/RAM integrity. | Section 8.2.1 |
| | **PORT** | Tests communication ports. | Section 8.2.4 |

# 4 Calibration

Before you can calibrate the scale, you must ensure that jumper JP1 is not in the sealed position (see section 4.5). You must also select a calibration method, using the **CAL MODE** scale parameter (see section 4.1). The following methods are available:

- Standard weights calibration, in which you record the center of zero, and then place a known weight on the scale and enter its weight (see section 4.2).
- Electronic calibration, in which you enter the mV value of the minimum and maximum weight (see section 4.3).

Calibration (either standard or electronic, depending on your **CAL MODE** selection) is performed using the **SYSTEM** > **1CAL** or **SYSTEM** > **2CAL** menu.

If you have two scales connected to the indicator, each scale has its own calibration parameters; all the parameters in the **1CAL** menu relate to scale 1, while all the parameters in the **2CAL** menu relate to scale 2.

After calibrating the scale, you must store calibration data in persistent memory (see section 4.4), and seal the calibration lock (see section 4.5).

## 4.1 Selecting Calibration Method

Before calibrating the scale, you should select the calibration method – standard or electronic – using the instructions below.

➔ **To select a calibration method:**

1. Press **MENU** and navigate to the **SYSTEM** > **1CAL** > **PAR** menu. Or, if you want to set the calibration method for scale 2, navigate to **SYSTEM** > **2CAL** > **PAR**.
2. Scroll through the parameters until you reach **CAL MODE**. Press **ENTER**.
3. Use ▲ and ▼ to select one of the options:
   - **WEIGHT** – standard weight calibration.
   - **ELECTR** – electronic calibration.
4. Press **ENTER** to confirm your selection.
   - If you selected **WEIGHT**, proceed to section 4.2 to perform standard calibration.
   - If you selected **ELECTR**, proceed to section 4.3 to perform electronic calibration.

# 4.2 Calibration with Standard Weights

To perform calibration with standard weights, you must set the **CAL MODE** scale parameter to **WEIGHT** (see section 4.1).

Calibration with standard weights is done in two stages:

- Zero calibration, in which you take a weight measurement when there is nothing on the scale (see section 4.2.1). This is also called dead-load adjustment.
- Span calibration, in which you place a known weight on the scale, and manually enter its correct weight (see section 4.2.2).

You must perform both of the above for the scale to be calibrated properly.

After calibrating the scale, you must save the values in permanent memories by entering the setup menus and selecting the **WRITE** option (see section 4.4). It is also advised to lock calibration (see section 4.5).

## 4.2.1 Zero (Dead-Load) Calibration

➔ **To perform zero calibration:**

1. Press **MENU** and navigate to **SYSTEM** > **1CAL** > **ZERO**. Or, if you wish to calibrate scale 2, navigate to **SYSTEM** > **2CAL** > **ZERO**.
2. Press **ENTER**. The display shows `EMPTY SCALE`. Clear the scale, and wait about 10 seconds.
3. Press **ENTER** to record the zero position. The display shows `WAIT…` as 64 measurements are taken and an average calculated. This should take about 10 seconds.
4. The display should now show `0`. If the zero point is not accurate, press **ESC** and go back to step 1.

## 4.2.2 Span Calibration

➔ **To perform span calibration:**

1. Press **MENU** and navigate to **SYSTEM** > **1CAL** > **SPAN**. Or, if you wish to calibrate scale 2, navigate to **SYSTEM** > **2CAL** > **SPAN**.
2. Press **ENTER**. The display shows `WEIGHT`, followed by the maximum capacity of the scale. Enter the correct calibration weight using the numeric keypad.
3. Press **ENTER** to confirm the calibration weight. The display shows `LOAD SCALE`.
4. Place the calibration weight on the scale, and wait about 10 seconds.
5. Press **ENTER**. The display shows `WAIT…` as 64 measurements are taken and the span coefficient calculated. This should take about 10 seconds.
6. Span calibration is now complete. If the weight shown is not accurate, press **ESC** and go back to step 1.

# 4.3 Electronic Calibration (E-CAL)

To perform electronic calibration, you must set the **CAL MODE** scale parameter to **ELECTR** (see section 4.1).

Electronic calibration involves setting two values, using the indicator keypad:

- The signal level in mV, corresponding to the zero, or dead-load point (see section 4.3.2).
- The signal level in mV, corresponding to the maximum capacity of the scale (see section 4.3.3).

To learn how to calculate these values from the load cell specifications provided by the manufacturer, see section 4.3.1 below. You must perform both of the above for the scale to be calibrated properly.

After calibrating the scale, you must save the values in permanent memories by accessing the calibration menu and selecting **WRITE** (see section 4.4). It is also advised to lock calibration (see section 4.5).

## 4.3.1 Calculating Calibration Values

Consider the following example. A scale has maximum capacity 30/60kg, e=0.010/0.020kg, with 4 load cells, each with rated capacity 50kg (2mV) and dead load 1.940kg. The load cell data, as noted in the manufacturer data sheet, is shown in the following table.

| Load cell | Output at 50kg | Zero balance |
|---|---|---|
| L/C1 | 1.9793mV | 0.0257 mV |
| L/C2 | 1.9392mV | 0.0276 mV |
| L/C3 | 1.9577mV | 0.0553 mV |
| L/C4 | 1.9640mV | -0.0022 mV |

➔ **To calculate the dead-load and span calibration values:**

1. Calculate an average of the load cells' rated output. In the example above, this equals (1.9793+1.9392+1.9577+1.9640)/4=1.9600mV.
2. Calculate the combined output of the load cells when the scale is at maximum capacity. In the example above, this equals 1.9600x60/4x50=**0.5880mV**. This is the *span calibration value*.
3. Calculate an average of the load cells' zero balance. In the example above, this equals [0.0257+0.0276+0.0553+(- 0.0022)]/4=0.0266mV.
4. Calculate the scale dead-load. In the example above, this equals 1.9600mV*[1.940Kg/(4*50Kg)]=0.0190mV.

5. Calculate the overall dead-load by adding together the load cell zero balance and the scale dead-load (calculated in step 4). In the example above, this equals 0.0266+0.0190=**0.0456mV**. This is the *dead-load calibration value*.

### 4.3.2 Setting Zero Calibration (Dead-Load) Value

➔ **To set the zero calibration value electronically:**

1. Press **MENU** and navigate to **SYSTEM** > **1CAL** > **ZERO**. Or, if you wish to calibrate scale 2, navigate to **SYSTEM** > **2CAL** > **ZERO**.
2. Press **ENTER**. The display shows `DEAD LOAD: 00000`.
3. Enter the overall mV of the dead-load, using the numeric keypad (see section 4.3.1 to learn how to calculate it).
4. Press **ENTER** to record the zero calibration value. The display shows the corresponding weight.

### 4.3.3 Span (Max. Capacity) Calibration

➔ **To set the span calibration value electronically:**

1. Press **MENU** and navigate to **SYSTEM** > **1CAL** > **SPAN**. Or, if you wish to calibrate scale 2, navigate to **SYSTEM** > **2CAL** > **SPAN**.
2. Press **ENTER**. The display shows `L/C OUT: 00000`.
3. Enter the overall mV of the scale's maximum capacity, using the numeric keypad (see section 4.3.1 to learn how to calculate it).
4. Press **ENTER** to confirm the maximum capacity calibration value. The display shows the corresponding weight.

## 4.4 Storing Calibration Data

After calibrating the scale (using either standard or electronic calibration), calibration data is stored in volatile memory only, and so it is lost when the indicator powers down. To store the calibration data permanently, follow the procedure below.

➔ **To store calibration data:**

1. Press **MENU** and navigate to **SYSTEM** > **1CAL** > **WRITE**. Or, if you calibrated scale 2, navigate to **SYSTEM** > **2CAL** > **WRITE**.
2. Press **ENTER**. The display shows `O.K.?  AE=Y , CE=N`.
3. Press **ENTER** to confirm. Calibration data is stored in persistent memory, and the indicator restarts.

# 4.5 Locking and Unlocking Calibration

An internal jumper (JP1, located on the main printed circuit board next to the analog circuit) must be removed to allow access to configuration and calibration parameters. One way to seal the indicator is to prevent access to this jumper. This is done by placing a brittle plastic sticker over one of the screws that keeps the cabinet closed.

The indicator also has an *Audit Trail Counter*, which is incremented every time weight parameters or calibration data are changed, regardless of whether the change was saved in EEPROM or not. This counter allows the authorities to check if any calibration attempt has been made since the last inspection.

A label with an inscribed count (all digits are permanently printed and suffixed by a hyphen) is placed on the rear side of the instrument. The label is designated `CAL-Nr`, and may not be removed without destroying it.

Seals bear the verification mark of a notified body, or an alternative mark of the manufacturer, according to Annex II, section 2.3 of Directive 90/384/EEC.

## 4.5.1 Sealing Indicator Enclosure with Stickers

After calibration, you can seal the indicator with two stickers:

- A non-removable label, to prevent unauthorized opening of the indicator enclosure (Figure 8)
- A lead wire seal or hard plastic sticker, to prevent unauthorized tampering with the load cell connector (Figure 9)


*Figure 8 – Non-removable sticker*


*Figure 9 – Lead wire seal / hard plastic sticker*

➔ **To seal the indicator:**

- For the wall-mount (stainless steel) model, refer to Figure 10 below.

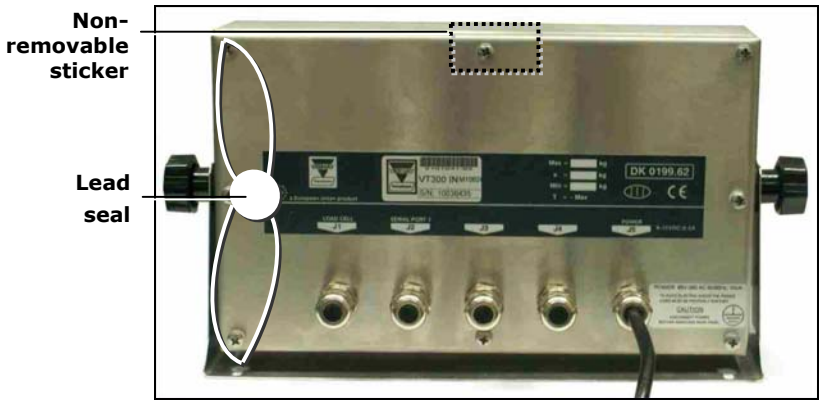



*Figure 10 - Wall mount model, sealing instructions*

- For the desktop (aluminum) model, either apply a non-removable sticker to the load cell connector and to the left edge of the front panel; or fix a lead seal to the load cell connector on one end, and to the left edge of the front panel on the other end.

### 4.5.2 Securing Load Receptor

You can inscribe the serial number of the load receptor as part of the indicator identification label.

The load receptor bears the serial number of the indicator on its data plate.

### 4.5.3 Checking Seal Status and Audit Trail Counter

In order to check whether the jumper is still in the sealed position, and that the audit trail counter has not changed.

➔ **To check seal status and audit trail counter:**

1. Press **MENU** and navigate to **MISC** > **1OIML**. Or, if you want to check scale 2, navigate to **MISC** > **2OIML**.
2. Press **ENTER**. If JP1 is currently in the sealed position, the word SEALED appears on the display briefly. Following this, the audit trail counter is displayed.

# 5 General System Parameters

Several submenus in the **SYSTEM** menu provide access to general system parameters, which affect how the scale operates:

- The **SYSTEM** > **1/2CAL** > **PAR** menu contains parameters including the number of display digits, the position of the decimal point, the A/D gain and the zero range (see section 5.2).
- The **SYSTEM** > **SET** > **OPER** menu contains parameters that effect user operations. For example, if allows you to enable and disable the totalizer and alibi memory storage; specify LCD brightness; specify auto power-off time delay, etc. (see section 5.3).
- The **SYSTEM** > **PRP** menu contains one parameter, **S.EMPTY**. This parameter defines the maximum weight, in kilograms, that will be considered as "empty" by the indicator.

If you have two scales connected to the indicator, parameters you define in the latter two menus (OPER and PRP) apply to both of them. Parameters you define in **SYSTEM** > **1CAL** > **PAR** refer to scale 1 only, and parameters defined in **SYSTEM** > **2CAL** > **PAR** refer to scale 2 only.

Other menus allow you to calibrate the scale (see chapter 4); set communication parameters (see chapter 6); and set input/output parameters (see chapter 7).

## 5.1 Editing Parameters

➔ **To edit parameters in one of the menus:**

1. Press **MENU** and navigate to the menu you need, using ▲ and ▼. To enter the menu press **ENTER**. To return to a higher menu press **ESC**.
2. The names of parameters are shown on the display. Use ▲ and ▼ to scroll to the parameter you wish to edit.
3. To edit the parameter, do one of the following:
   - If the parameter has two or more preset values, the display will show the current value (e.g. YES). Use ◄ and ► to scroll to the value you need, and press **ENTER** to confirm it.
   - If the parameter is numeric, enter a new value using the numeric keypad. Press **ENTER** to confirm the new value.
4. If the parameter is in the **1CAL** > **PAR** or **2CAL** > **PAR** menu, you must perform a **WRITE** operation to save the new settings to persistent memory (see section 4.4).

# 5.2 SYSTEM > 1/2CAL > PAR Menu

| # | Parameter | Description | Values |
|---|---|---|---|
| 00 | 2SCL ENABLE (only appears in **1CAL** menu) | **Scale 2 enable.** Activates the second scale input. This option only appears in the 1CAL menu. If set to NO, parameters in the **2CAL** menu are ignored. | YES, NO |
| 01 | S1+S2 ENABLE (only appears in **2CAL** menu) * | **Sum of two scales.** YES specifies that the SCALE key should toggle between scale 1 weight, scale 2 weight and the sum of both scales. NO specifies that the SCALE key should only toggle between scale 1 weight and scale 2 weight. | YES, NO |
| 02 | DISP.DIGITS | **Number of display digits**. | 4, 5, 6 |
| 03 | DEC.POINT * | **Number of digits after decimal point**. Defines the position of the decimal point. | 0-5 |
| 04 | SCALE DIV. * | **Display resolution**. | 1, 2, 5, 10, 20, 50, 100, 200 |
| 05 | WEIG.RANGE | **Two most significant digits of full load**. | 00-99 |
| 06 | DIG. FILTER | **Digital filter**. If x is entered, filter averages $2^x$ samples. 0 is considered low, 3 is normal and 5 is high. | 0-5 |
| 07 | CONV. RATE * | **Number of conversions per second**. If there are two scales connected, the sum of their conversion rates (6P+6P) must be less than 70. Otherwise the unit sets CONV.RATE=14 for each scale. | 3, 7, 14, 28, 57, 70 |
| 08 | MOTION SAMPLES | **No-motion samples.** Number of samples for no-motion detection. 1 is considered low; 7 is considered high. | 1-7 |
| 09 | AUTO Z TRACK | **Auto-zero tracking**, with a maximum of 0.5 display divisions per second. | YES, NO |
| 10 | INIT ZERO | **Auto-zero at power up**. If enabled, sets the instrument to zero on power-up. It the starting weight is outside the zero range, `E.15` is displayed (see chapter 10). | YES, NO |
| 11 | DUAL FILTER | **Dual digital filter** (anti-flicker). The digital filter increases automatically when the scale is not in motion. | YES, NO |
| 12 | A/D AUTO CON | **Automatic clearing of A/D converter errors**. NO specifies that, when the A/D converter is enabled, errors are automatically cleared when the cause is no longer present. YES specifies that A/D converter errors should remain on the display until the operator presses **ESC**. | YES, NO |
| 13 | BATTERY | **Battery conversion.** Enables battery conversion, for battery-powered models. | YES, NO |

SYSTEM > 1/2CAL > PAR Menu

| # | Parameter | Description | Values |
|---|---|---|---|
| 14 | LEAD Z BLANK | **Leading zero blank**. Enables and disables leading zeroes in the display. | YES, NO |
| 15 | A/D GAIN | **Load cell amplifier gain adjustment (A/D Gain)**<br>2mV/V setting allows maximum utilization of 1.75mV/V.<br>4mV/V setting allows maximum utilization of 3.75mV/V. | 10=2mV/V<br>(1.75mV/V utilization)<br>20=4mV/V<br>(3.75mV/V utilization) |
| 16 | AC EXC. | **AC/DC excitation.**<br>YES specifies polarity should be switched at a rate determined by the conversion rate. Switching excitation results in a more stable zero.<br>NO sets load cell excitation to DC. | YES=AC<br>NO=DC |
| 17 | ZERO RANGE | **Zero range**. The zero range can be set to 2% or 10% of maximum capacity. | 2%, 10% |
| 18 | DUAL MODE * | **Dual interval or range**.<br>INTERV specifies that the lower display division should be selected at the defined internal value.<br>RANGE specifies that the lower display division should be selected at zero weight. | INTERV, RANGE |
| 19 | DUAL RANGE | **First two digits defining the limit between the two ranges** where the lower display division will be selected automatically (Max1). | 00 - 99 |
| 20 | PR. BELOW MIN | **Do not print weights below minimum.**<br>YES specifies that weights below 20 scale divisions should not be printed.<br>NO specifies that weights below 20 scale divisions should be printed. | YES, NO |
| 21 | CAL MODE | **Calibration method.** Sets calibration to standard weights (WEIGHT) or electronic (ELECTR). This affects the calibration dialogs **1/2CAL** > **ZERO** and **1/2CAL** > **SPAN**. | WEIGHT, ELECTR. |
| 22 | UNIT SELECT | **Unit selection.** Specifies unit used for measurement: kilograms or pounds. | KG, LB |

* Refer to Section 5.2.1 for how to set parameters when using two scales.

### 5.2.1 Dual-scale Connecting And Parameter Settings

➔ **To connect and set up VT300 for dual-scale operations:**

1. Set parameter **2SCL ENABLE(00)** to YES, **DUAL RANGE(19)** to 00, and **CONV.RATE (07)** to a value less than 70.
2. Ascertain that the first scale is calibrated and working properly.
3. Connect the second scale to **ST5**, 7 pins socket in the one side and in the other side using the mounting posts/spacers provided to:
   **Stainless Steel Enclosure** – The main board.
   **Aluminum Enclosure** – To the indicator's rear panel.
4. Ascertain that the Scale 2 values for parameters **DEC.POINT (02)** and **SCALE.DIV (03)** are the same as those for Scale 1.
5. After checking that the **S2** annunciator is on,(switching with the **SCALE** key) calibrate the second scale.
6. The device is now ready to work in dual-scale mode.
7. Use the **SCALE** key for switching between Scale1(**S1** on the display) , Scale2(**S2** on the display) or sum of Scale1 and Scale2(**S0** on the display).

## 5.3 SYSTEM > SET > OPER

| # | Parameter | Description | Values |
|---|---|---|---|
| 01 | TOTALIZING M | **Enable totalizer**. YES enables the accumulated total function for users. NO disables it. | YES, NO |
| 02 | WEIGHING MEM | **Store first weighing in memory.** If set to NO, first weighing information is discarded and cannot be accessed through the **FIRST** submenu in the **VFILE** menu. | YES, NO |
| 03 | REFR CODE | **Number of descriptions for weighbridge operations.** Specifies the number of descriptions (reference codes) the user is prompted for during first and second weighings. By default these are VEHICLE, CLIENT and PRODUCT.<br>If set to 0, weighbridge descriptions are disabled altogether. In any event, only the first two descriptions are stored in memory. | 0-4<br>0=disable descriptions |
| 04 | CODE MEM | **Remember last weighbridge description.** Specifies whether or not the first and second weighing dialogs should display, for each description such as VEHICLE and CLIENT, the value entered by the user in the previous weighing operation. | YES, NO |

SYSTEM > SET > OPER

| # | Parameter | Description | Values |
|---|---|---|---|
| 05 | WAIT UNLOAD | **Wait for weight to unload before printing again.**<br>YES specifies that after printing, the indicator should not allow the user to print again, until the scale has been unloaded.<br>NO specifies that the user should be able to print again, even if the scale has not been unloaded. | YES, NO |
| 06 | 1stW PRINT | **Print first weighing ticket automatically.**<br>YES specifies that the first weighing data should be automatically printed.<br>NO specifies that the user should be prompted to print the first weighing ticket, and will have the option of canceling the printing.<br>Regardless of what is selected here, first weighing data is saved to memory, unless **WEIGHING MEM**=NO. | YES, NO |
| 07 | USER FORMS | **Custom weighbridge descriptions and printing formats.**<br>YES specifies that service personnel should be able to define custom weighbridge descriptions (reference codes) and custom print formats.<br>NO specifies that only the default weighbridge descriptions and print formats should be available. | YES, NO |
| 08 | KEY IN TIME | **Time for character selection entry** (in 0.1 seconds).<br>00 disables alpha characters. | 0-99 |
| 09 | BRIGHTNESS | **LCD backlight brightness.** Low is the least bright, MID1 is brighter, MID2 is brighter still, HIGH is brightest. | LOW, MID1, MID2, HIGH |
| 10 | DATE FORMA | **Date format.** Select either day-month-year (D-M-Y) or month-day-year (M-D-Y). In either case, the numbers in the date will be separated by hyphens ("-"). | D-M-Y, M-D-Y |
| 11 | AUTO PWR OFF | **Power off interval.** Specifies the idle time, in minutes, that should pass before the indicator automatically switches itself off. | 00-99<br>00=disable power off |

# 6 Serial Communication

## 6.1 Serial Ports Configuration

VT300 has two serial ports, designated port 1 and port 2. Port 1 is an RS232 port. Port 2 is an optional port installed on order, and can be either RS232 or RS485.

### 6.1.1 RS232 Serial Port

The port is used to connect to serial printers or personal computers.

| | |
|---|---|
| **General** | Asynchronous serial ASCII, RS232C standard, full duplex. |
| **Protocol** | 2400 baud, 1 start, 7 data/even parity or 8 data/no parity, 1 stop bit.<br>**OR** transmit only, 9600 baud, 1 start, 7 data/even parity or 8 data/no parity, 1 stop bit. |
| **Handshake** | DTR BUSY per character for fanfold printers or REQUEST PAPER END STATUS for EPSON TM-295 slip printer. |
| **Connection** | Cable gland: stainless steel enclosure or DB9 male on rear panel, aluminum enclosure (J1 or J3). Three-conductor shielded cable, max distance 15m.<br>Tx = Pin 3<br>Rx/DTR = Pin 2<br>GND = Pin 5 |

### 6.1.2 RS485 Serial Port

Used to connect to a host computer, remote printer, remote display, etc.

| | |
|---|---|
| **General** | Asynchronous serial ASCII, RS485 half duplex. |
| **Protocol** | 2400 to 57600 baud, 1 start, 7 or 8 data, 1 even parity, 1 stop bit. |
| **Connection** | Cable gland: stainless steel enclosure or DB9 female on rear panel, aluminum enclosure (J3). Two-conductor twisted-pair shielded cable, max distance 1000m. A termination resistor 120R may be connected by shorting pins 8 and 9.<br>A = Pin 6<br>B = Pin 7 |

# 6.2 Setting Port Output

## 6.2.1 Setting Port 1 Output

You can use menu path **SYSTEM** > **SET** > **1COM** > **OPERATION** to determine the output for port 1. The following options are available:

- **TICK 3** – Printer mode. The printer driver is selected using menu path **SYSTEM** > **SET** > **1COM** > **PRN TYPE**.

To learn more about the standard ticket formats printed in **TICK 3** mode, see section 6.4. To learn how to customize these formats, see section 6.5.

- **W.OUT** – continuous weight output. See section 6.3.1.
- **W2OUT** – continuous weight output with dual scale operation. See section 6.3.2.
- **ALIBI** – transmit alibi memory. See section 6.3.4.
- **9600T** – set baud rate to 9600, transmit only.
- **NONE** – deactivate the port.

The **1COM** menu has additional parameters related to port 1 output, detailed below.

| Parameter | Description | Values |
|---|---|---|
| PARITY/DATA | **Parity bits.** Specifies whether there should be even parity with 7 data bits (E7) or no parity (E8). | E7, E8 |
| PRN TYPE | **Printer type.** Specifies which type of printer is connected to the indicator: Epson FX (EP-FX or other similar serial printer) or TM-295. | EP-FX, TM-295 |
| ERROR CTRL | **Printer error display.**<br>YES specifies that printer errors (DTR) should be displayed and acknowledged by the user.<br>NO specifies that errors should be ignored. You must set this parameter to NO for communication with a PC. | YES, NO |
| ADDRESS | **Port 1 network address.** Used in alibi mode. This can be different from the address set in **2COM** > **M/S**. | |

### 6.2.2 Setting Port 2 Output

You can use menu path **SYSTEM** > **SET** > **2COM** > **OPERATION** to determine the output for port 2. The following options are available:

- **W.OUT** – continuous weight output. See section 6.3.1.
- **W2OUT** – continuous weight output with dual scale operation. See section 6.3.2.
- **A.OUT** - continuous weight output with tare. See section 6.3.3.
- **NONE** – Port is disabled.
- **EDP** – EDP protocol output. See section 6.3.6.
- **R.PRN** – printing data from the local printer on a remote printer. See section 6.3.7.
- **M/S A-Y** [A=network address] – participate in a network of several indicators as slave, with this address. See section 6.3.8.

The **2COM** menu has additional parameters related to port 2 output, detailed below.

| Parameter | Description | Values |
|---|---|---|
| PARITY/DATA | **Parity bits.** Specifies whether there should be even parity with 7 data bits (E7), no parity with 7 data bits (N8) or no parity with 8 data bits (E8). | E7, N8, E8 |
| PRN TYPE | **Printer type.** Specifies which type of printer is connected to the indicator: Epson FX (EP-FX or other similar serial printer) or TM-295. | EP-FX, TM-295 |
| ERROR CTRL | **Printer error display.**<br>YES specifies that printer errors (DTR) should be displayed and acknowledged by the user.<br>NO specifies that errors should be ignored. You must set this parameter to NO for communication with a PC. | YES, NO |

# 6.3 Output Formats

## 6.3.1 Continuous Weight Output

### Works With Ports

Ports 1, 2 (RS232 or RS485)

### Description

Net weight and status information is transmitted continuously, along with the current tare and gross weight. No handshake is required. Used mainly for remote display or PC. The structure of the transmitted data block is shown below.

### Data Block Composition

| Byte | Name | Description | | |
|---|---|---|---|---|
| 1 | Weight status | Bit0 | 0=Normal | 1=No weight display |
| | | Bit1 | 0=Gross | 1=Net |
| | | Bit2 | 0=No Auto zero | 1=Auto zero |
| | | Bit3 | 0=Within range | 1=Out of range |
| | | Bit4 | 0=No standstill | 1=Standstill |
| | | Bit5 | 0=Normal | 1=Under minimum weighing range |
| | | Bit6 | Always 1 | |
| | | Bit7 | Zero or parity | |
| 2 | Polarity | "+" or "-". | | |
| 3-8 | Weight | 6 digits, including decimal point if any | | |
| 9 | Sync | Carriage return (0D hex) for end of transmission. | | |

## 6.3.2 Continuous Weight Output with Dual Scale Operation

### Works With Ports

Ports 1, 2 (RS232 or RS485)

### Description

When two scales are connected to the indicator, both their weights are transmitted continuously in the format `P+123.45 P+678.90CR`. In each pair, the first block transmitted is the weight of the first scale, and the second block transmitted is the weight of the second scale.

For this mode of operation, the parameter settings are **SYSTEM** > **SET** > **1COM > W2OUT**, and **SYSTEM** > **SET** > **2COM > W2OUT.**

### Data Block Composition (for Each Scale)

| Byte | Name | Description | | |
|---|---|---|---|---|
| 1 | Weight status | Bit0 | 0=Normal | 1=No weight display |
| | | Bit1 | 0=Gross | 1=Net |
| | | Bit2 | 0=No Auto zero | 1=Auto zero |
| | | Bit3 | 0=Within range | 1=Out of range |
| | | Bit4 | 0=No standstill | 1=Standstill |
| | | Bit5 | 0=Normal | 1=Under minimum weighing range |
| | | Bit6 | Always 1 | |
| | | Bit7 | Zero or parity | |
| 2 | Polarity | "+" or "-" | | |
| 3-8 | Weight | 6 digits, including decimal point if any. | | |
| 9 | Sync | Carriage return (0D hex) for end of transmission. | | |

## 6.3.3 Continuous Weight With Tare

### Works With Ports

Ports 2 (RS232 or RS485)

### Description

This option can be programmed using setup parameter **SYSTEM** > **SET** > **2COM** > **OPERATION** to `A.0UT`. The weight indication of each scale is transmitted continuously along with its current tare and gross weight. The format is:

`P+123.45N010.00(T/P)133.45G`

Where the characters indicate:

- `N` for Net weight.
- `G` for Gross weight.
- `T` for the Tare weight when the scale was manually tared, or `P` for the tare weight when the tare was preset either from the device or from a PC.

### Data Block Composition

| Byte | Name | Description | | |
|---|---|---|---|---|
| 1 | Weight status | Bit0 | 0=Normal | 1=No weight display |
| | | Bit1 | 0=Gross | 1=Net |
| | | Bit2 | 0=No Auto zero | 1=Auto zero |
| | | Bit3 | 0=Within range | 1=Out of range |
| | | Bit4 | 0=No standstill | 1=Standstill |
| | | Bit5 | 0=Normal | 1=Under minimum weighing range |
| | | Bit6 | Always 1 | |
| | | Bit7 | Zero or parity | |
| 2 | Polarity | "+" or "-". | | |
| 3-8 | Weight | 6 digits, including decimal point if any | | |
| 9 | "N" | Indicates that the preceding weight is net. | | |
| 10-15 | Net weight | 6 digits, including decimal point if any. | | |
| 16 | "T" or "P" | "T" specifies that the preceding weight is a manual tare. | | |
| | | "P" specifies that the preceding weight is a preset tare. | | |
| 17-22 | Gross weight | 6 digits, including decimal point if any. | | |
| 23 | "G" | Indicates that the preceding weight is gross. | | |
| 24 | Sync | Carriage return (0D hex) for end of transmission. | | |

### When Display Indication is Not Weight (Port 2 Only)

When the indicator displays something other than weight, the data string to COM2 will be as follows:

`|A|XXXX|TARE VALUE|T/P|GROSS VALUE|G|CR`

"XXXX" in the format above will either be blank spaces, an error message, or the menu currently accessed by the user.

### 6.3.4 Alibi Transmit

#### Works With Ports

Port 1 (RS232).

#### Description

Alibi mode can be set in **SYSTEM** > **SET** > **1COM** > **OPERATION: ALIBI**. When the **PRINT** key is pressed, the record is transmitted in the following format:

```
1234 _ 012340kg G
```

### 6.3.5 Alibi Mode Commands

The following operations can be executed in Alibi mode.

#### *Transmit Displayed Weight*

This is executed when the ASCII character "?" (3F hex) is received. The output data block is as shown below:

| Byte | Name | Description | | |
|---|---|---|---|---|
| 1 | Weight status | Bit 0: | 0=Normal | 1=No weight display |
| | | Bit 1: | 0=Gross | 1=Net |
| | | Bit 2: | 0=No Auto zero | 1=Auto zero |
| | | Bit 3: | 0=Within range | 1=Out of range |
| | | Bit 4: | 0=No standstill | 1=Standstill |
| | | Bit 5: | 0=Normal | 1=Under minimum weighing range |
| | | Bit 6: | Always 1 | |
| | | Bit 7: | Zero or parity | |
| 2 | Polarity | "+" or "-". | | |
| 3-8 | Weight | 6 digits, including decimal point if any | | |
| 9 | Sync | Carriage return (0D hex) for end of transmission. | | |

#### *Command "ZERO"*

Equivalent to pressing the front panel ZERO key. This is executed when ASCII character 0 (30 hex) is received. No data is returned to the host. Execution of the command may be verified by examining the weight (command "?").

### *Character for Print-on-Demand*

When a demand character is received the unit saves the weight in its Alibi flash memory. It then transmits the Alibi number and the weight. For example: `1234 012.340 kg G CR LF`. The demand character may be programmed through **SYSTEM** > **SET** > **1COM** > **ADDRESS: ALIBI.A** to **ALIBI.Z**, where **A** will generate and transmit the new Alibi number and **a** (61h) will repeat the last Alibi number (in the case where the message was not received properly).

## 6.3.6 EDP Protocol Output

#### Works With Ports

Port 2 (RS232 or RS485).

#### Description

Transmits weight measurements to a host computer, according to the currently-selected print format, with or without an ENQ prompt, and with or without an ACK/NAK handshake (see 'Relevant Setup Parameters' below). The EDP protocol enables communication with two or more indicators connected to the host PC.

#### Full Protocol Workflow

1. Within 5 seconds of initialization, the PC requests data by sending an ENQ (05h) command. If it doesn't send an ENQ, the indicator shows error 30 (host not ready).
2. After the **ENTER** button is pressed, the indicator transmits weight information according to the currently-selected print format, using the standard data block composition (shown below).
3. Within 5 seconds of transmission, the PC either:
   - Acknowledges receiving the data properly, by sending an ACK (06h) command.
   - Notifies the indicator the data was not properly received, by sending a NAK (15h) command.
   - Does not respond, in which case the indicator shows error 33 (host does not acknowledge).
4. If the host responded with a NAK command, steps 2 and 3 are repeated. The number of repeats is unlimited.

#### Relevant Setup Parameters

- **SYSTEM** > **2COM** > **EDP** > **ERROR CTRL** (**YES**/**NO**) – timeout control. Turning off timeout removes the 5-second constraint in workflow steps 2 and 4. Errors 30 or 33 are never shown.
- **SYSTEM** > **2COM** > **EDP** > **PROTO A/N** (**YES**/**NO**) – handshake. Turning off handshake removes steps 4 and 5 of the protocol workflow - the indicator sends data blocks on demand, without waiting for a response.

- **SYSTEM** > **2COM** > **EDP** > **DIS. PROTO** (**YES**/**NO**) – operator disable. If this option is turned on, an operator can interrupt the protocol by pressing any key on this indicator's keypad.
- **SYSTEM** > **2COM** > **EDP** > **HOST ENQ.** (**YES**/**NO**) – host enquiry. Turning off host enquiry specifies that the indicator should send weight information continuously, not on demand.

### Data Block Composition

| Character/s | Description |
|---|---|
| STX (02h) | Start of transmission. |
| ASCII (any) | ASCII data is identical to the data printed. |
| ETX (03h) | End of transmission. |
| BCC | Block check character (XORSUM of all data characters STX, ETX inclusive). |

## 6.3.7 Remote Printer Output

### Works With Ports

Port 2 (RS485 or RS232)

### Description

Used to transmit the data printed on the local printer to a remote printer. No handshake is required.

## 6.3.8 Master-Slave Protocol

### Works With Ports

Port 2 (RS232 or RS485)

### Description

The indicator participates in a network of several indicators. In such a network, all slave units have access to weighing data in the master's memory or storage device.

You specify this indicator's network address by setting the port 2 output method (**SYSTEM** > **SET** > **2COM** > **OPERATION**) to **M/S A**, where A is the network address (a unique letter between A [41h] and Y [59h]).

The **SYSTEM** > **SET** > **2COM** > **OPERATION** > **M/S A** submenu has several other options, beside the network address parameter. These are described below.

| Parameter | Description | Values |
|---|---|---|
| ERROR CTRL | **Protocol error display.**<br>YES specifies that master-slave protocol errors should be displayed and acknowledged by the user.<br>NO specifies that errors should be ignored. | YES, NO |
| RETRY | **Manual retry on transmission failure.**<br>YES specifies that if transmission fails, the user should be prompted to retry.<br>NO specifies that if transmission fails, the indicator should automatically retry. | YES, NO |
| DIS. PROTO | **Manual disable.**<br>YES specifies that the operator can manually disable further communications, if many errors are encountered.<br>NO specifies that the operator may not manually disable master-slave protocol communications. | YES, NO |
| X/MIT RESULT | **Transmit individual weighings.**<br>YES specifies that the indicator should send individual weighings to the host.<br>NO specifies that only the start and stop reports should be sent to the host. | YES, NO |
| KBD COM/DS | **Accept keyboard commands from host.** | YES, NO |

## Working With Local and Remote Memory

The following table shows how to set the parameters listed above, for an indicator operating as a slave, with local weighing memory, remote weighing memory, or both.

| Parameter | Slave w/local memory | Slave w/remote memory | Slave w/local and remote memory |
|---|---|---|---|
| TYPE / ADDRESS | 65-89 (A-Y) | 65-89 (A-Y) | 65-89 (A-Y) |
| ERROR CTRL | YES/NO | YES/NO | YES/NO |
| RETRY | YES/NO | YES | YES/NO |
| DIS. PROTO | YES/NO | YES | YES/NO |
| X/MIT RESULT | YES/NO | YES/NO | YES/NO |

## *Master-Slave Commands*

### List of Commands

| Command | Hex | Description | Time | Slave response |
|---|---|---|---|---|
| ? | 3F | UPLOAD WEIGHT & STATUS | 50 ms | STATUS + WEIGHT |
| @ | 40 | RESET SLAVE | 15ms | NONE |
| K | 4B | DOWNLOAD KEY | 0.1 ms | NONE |

### "?" Command: Upload Status

It is the main command used to poll the slave or slaves, which reply with the current weight being measured or with a message if bit0 of status byte is '1'. In the normal state the slave will respond within 3-4 character time.

(e.g. with 9600 baud, the character time ≈ 1msec, the master should expect reception of STX from the slave within 5msec after the ETX was transmitted from the master).

**Master Transmission**

| | | | | | | |
|---|---|---|---|---|---|---|
| STX | ADD | ? | 0 | BCS2 | BCS1 | ETX |

***Example:***

| | **STX** | **ADD** | **?** | **0** | **BCS2** | **BCS1** | **ETX** |
|---|---|---|---|---|---|---|---|
| **Hex** | 2 | 41 | 3F | 30 | 3C | 34 | 3 |
| **Ascii** | STX | A | ? | 0 | < | 4 | ETX |

- ADD is one of the address sets in **SYSTEM > SET > 2COM > OPERATION: M/S A-Z**
- CheckSum is calculated as the XOR sum of all data characters, ETX excluded.

  E.g. 02 XOR 41 XOR 3F XOR 30 = 4C (BCS1 = 30+C=3C, BCS2 = 30+4=34)

**Slave Response**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| STX | ADD | ? | 0 | STATUS BYTE | WEIGHT | X | Y | Z | BCS2 | BCS1 | ETX |

WEIGHT = 5 digits + decimal point if any.(ASCII,MSD FIRST)

X = Scale number

- 0 = Scale 1 + Scale 2
- 1 = Scale 1
- 2 = Scale 2

Y = Digital input (TILT)

- 0 = Not Active
- 1 = Active

Z = Setpoints

- 0 = Neither is active
- 1 = Setpoint 1 is active
- 2 = Setpoint 2 is active
- 3 = Setpoint 1, Setpoint 2 are active

**Status Byte**

| B7 | B6 | B5 | B4 | B3 | B2 | B1 | B0 |
|---|---|---|---|---|---|---|---|
| Zero or Parity | 1 | Under Min. Weighing Range<br>0=NO, 1=YES | No Motion<br>0=NO, 1=YES | Out of Range<br>0=NO<br>1=YES | Autozero<br>0=NO<br>1=YES | 0=Gross<br>1=Net | 0=Normal Weight<br>1=No Weight |

The slave response will contain a message in place of the weight if b0 of the status byte is high.

### @ Reset Slave

Resets the slave.

**Master Transmission**

| STX | ADD | @ | 0 | BCS2 | BCS1 | ETX |
|---|---|---|---|---|---|---|

**Slave Response**

None.

### Download Key

This is used to download keyboard commands. Use of remote keyboard commands must be enabled: This is done by the setting 2COM > KBDCOMMANDS: YES.

**Master Transmission**

| STX | ADD | K | 0 | xx | BCS2 | BCS1 | ETX |
|---|---|---|---|---|---|---|---|

XX values (2 bytes):

- 0 – ZERO
- 19 – SCALE
- 1 – TARE
- 2 – P.TARE
- 5C – CE
- 6 – PRINT
- 1A – PCS
- 17 – WEIGH1
- 18 – WEIGH2
- 5d – ENTER
- 30-39 – numeric keypad, 0-9
- 1b – MENU
- 0B - ▶
- 08 - ◀
- 09 - ▲
- 05 - ▼

**Slave Response**

None.

### *Gross-Tare-Net Weight Transmission*

The output data format of the master-slave protocol is shown below:

`|STX|Addr|=|0|Data Block|BCS2|BCS1|ETX`

The output data block is as shown below:

| Byte | Name | Description | | |
|---|---|---|---|---|
| 1 | Weight status | Bit 0: | 0=Normal | 1=No weight display |
| | | Bit 1: | 0=Gross | 1=Net |
| | | Bit 2: | 0=No Auto zero | 1=Auto zero |
| | | Bit 3: | 0=Within range | 1=Out of range |
| | | Bit 4: | 0=No standstill | 1=Standstill |
| | | Bit 5: | 0=Normal | 1=Under minimum weighing range |
| | | Bit 6: | Always 1 | |
| | | Bit 7: | Zero or parity | |
| 2 | Polarity | "+" or "-" | | |
| 3-8 | Net weight | 6 digits, including decimal point if any. | | |
| 9 | "N" | Indicates that the preceding weight is net. | | |
| 10-15 | Net weight | 6 digits, including decimal point if any. | | |
| 16 | "T" or "P" | "T" specifies that the preceding weight is a manual tare. | | |
| | | "P" specifies that the preceding weight is a preset tare. | | |
| 17-22 | Gross weight | 6 digits, including decimal point if any | | |
| 23 | "G" | Indicates that the preceding weight is gross. | | |
| 24 | Scale number | Either 1 or 2. | | |

# 6.4 Default Ticket Formats

The VT300 has four print formats, shown in the table below. These print formats are not interchangeable – each one is used for a specific purpose. Each print format is identified by a ticket number.

Each of the print formats below can be customized, provided that **SYSTEM** > **SET** > **OPER** > **USER FORMS** is set to YES. See section 6.5 below to learn how to create and download custom formats.

| Ticket # | Ticket Name | Description | Layout |
|---|---|---|---|
| 01 | First Weighing | In a weighbridge operation (see *VT300 User's Guide*, chapter 5), this is the format of the ticket printed after the first weighing of a vehicle. | DATE:16-05-03  15:46   N:00125<br><br>1st   WEIGHT :<15000>kg<br><br>VEHICLE  : AB1234          MF:054<br>CLIENT   : SMITH<br>PRODUCT  : SAND BB |
| 02 | Second Weighing | In a weighbridge operation (see *VT300 User's Guide*, chapter 5), this is the format of the ticket printed after the second weighing of a vehicle. | DATE:16-05-03  16:00   N:00126<br><br>1st WEIGHT:<15000>kg 16-05-03 15:46<br><br>2nd WEIGHT:<32000>kg 16-05-03<br>NET WEIGHT: 17000  kg<br><br>VEHICLE  : AB1234          MF:054<br>CLIENT   : SMITH<br>PRODUCT  : SAND BB |
| 03 | Regular Weighing | This is the ticket printed when the user presses **PRINT**, and the indicator is in weight mode (see *VT300 User's Guide*, chapter 4). | 0100 001.000 kgG |
| 04 | Piece Count | This is the ticket printed when the user presses **PRINT**, and the indicator is in counting mode (see *VT300 User's Guide*, chapter 6). | WEIGHT  : 00.050 kg<br>APW     : 0.00001 kg<br>PIECES  : 0005000 |

# 6.5 Custom Ticket Formats

The four default ticket formats, shown in section 6.4 above, can be replaced by custom ticket formats. If you do this, you can revert to the default formats later.

➔ **To replace a default ticket format with a custom format:**

1. Press **MENU** and navigate to **SYSTEM** > **SET** > **OPER** > **USER FORMS**. Set this parameter to `YES`.
2. Create a custom print format on a PC (see section 6.5.1).
3. Download the custom format from the PC (see section 6.5.2).

➔ **To revert to the default ticket formats:**

1. Press **MENU** and navigate to **SYSTEM** > **SET** > **FORM** > **DEFAULT**.

The next step erases **all four** ticket formats and replaces them with the default formats. The only way to get the custom formats back is to download them again. If you do not want to do this, press **ESC** and do not proceed to step 2.

2. The display shows `O.K. ? AE=Y , CE=N`. Press **ENTER** to confirm.

   The current print formats for all four tickets are erased, and replaced with the default formats (shown in the table in section 6.4).

## 6.5.1 Creating a Custom Ticket Format

A custom print format is created on a PC, as an ASCII file that may be no larger than 1023 bytes. The ASCII file can have two types of text:

- Fields – text with the format `[!xx]`, where xx is the field code. When a ticket is printed, each field added to the print format is added with data from the current weight measurement. The table below lists all the field codes.
- Fixed text – any ASCII characters that do not specify a field. These characters are printed regardless of the data in the current weight measurement.
- Non-printable characters – may be inserted in the format `[@123]`, where 123 is the decimal equivalent of the character code. For example, Esc E (1Bh, 45h) is inserted as `[@027]E`. This may be repeated as many times as required in the string.

When you follow the procedure for downloading a custom print format (see section 6.5.2 below), the indicator uploads the default print format to the PC, as an ASCII file. You can edit this file to create the custom print format.

### Field Codes Allowed in Custom Print Formats

- [!001] – indicator address (A-Y).
- [!003] – scale used for first weighing.
- [!004] – scale used for second weighing.
- [!005] – date.
- [!011] – average piece weight used in counting.
- [!012] – number of pieces counted.
- [!013] – time with seconds.
- [!014] – gross weight.
- [!015] – current tare value.
- [!016] – serial number.
- [!017] – net weight.
- [!021] – MF or MT or M@.
- [!022] – net weight (1W-2W).
- [!023] – serial number of first weighing ticket.
- [!024] – date of first weighing.
- [!025] – time of first weighing.
- [!026] – weight measured in first weighing.
- [!027] – serial number of second weighing ticket.
- [!028] – date of second weighing.
- [!029] – time of second weighing (hours and minutes).
- [!030] – time of second weighing (hours, minutes and seconds).
- [!031] – weight measured in second weighing.
- [!032] – CODE 0 prompt*.
- [!033] – CODE 0 data*.
- [!034] – CODE 1 prompt*.
- [!035] – CODE 1 data*.
- [!036] – CODE 2 prompt*.
- [!037] – CODE 2 data*.
- [!038] – CODE 3 prompt*.
- [!039] – CODE 3 data*.
- [!040] – CODE 4 prompt*.
- [!041] – CODE 4 data*.

- [!042] – current accumulated total.
- [!043] – subtotal.

* These field codes refer to weighbridge operation descriptions. For more information on these descriptions and how to customize them, see section 9.1.

**Example of Custom Print Format**

```
Vishay Transducers
WEIGHT <[!014] kg>
N: [!016]
```

The above code results in the following printed ticket:

```
Vishay Transducers

WEIGHT <12345 kg>

N: 0001
```

## 6.5.2 Downloading and Uploading Custom Ticket Formats

The VT300 has four tickets; their standard formats are shown in the table in section 6.4. You can replace any of these tickets with a custom format, which is downloaded from a PC. The custom ticket format must be an ASCII file 1023 bytes or less in length (see the previous section for more details).

➔ **To download a custom print format:**

1. Connect a PC to port 1 on the indicator.
2. Use a serial communication program (such as Windows Hyper Terminal or Procomm) to set the serial port, baud rate, data bits, etc. The indicator's ports communicate at 2400 baud unless otherwise specified.
3. Press **MENU** and navigate to **SYSTEM** > **SET** > **FORM** > **DOWNLOAD**.
4. The display shows `TICKET Nr : 00`. Enter the ticket number: `01` for first weighing ticket, `02` for second weighing ticket, `03` for regular weighing ticket, or `04` for a counting ticket.
5. Press **ENTER**. The display shows `TRANSMIT…` while the indicator uploads the selected ticket format to the PC. The uploaded ticket may be the default format, or a custom format, if you downloaded a custom format previously.
6. On the PC, you can open the ASCII file and edit it to create the custom print format. If you have already prepared an ASCII file for the custom print format, discard the uploaded file.
7. The display shows `READY? AE=Y , CE=N`. Press **ENTER**. The indicator enters receive mode, and the display shows `RECEIVE…`
8. Use the serial communication program on the PC to transmit the custom ticket format to the indicator.

9. When the transmission ends, press **ESC** on the indicator.
10. The display shows `END OF FORM` briefly, and the received ASCII block is transmitted to the PC for verification. The received ticket is stored in non-volatile memory.
11. On the PC, check the ASCII block sent by the indicator, to ensure communication was successful. If not, go back to step 3.

# 7 Outputs and Digital Input

The VT300 is able to interface with weighing automation systems, using two optoisolated outputs (digital setpoints) and one digital input. There is also an analog output configuration.

- The digital outputs (setpoints) are triggered when the scale reads an upper weight threshold, defined by the user. There is a separate threshold for each setpoint, which can be set in **SYSTEM** > **SET** > **SETP** (see section 7.3).
- The analog output configuration consists of a galvanically-isolated D/A converter, generating either voltage or current output. Relevant parameters can be modified using the **SYSTEM > D/A CAL** dialog (see section 7.4.2).
- The digital input is used as a tilt switch. When a signal is received on the input cable, the display locks for a certain period of time. The tilt switch is enabled, and its time delay defined in **SYSTEM** > **SET** > **TILT** (see section 7.5).

## 7.1 Specifications

### 7.1.1 Digital Outputs

- Transistor output open collector positive common.
- 24VDC + 10% / 100mA per output.
- Max off: State voltage 30VDC / leakage 100µA.
- Optoisolated to 2.5kV.
- Short-circuit protected.
- 2ms maximum delay for both on and off positions.

### 7.1.2 Analog Outputs

- Galvanically-isolated D/A converter.
- Circuit may be operated as current output or voltage output.
- Output is capable of driving 20mA into 1KΩ load.
- Current output values: 0-20mA, 4-20mA, 0-24mA.
- Voltage output values: 0-10V.
- Powered by an external 24VDC (stabilised +/- 10%, current 50 mA).

### 7.1.3 Digital Input (Tilt Switch)

- 9-24 VDC, positive common optoisolated to 2.5KV.
- Input resistance 3.3KΩ.
- 2ms maximum delay for both on and off positions.

# 7.2 Connecting Digital Outputs and Tilt Switch

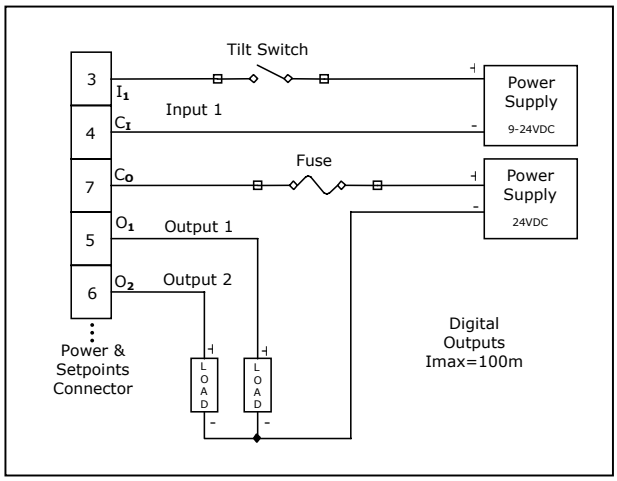



*Figure 11 – Digital output and tilt switch connection diagram*

# 7.3 Setting Thresholds for Digital Setpoints

Each setpoint has an upper weight threshold that triggers it. For example, if you set a threshold of 13kg for setpoint 1, nothing will happen as long as the items on the scale weigh less than 13kg. As soon as an item is placed on the scale that weighs exactly 13kg, or more, the setpoint will be switched to on (if normally off) or to off (if normally on).

Setpoints can be activated either by net weight value or by gross weight, depending on how this was defined in setup.

Setpoints can be either normally open or normally closed, depending on how this was defined in setup.

➔ **To edit weight thresholds for a setpoint:**

1. Press **MENU** and navigate to **WEIGH** > **SETP**.
2. The display shows **SETP1**. Press **ENTER** to select setpoint 1, or press ▼ and **ENTER** (the display shows **SETP2**) to select setpoint 2.
3. The display shows the current threshold for the setpoint you selected.
   - If you do not want to change this threshold, press **ESC**.
   - If you do want to change it, proceed to the next step.
4. Enter a new threshold value using the numeric keypad, and press **ENTER**.

### 7.3.1 Setpoint Options

➔ **To edit setpoint options:**

1. Press **MENU** and navigate to **SETUP** > **SET** > **SETP**.

The following dialog's first four parameters (SETP 1.1, 1.2, 2.3 and 2.4) can be set in several combinations. See 'Setpoint On/Off Combinations' below for the implication of each possible combination.

2. The display shows `SETP 1.1 ON/OFF`. Set this parameter to `ON` or `OFF` (refer to the table below).
3. The display shows `SETP 1.2 ON/OFF`. Set this parameter to `ON` or `OFF` (refer to the table below).
4. The display shows `SETP 2.3 ON/OFF`. Set this parameter to `ON` or `OFF` (refer to the table below).
5. The display shows `SETP 2.4 ON/OFF`. Set this parameter to `ON` or `OFF` (refer to the table below).
6. The display shows `SETUP GROSS=NO/YES`. Set this parameter to:
   - `NO`, to specify that setpoints should be activated by net weight.
   - `YES`, to specify that setpoints should be activated by gross weight.

#### *Setpoint On/Off Combinations*

| Parameters | Used for | Combinations |
|---|---|---|
| SETP 1.1, SETP 1.2 | **Setpoint 1 output.** | 1.1=0 and 1.2=0: normal<br>1.1=1 and 1.2=0: no motion<br>1.1=0 and 1.2=1: error |
| SETP 2.3, SETP 2.4 | **Setpoint 2 output.** | 2.3=0 and 2.4=0: normal<br>2.3=1 and 2.4=0: zero<br>2.3=0 and 2.4=1: net |
| 5.6 | **Net / gross for both setpoints.** | 0=net<br>1=gross |
| 5.7 | **Normally open / closed for both setpoints.** | 0=normally open<br>1=normally closed |

# 7.4 Configuring Analog Output

The analog output channel allows the indicator to communicate with PLC devices, using one of the following two methods:

- Converting load cell input into voltage (0-10V)
- Converting load cell input into current (0-20mA or 4-20mA)

This feature is only active if your indicator is equipped with an optional analog output board. Section 7.4.1 below explains how to connect the analog output board, and set a hardware jumper to define which of the two output methods to use.

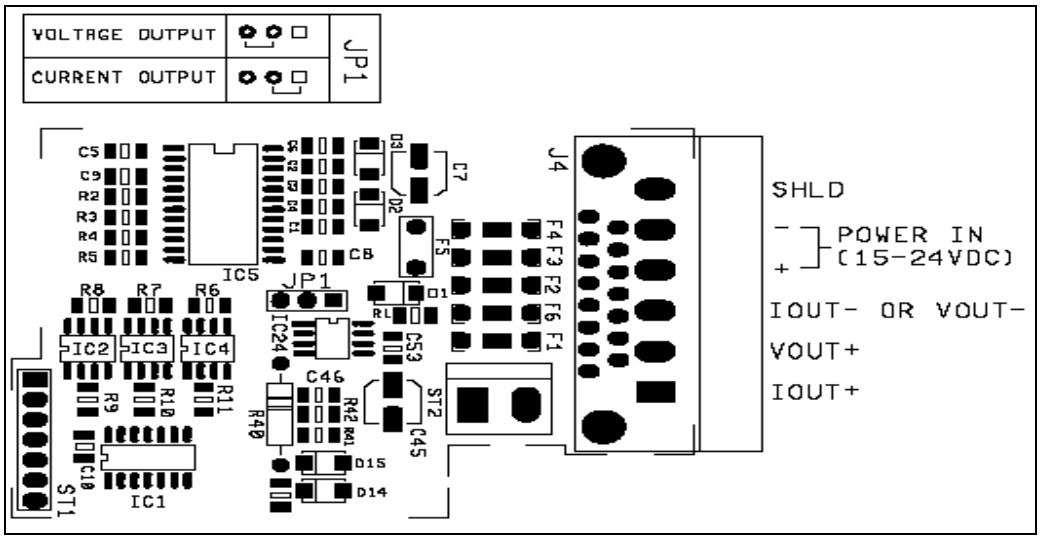
After connecting the board and setting the jumper, you can set analog output parameters using the **SYSTEM** > **D/A CAL** menu (see section 7.4.2).

## 7.4.1 Connecting PCB and Setting Jumper

In order to use analog output, the option PCB (PCB 761) connected it to the VT200 as follows: In the one side to **ST5** socket on the main board and in the other side using the mounting posts/spacers provided to:
**Stainless steel enclosure** – The main board.
**Aluminum enclosure** – The Indicator's rear panel (see page 82).
Jumper JP1 determines the output mode – current or voltage.

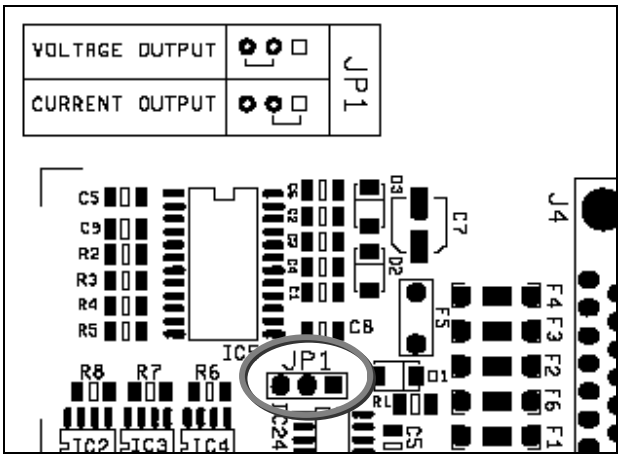
➔ **Analog output pins connections:**

1. Connect pins as follows:
   - For current output, connect pin 1 (current output, +) and pin 3 (common).
   - For voltage output, connect pin 2 (voltage output, +) and pin 3 (common).
2. Connect an external power supply of 24VDC, using pins 4 and 5:
   - Pin 4 – power in (+).
   - Pin 5 – power in (-).



➔ **To set output mode jumper (JP1):**

Set jumper JP1 to the appropriate position, to define voltage output or current voltage, as shown in the image below.




## 7.4.2 Setting Analog Output Parameters

The output can be set to the standard calibration, where 0 on the weight display is output as 0mA or 4mA, and max on the display is output as 20mA. The output is capable of driving 20mA into 1K Ohm load.
Alternatively, you can edit these zero and span calibration values. This is controlled through the **CALIBRATION** parameter in **SYSTEM** > **D/A CAL**. When you set this parameter to USER, a dialog opens which allows you to enter mA values for zero and span.

There are several other analog output parameters, detailed in the table below.

| Parameter | Description | Values |
|---|---|---|
| CALIBRATION | **Standard / custom zero and span**.<br>STD specifies that the scale should output 0mA at zero input and 20mA at maximum input (or 0V at zero and 10V at max).<br>USER allows user-defined zero and span values. These can be defined using the parameters **ZERO D/A** and **FULL D/A**. | STD, USER<br>STD = Standard (20mA max)<br>USER = User defined zero and span |
| SCALE ERROR | **Error output level**. Specifies whether scale errors should be indicated as a low or high signal. | 0mA, 24mA |
| OUTPUT | **Current / voltage**. This parameter must correspond to the hardware jumper, which defines whether output should be in current or voltage (see section 7.4.1). | CURR, VOLTAGE |
| MODE | **Net / gross**. Specifies whether the indicator should always output gross weight, or output net weight when tare is active. | NET, GROSS |

| Parameter | Description | Values |
|---|---|---|
| CURRENT | **Effective range for current output**. Sets the range to 0-20mA or 4-20mA. Relevant only if **OUTPUT** and the hardware jumper are set to current. | 0-20, 4-20 |
| RESOLUT. | **Resolution**. Specifies whether output should be in high resolution if the display is showing high resolution.<br>DISP specifies that output should match display.<br>INIT specifies that output should be in low resolution even if the display is showing high resolution. | DISP, INIT |
| OPERATION | **Enable analog output.** Setting this parameter to NO disables the analog output channel. | YES, NO |
| ZERO D/A* | **D/A output at zero**, in voltage or mA. | XX.XXX |
| FULL D/A* | **D/A output at maximum input**, in voltage or mA. | XX.XXX |

* These parameters only appear if **CALIBRATION** is set to USER.

### 7.4.3 Calibrating D/A Converter

➔ **To calibrate D/A converter (0-10V):**

1. Place jumper JP1 on PCB (761) for voltage output.
2. Power up the unit, press **MENU** and navigate to **SYSTEM** > **D/A CAL**.
3. Set parameters as follows: **CALIBRATION**=USER; **SCALE ERROR**=0mA; **OUTPUT**=VOLT; **MODE**=NET; **CURRENT**=0-20; **RESOLUT.**=INT; **OPERATION**=YES.
4. Skip D/A calibration and save the above settings by accessing **SYSTEM** > **1CAL** > **WRITE**.
5. Press **MENU** and navigate to **SYSTEM** > **TEST** > **D/A TEST**.
6. The display shows 00000. Type 65535. Press **PRINT** to output the value.
7. Use a voltmeter to measure the voltage at pins 2 (+) and 3 (-) of the analogue output connector (J4). Record the value (in volts). Calculate a new value, which is: 100/recorded value. E.g. recorded value is 9.94, new value is 100/9.94=10.06. This is the *full scale voltage*.
8. Press **MENU** and navigate to **SYSTEM** > **D/A CAL**.
9. Set the **CALIBRATION** parameter to YES. The calibration dialog starts.
10. When prompted for D/A zero, enter 00.000.
11. When prompted for D/A span, enter the *full scale voltage* you calculated in step 7.
12. When you finish stepping through the dialog, exit the menu.
13. Access **SYSTEM** > **1CAL** > **WRITE** to save your settings.

# 7.5 Using the Tilt Switch

You can set the time delay for the tilt switch function using the setup parameter **SYSTEM** > **SET** > **TILT**. Use this parameter to enter the time delay for display lock, specified in 1/10 of a second. The delay may be between 1 and 90 1/10 seconds (i.e. between 0.1 and 9 seconds).

When the contacts close, the display locks after the time delay elapses. When they open again, the display unlocks after the same time delay elapses.

Set **SYSTEM** > **SET** > **TILT** to `00` to disable the tilt-switch function.

## 7.5.1 Tilt Switch Options

Parameter **SYSTEM** > **SET** > **TILT**, which controls the tilt switch, allows several special options. To access these options, set the parameter above `90`:

- `91` – Tare scale on the rising edge of input. Setpoints always enabled.
- `92` – Print on the rising edge of the input. Setpoints always enabled.
- `93` – Setpoints active when input is high. Setpoints inactive when input is low.
- `94` – Scale is tared at the rising edge of input. If taring is successful, setpoints are activated. If input is low, setpoints are inactive.
- `95` – When input is low, scale 1 is selected and displayed. When input is high, scale 2 is selected and displayed.
- `96` – Scale is reset to 0.

# 8 Service Operations and Testing

## 8.1 Service Operations

### 8.1.1 Setting and Changing System and Operator Password (SYSTEM > PIN)

The VT300 has two Personal Identification Numbers (PINs):

- A "system PIN", which restricts access to the **SYSTEM** menu. This menu contains the calibration menus, so this also functions as the calibration PIN.
- An "operator PIN", which restricts user access to sensitive operations like changing the date and deleting from memory.

By default, both PINs are inactive and set to `000000`. You can use one of the procedures below to set a PIN, which should only be given to authorized personnel.

In the future, if you want to deactivate one of the PINs, you can follow the same procedure and set that PIN to `000000`.

➔ **To set or change a PIN number:**

1. Press **MENU** and navigate to one of the following:
   - **SYSTEM** > **PIN** > **SYSTEM**, to edit the system PIN, which safeguards the **SYSTEM** menu and calibration parameters.
   - **SYSTEM** > **PIN** > **OPER**, to edit the operator PIN, which safeguards sensitive user operations.

You cannot set an operator PIN unless you have already set a system PIN.

2. If a system PIN has already been set, you are prompted for the current PIN. Type it using the numeric keypad, and press **ENTER**.
   - If the PIN you entered is correct, the display shows `NEW CODE:`
   - If you entered a wrong PIN, the unit resets. Turn it on and go back to step 1.
3. The display shows `NEW CODE:` Type a new PIN, using the numeric keypad, and press **ENTER**.
4. The display shows `CONFIRM:` Type the new PIN again and press **ENTER**..
   - If both entries were the same, `PASS` is displayed briefly, and the new PIN is stored in memory.

- If the two entries are not the same, FAIL is displayed briefly and the new PIN you entered is discarded.

**IMPORTANT: Make sure you do not forget the PIN entered. If the PIN is lost, the unit must be returned to the factory to initialize the PIN, and a fee is charged.**

### 8.1.2 Setting Date, Time and Serial Number (SYSTEM > DATE)

➔ **To set date, time and serial number:**

1. Press **MENU** and navigate to **SYSTEM** > **DATE**.
2. The display shows DATE.
   - If the date is incorrect, type the current date using the numeric keypad (in either of the formats DDMMYY or MMDDYY, depending on the parameter **SYSTEM** > **SET** > **OPER** > **DATE FORMA**), and press **ENTER**.
   - If the date is correct, press **ENTER** to confirm it.
3. The display shows TIME.
   - If the time is incorrect, type the current time in HHMMSS format (hours, minutes, seconds) and press **ENTER**.
   - If the time is correct, press **ENTER** to confirm it.
4. The display shows the current alibi memory serial number, used on printed tickets and to retrieve records from memory. Edit this number, if needed, and press **ENTER**.

### 8.1.3 Resetting Parameters (INIT)

At any time, you can reset a group of scale parameters to their factory defaults, using the **INIT** operation.

**IMPORTANT:** Be aware that the **INIT** operation has no warning or confirmation. Parameters are reset immediately when you access the **INIT** option and press **ENTER**.

➔ **To reset parameters to their factory defaults:**

Press **MENU** and navigate to one of the following, depending on the group of parameters you wish to reset:

- Access **SYSTEM** > **1CAL** > **INIT** to reset all calibration parameters, and general parameters in the **PAR** submenu (see section 5.2), pertaining to scale 1.

- Access **SYSTEM** > **2CAL** > **INIT** to reset all calibration parameters, and general parameters in the **PAR** submenu (see section 5.2), pertaining to scale 2.
- Access **SYSTEM** > **SET** > **INIT** to reset all parameters defined in the **SYSTEM** > **SET** menu. These are general operational parameters (see section 5.3); communication parameters and custom ticket formats (see chapter 6); custom reference codes (see section 9.1); setpoint parameters (see section 7.3) and tilt switch options (see section 7.5).

### 8.1.4 Displaying Remaining Battery Capacity (WEIGH > BATTERY)

➔ **To display remaining battery capacity:**

Press **MENU** and navigate to **WEIGH** > **BATTERY**. The current battery charge is displayed as a percentage of total capacity. Press **ESC** to exit.

### 8.1.5 Checking Calibration Seal (MISC > 1/2OIML)

In order to check that calibration has not been tampered with. This can be verified by means of the audit trail counter, which increments each time calibration parameters are changed, and by means of a jumper (for more information, see section 4.5). Use the procedure below to see the current value of the counter and the current position of the jumper.

➔ **To check calibration seal and audit trail counter:**

1. Press **MENU** and navigate to **MISC** > **1OIML**. Or, if you want to check scale 2, navigate to **MISC** > **2OIML**.
2. Press **ENTER**. If JP1 is currently in the sealed position, the word SEALED appears on the display briefly. Following this, the audit trail counter is displayed.

### 8.1.6 Viewing Load Cell mV (TEST > CVM)

➔ **To view an mV meter:**

Press MENU and navigate to **SYSTEM** > **TEST** > **CVM**. The indicator loads calibration data, and displays mV transmitted by the load cell.

### 8.1.7 Viewing A/D Count (TEST > A/D)

➔ **To view the A/D count:**

Press MENU and navigate to **SYSTEM** > **TEST** > **A/D**. The indicator shows the analog-to-digital converter internal count. Press **ESC** to exit.

### 8.1.8 Locking and Unlocking Keys

➔ **To lock keys:**

1. Press **MENU** and navigate to **SYSTEM** > **SET** > **LOCK KEY**.
2. Set one or more of the following parameters to `LOCKD`:
   - **ZERO KEY**
   - **TARE KEY**
   - **P.TARE KEY**
   - **PIECES KEY**
   - **PRINT KEY**
   - **SCALE KEY**
   - **WEIGH1 KEY**
   - **WEIGH2 KEY**

   Keys you lock will not work (i.e. if a user presses them nothing will happen) until you unlock them.

➔ **To unlock keys:**

1. Press **MENU** and navigate to **SYSTEM** > **SET** > **LOCK KEY**.
2. Set the corresponding parameter to `UNLOC` (see the bulleted list above).

## 8.2 Testing the Indicator

### 8.2.1 Testing ROM/RAM Integrity (TEST > MEM)

From time to time, it is advised to check the integrity of the unit's ROM and RAM using the procedure below.

Note that partly-corrupted memory does not necessarily affect indicator's operations, and can be corrected.

➔ **To test ROM/RAM integrity:**

1. Press **MENU** and navigate to **SYSTEM** > **TEST** > **MEM**.
2. One of the following messages are displayed:
   - `Err 01` – indicates that ROM data is corrupted.
   - `Err 02` – indicates that RAM data is corrupted.
   - `PASS` – indicates that both the ROM and RAM memory units are okay.

### 8.2.2 Testing the Keypad and Display (TEST > KBD, LCD)

➔ **To test that the display is working properly:**

Press **MENU** and navigate to **SYSTEM** > **TEST** > **LCD**.

The display shows the entire character set, in sequence.

➔ **To test that the keypad is working properly:**

Press **MENU** and navigate to **SYSTEM** > **TEST** > **KBD**.

The display blanks. When you press a key, the scan code for that key is shown on the display. The scan codes are as follows:

- `0` – **ZERO**
- `13` – **SCALE**
- `1` – **TARE**
- `2` – **P.TARE**
- `6` – **PRINT**
- `22` – **ESC**
- `1A` – **PCS**
- `11` – **WEIGH1**
- `12` – **WEIGH2**
- `5d` – **ENTER**
- `5C` – **CE**
- `30-39` – numeric keypad, **0**-**9**
- `1b` – MENU
- `0B` - ▶
- `08` - ◀
- `09` - ▲
- `05` - ▼

### 8.2.3 Testing Digital Input and Outputs (TEST > I/O)

➔ **To test digital input and outputs:**

1. Press **MENU** and navigate to **SYSTEM** > **TEST** > **I/O**.
2. The display shows `INP:0 OUT:00`.
   - The digit next to the word `INP` shows data received on the digital input.
   - The most significant digit next to the word `OUT` shows data sent on digital output 1, when you toggle it on (see step 3).

- The least significant digit next to the word OUT shows data sent on digital output 2, when you toggle it on (see step 4).

3. Press 1 to toggle output 1 on and off. If the output connects to another device, you can check if the signal was received.
4. Press 2 to toggle output 2 on and off. If the output connects to another device, check if the signal was received.
5. Connect a device to the digital input, and send a signal. See if the data appears next to INP.

### 8.2.4 Testing Data Received on Both Serial Ports (TEST > PORT)

➔ **To test data received on one or both serial ports:**

1. Press **MENU** and navigate to **SYSTEM** > **TEST** > **PORT**.
2. The display shows Rx1 and Rx2, where:
   - Rx1 is data received on port 1, in ASCII Hex.
   - Rx2 is data received on port 2, in ASCII Hex.
3. Connect a PC or another device to one or both of the indicator's ports, and begin transmitting data. Watch the display to see if the data is received properly.

# 9 Special Weighbridge Operations

## 9.1 Customizing Weighbridge Descriptions

This section assumes you are familiar with VT300 weighbridge functionality. If not, refer to the *VT300 User's Guide*, chapter 6.

When users weigh a vehicle using the VT300, they are prompted for information on the vehicle, also known as *weighbridge descriptions*, or *reference codes*.

By default, users are asked to enter three descriptions: `VEHICLE` (the license plate of the truck), `CLIENT` (the owner of the truck) and `PRODUCT` (the produce being weighed). This data entry can be customized, in one of the following ways:

- You can define the number of descriptions that users are prompted for. For example, you can increase the number of descriptions to 4, or reduce it to 1.
- You can define the labels of the data fields, which are shown to the user. For example, you can change the label `CLIENT` (which by default is used for the second data field) to `COMPANY`. Changing the label effects what users enter in the data field, and subsequently, the data saved about vehicles that enter the weighbridge.

Before you can customize the weighbridge descriptions, you must set **SYSTEM** > **SET** > **OPER** > **USER FORMS** to `YES`.

After customizing weighbridge descriptions, you must inform users of the indicator what to enter in each descriptive field.

➔ **To change the number of weighbridge descriptions shown to users:**

1. Press **MENU** and navigate to **SYSTEM** > **SET** > **OPER** > **REFR CODE**.
2. Select one of the options:
   - 0 – no weighbridge descriptions are shown to users.
   - 1 – only weighbridge description 1 is shown to users.
   - 2 – only weighbridge descriptions 1 and 2 are shown to users (in this order).
   - 3 – only weighbridge descriptions 1, 2 and 3 are shown to users (in this order).
   - 4 – all weighbridge descriptions are shown to users (in the order 1, 2, 3, 4).

You can view and customize descriptions 1, 2, 3 and 4 using the procedure below.

3. Press **ENTER** to save the new setting.

➔ **To view or edit weighbridge descriptions:**

1. Press **MENU** and navigate to **SYSTEM** > **SET** > **REFR** > **EDIT**.
2. The display shows `CODE A:BBB`, where A is the number of the description, and BBB is the current description (for example, `CODE 1:VEHICLE`). Do one of the following:
   - If you want to change the description, type a new one using the alphanumeric keypad. Press **ENTER** to proceed to the next description.
   - If you do not want to change this description, press **ENTER** to proceed to the next one.

The "code number" of the description denotes its position in the sequence of descriptions. For example, if the code is 3, the description is shown to the user after descriptions 1 and 2.

3. Repeat step 2 until you reach the last description (code 4).

If you set the number of descriptions to less than 4 (using the previous procedure), some descriptions may not be shown. For example, if you set the number of descriptions to 2, descriptions 3 and 4 are never shown to users.

## 9.2 Batch Weighing

If you need to weigh several trucks for the same customer, you can print a batch weighing ticket, in which each line represents a single weighing, and shows an accumulated total of the batch weighing.

```
CLIENT  : ABC
PRODUCT : DEE
07-05-03   15:18:56   N:00084

SN    WEIGHT    TOTAL
--------------------
0001  00.390kg  000000.390kg
0002  04.330kg  000004.720kg
0003  04.330kg  000009.050kg
0004  04.330kg  000013.380kg
0005  04.330kg  000017.710kg
0006  04.330kg  000022.040kg
0007  04.330kg  000026.370kg
0008  04.330kg  000030.700kg
0009  04.330kg  000035.030kg
0010  04.330kg  000039.360kg
0011  04.330kg  000043.690kg
0012  04.330kg  000048.020kg
0013  04.330kg  000052.350kg
```

➔ **To perform a batch weighing:**

For performing Batch Weighing **SYSTEM** > **SET** > **1COM** > **OPERATION** > **TICK3** must be set.

1. Press **MENU** and navigate to **WEIGH** > **BATCH**.
2. Enter the required weighbridge descriptions (see section 9.1 above to learn how to customize these).
3. Perform a regular weighing.
4. Press **PRINT**. A single line is added to the ticket.
5. Repeat steps 3 and 4 for each additional weighing.
6. When you are done, press **ESC**.

# 10 Troubleshooting

The indicator has no serviceable parts. Authorized technicians may:

- Respond to errors shown on the display (see section 10.1)
- Check load cell connections (see section 10.2)
- Check the power supply (see section 10.3)
- Check the digital outputs (see section 10.4)

## 10.1 Errors, Causes and Remedies

When an error or an unexpected event occurs, the indicator displays the message E.X, where X is the error code, followed by a descriptive message. The following table explains all the error codes and suggests what to do when each error message is displayed.

### 10.1.1 Hardware and General Errors

| Error code & desc. | Possible cause | Actions to be taken |
|---|---|---|
| E01: ROM | Faulty ROM chip. | Contact Vishay Transducers. |
| E02: RAM | Faulty flash RAM. | Contact Vishay Transducers. |
| E04: EEPROM | Faulty EEPROM. EEPROM memory stores calibration data. | Contact Vishay Transducers. |
| E05: SC-A/D s1 | Scale 1 extremely out of range. | Check scale, cable, connectors, LC excitation, A/D converter. Contact service. |
| E05: SC-A/D s2 | Scale 2 extremely out of range. | Check scale, cable, connectors, LC excitation, A/D converter. Contact service. |
| E06: LOW VOLT. | Low input voltage (insufficient power). | Check power supplied to the instrument. |
| E15: PWRUP ZERO | System has been initialized due to power failure or soft reset. | Zero the scale. |
| E16: W DATE TIME | System not initialized properly, or backup battery failure. | Enter a new date and time using **SYSTEM** > **DATE**. Replace battery. |

### 10.1.2 Printing and EDP Protocol Errors

| Error code & desc. | Possible cause | Actions to be taken |
|---|---|---|
| E20 :PRN NOT RDY | The printer is offline, because it is either not connected, out of paper or malfunctioning. | Check printer and cables. Replace printer. |
| E26:NO PAPER | No paper. This error only applies to the EPSON TM295 printer. | Add paper to printer tray. |
| E30:HOST NOT RDY | The host PC is not online, either because it is not connected or because the communication link failed. | Check computer and cables. Retry. |
| E33:HOST NOT ACK | The host does not issue a correct response (acknowledgement) to a request from the indicator. | Check computer and cables. Retry. |

### 10.1.3 Weighing and Counting Errors

| Error code & desc. | Possible cause | Actions to be taken |
|---|---|---|
| E40:OUT OF MEM. W | Weighing memory is full. | Delete unused records or check errors in vehicle file (see User's Guide, section 9.4). |
| E41:INVALID I.D. | No data entered during first weighing. | Enter first weighing data. |
| E42:V/CLE IN W.F. | A first weighing has already been made for this vehicle. | Retry entry; carry out second weighing; or delete the first weighing from memory. |
| E43:SCALE TARED | First or second weighing cannot be performed because the scale has been tared. | Cancel tare and return to gross mode. |
| E44:NEG. WEIGHT | Negative weights cannot be printed. | Retry or abort. |
| E45:SCALE MOT. | Non-stable weight cannot be processed. | Wait until the  status annunciator activates, and retry. |
| E47:OUT OF LIMIT | Weight is out of limits. | Retry. |
| E50:SAMPLE CNT | The sample used in counting has too few units. | Retry. |
| E51:SAMPLE WEIGH | The sample used in counting weighs too little. | Retry. |

### 10.1.4 Alibi Memory and Accumulated Total Errors

| Error code & desc. | Possible cause | Actions to be taken |
|---|---|---|
| E55:ALIBI FULL | Alibi memory is full. | Press **ENTER** to acknowledge. The unique identification number will reset to `0000`. |
| E56:NO ALIBI | Tare is active, so it is not possible to print. | Printout aborted. Cancel tare by pressing **ESC**, and retry. |
| E57:ALIBI CSUM | Alibi memory is corrupted. | No action. The alibi memory cannot be cleared, but the next records will be corrected. |
| E67:TM CHECKSUM | Corrupted accumulated total. | Clear accumulated total (**TFILE** menu). |
| E69:TM OVERFLOW | Accumulated total has overflowed because it has not been cleared for a long time. | Clear accumulated total (**TFILE** menu). |
| E77:WM CHECKSUM | Corrupted weighing memory. | Use menu path **VFILE** > **DELETE** to clear weighing memory. |

## 10.2 Checking Load Cell Connection

If there appears to be a problem with the load cell connection:

- Check input and output resistance.
- Check resistance between any terminal and shield.
- Check load cell connection and cable.

## 10.3 Checking Power Supply

If the unit does not turn on:

- Check 9-15VDC power supply.
- Check the resettable fuse F4 on PCB 801.

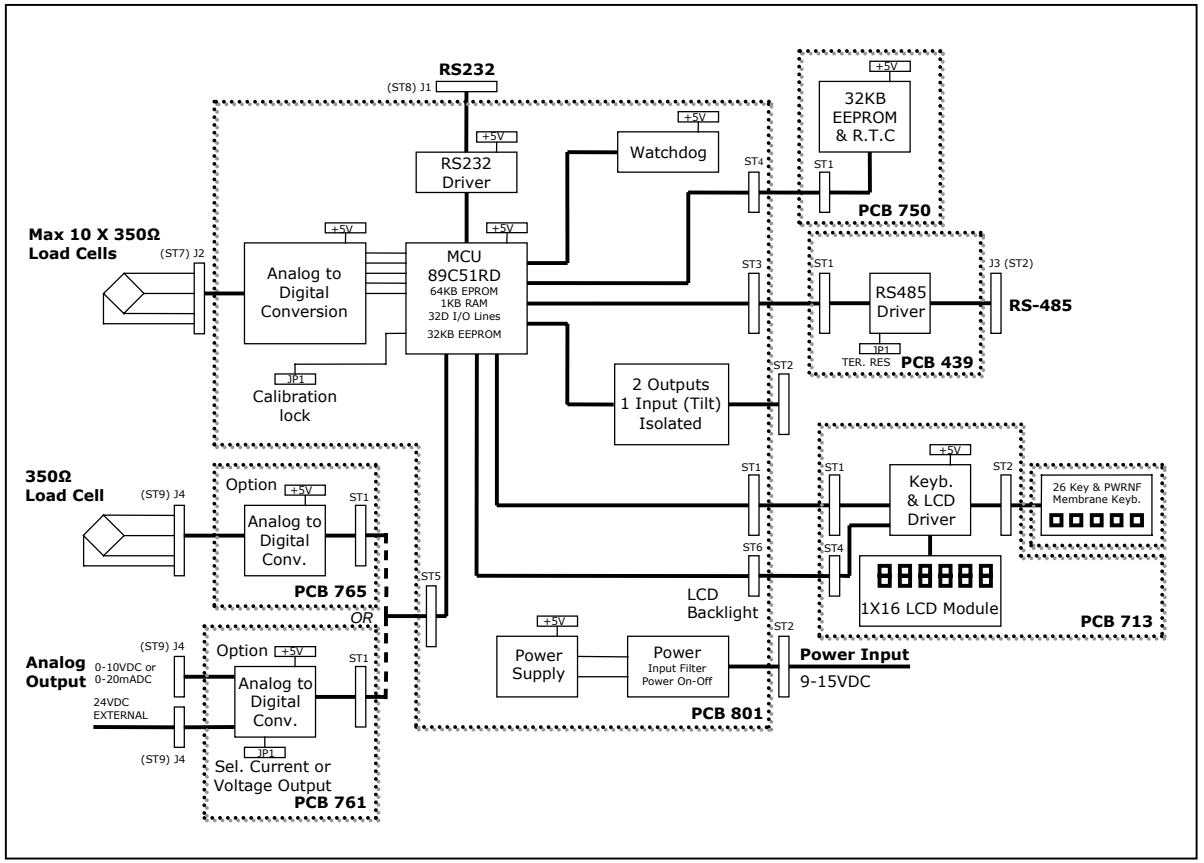
## 10.4 Checking Digital Outputs

If the setpoints are not working properly:

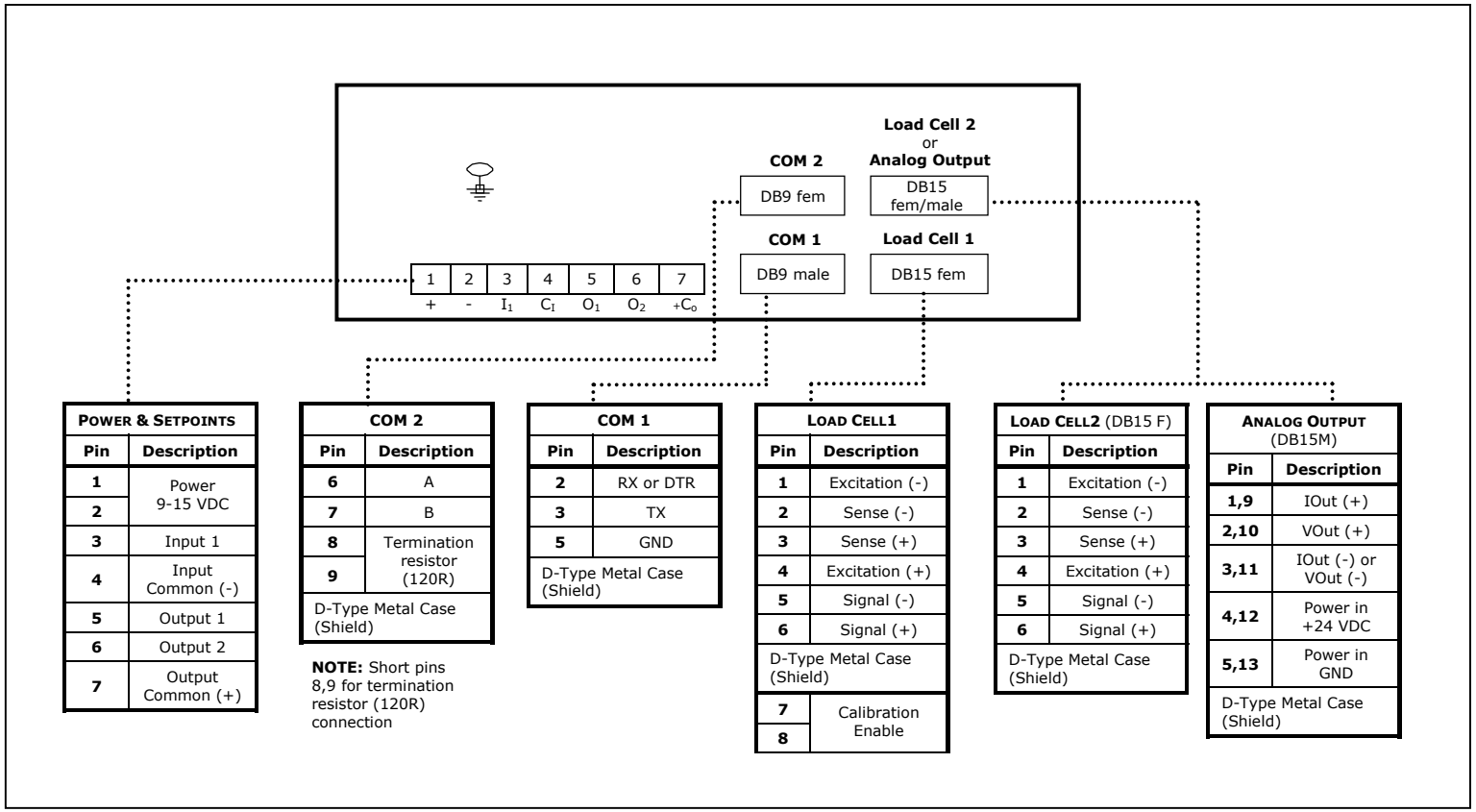
- Test the setpoints (see section 8.2.3).
- Check 24VDC power supply.
- Check the resettable fuse F3 on PCB 801.

# **Appendix A:** Technical Drawings

## *i. System Block Diagram*



## *ii. Rear Panel Connections (Desktop Model)*




| POWER & SETPOINTS | |
|---|---|
| **Pin** | **Description** |
| **1** | Power 9-15 VDC |
| **2** | |
| **3** | Input 1 |
| **4** | Input Common (-) |
| **5** | Output 1 |
| **6** | Output 2 |
| **7** | Output Common (+) |

| COM 2 | |
|---|---|
| **Pin** | **Description** |
| **6** | A |
| **7** | B |
| **8** | Termination resistor (120R) |
| **9** | |
| D-Type Metal Case (Shield) | |

**NOTE:** Short pins 8,9 for termination resistor (120R) connection

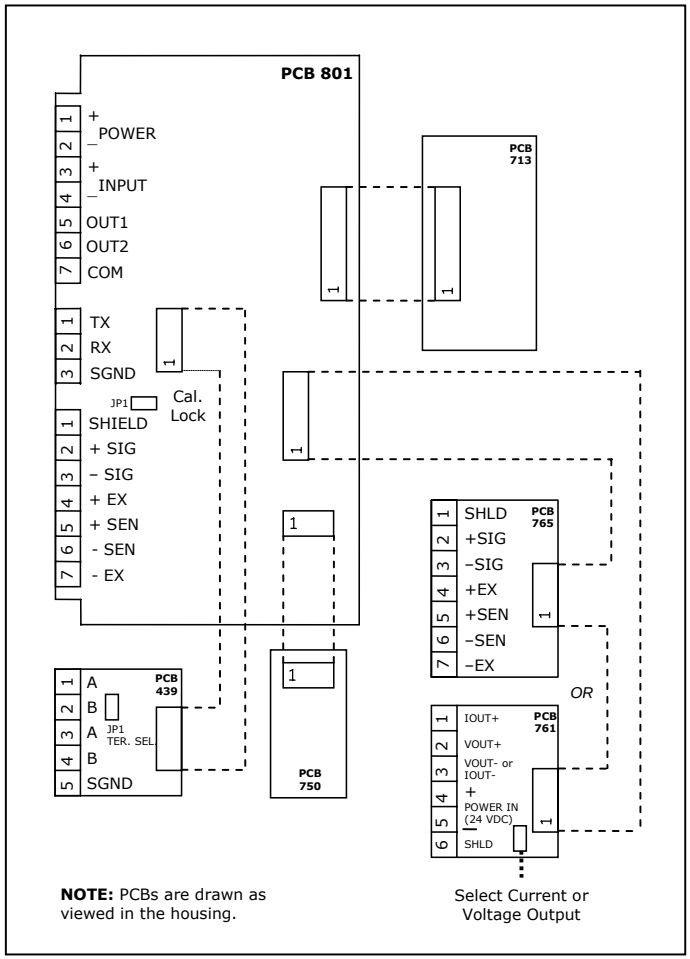
| COM 1 | |
|---|---|
| **Pin** | **Description** |
| **2** | RX or DTR |
| **3** | TX |
| **5** | GND |
| D-Type Metal Case (Shield) | |

| LOAD CELL1 | |
|---|---|
| **Pin** | **Description** |
| **1** | Excitation (-) |
| **2** | Sense (-) |
| **3** | Sense (+) |
| **4** | Excitation (+) |
| **5** | Signal (-) |
| **6** | Signal (+) |
| D-Type Metal Case (Shield) | |
| **7** | Calibration Enable |
| **8** | |

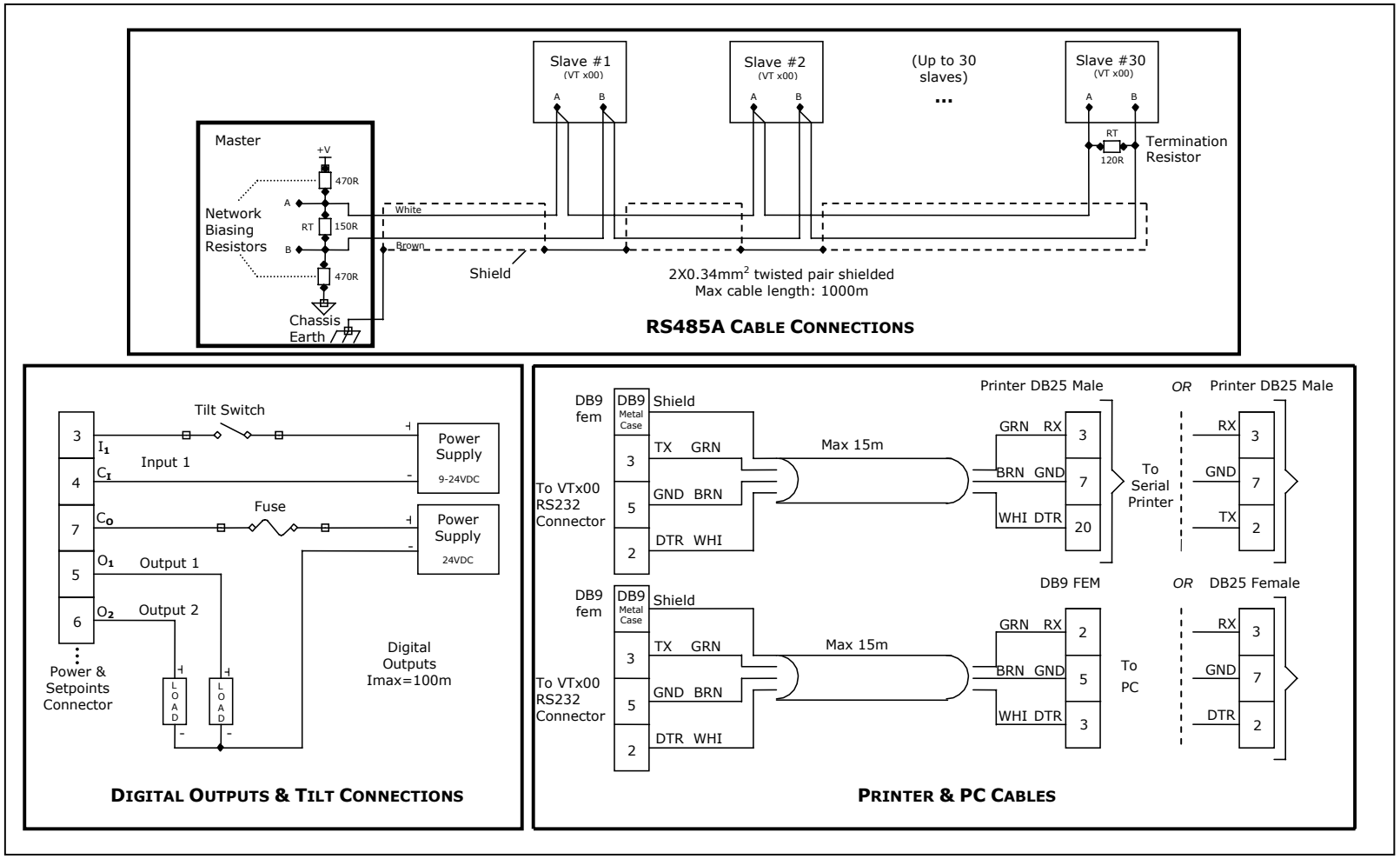
| LOAD CELL2 (DB15 F) | |
|---|---|
| **Pin** | **Description** |
| **1** | Excitation (-) |
| **2** | Sense (-) |
| **3** | Sense (+) |
| **4** | Excitation (+) |
| **5** | Signal (-) |
| **6** | Signal (+) |
| D-Type Metal Case (Shield) | |

| ANALOG OUTPUT (DB15M) | |
|---|---|
| **Pin** | **Description** |
| **1,9** | IOut (+) |
| **2,10** | VOut (+) |
| **3,11** | IOut (-) or VOut (-) |
| **4,12** | Power in +24 VDC |
| **5,13** | Power in GND |
| D-Type Metal Case (Shield) | |

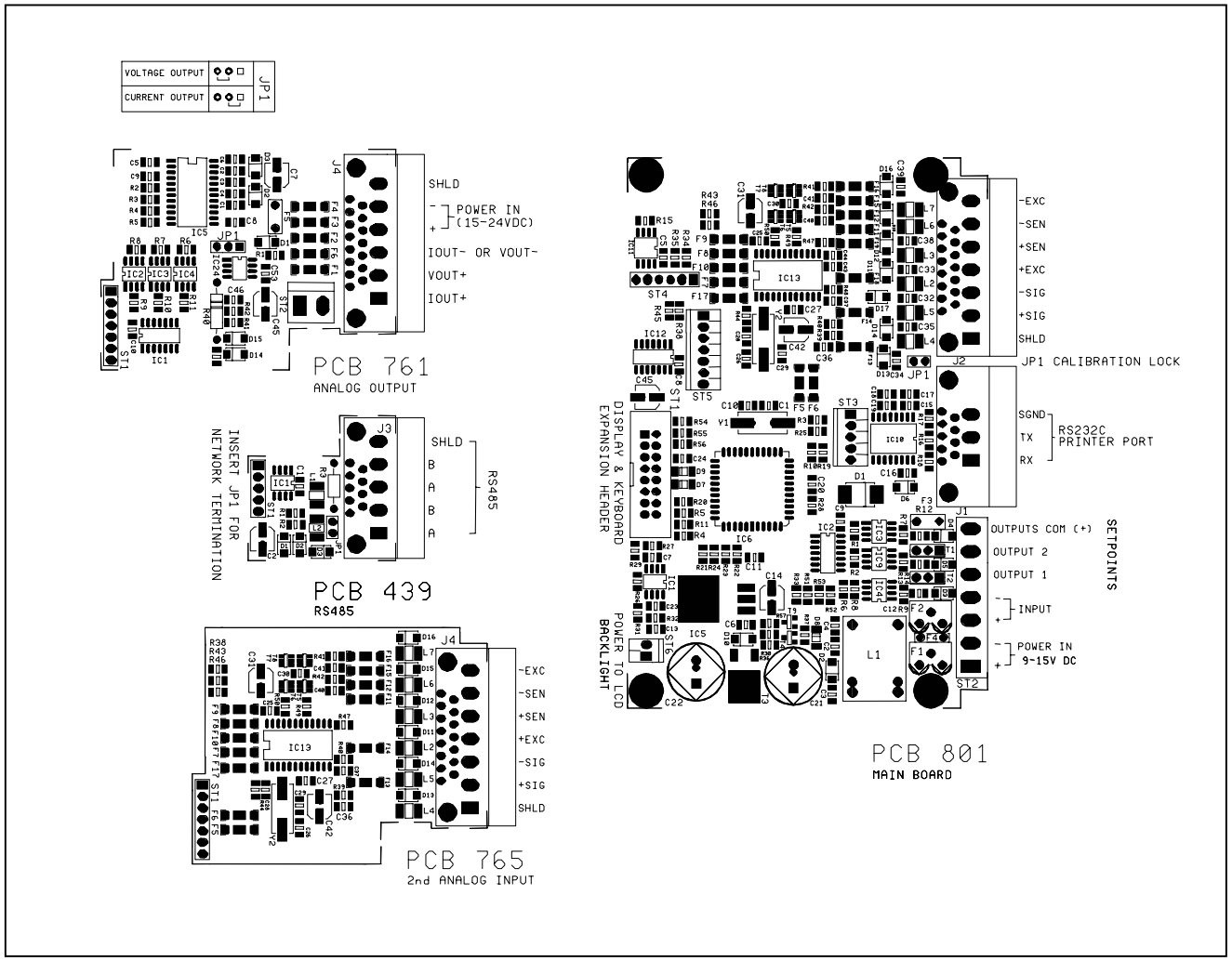
## *iii. Terminal Connections (Wall-Mount Model)*



## *iv. Cabling Diagram*



## *v. Printed Circuit Boards*



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