KINGKIRD INDICATOR

CONTENTS

PRECAUTIONS

READ this manual BEFORE installing, operating, or servicing this equipment.

⚠ **WARNING**

ONLY PERMIT QUALIFIED ERSONNEL TO SERVICE THIS EQUIPMENT. EXERCISE CARE WHEN MAKING CHECKS, TESTS AND ADJUSTMENTS THAT MUST BE MADE WITH POWER ON. FAILING TO OBSERVE THESE PRECAUTIONS CAN RESULT IN BODILY HARM.

FOLLOW these instructions carefully.

SAVE this manual for future reference.

⚠ **WARNING**

FOR CONTINUED PROTECTION AGAINST SHOCK HAZARD CONNECT TO PROPERLY GROUNDED OUTLET ONLY. DO NOT REMOVE THE GROUND PRONG.
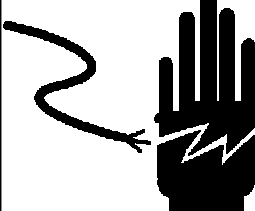
DO NOT allow untrained personnel to operate, clean, inspect, maintain, service, or tamper with this equipment.

⚠ **WARNING**

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

ALWAYS DISCONNECT this equipment from the power source before cleaning or performing maintenance.

⚠ **CAUTION**

BEFORE CONNECTING/DISCONNECTING ANY INTERNAL ELECTRONIC COMPONENTS OR INTERCONNECTING WIRING BETWEEN ELECTRONIC EQUIPMENT ALWAYS REMOVE POWER AND WAIT AT LEAST THIRTY (30) SECONDS BEFORE ANY CONNECTIONS OR DISCONNECTIONS ARE MADE. FAILURE TO OBSERVE THESE PRECAUTIONS COULD RESULT IN DAMAGE TO OR DESTRUCTION OF THE EQUIPMENT OR BODILY HARM.

CALL METTLER TOLEDO for parts, information, and service.

1 Introduction

This manual provides detailed information for installing, programming, and servicing the KINGBIRD industrial scale terminal, an excellent performance basic capability weighing instrument designed to meet the needs of Bench & Floor scale application, meanwhile, the terminal provides multiple weighing functions , e.g. Animal weighing , basic counting , hold and weight accumulation , autoprint ….. , you can use the KINGBIRD terminal throughout your facility to serve all of these diverse applications .

Information on operating the KINGBIRD terminal can be found on the operation card along with the product.

Review all instructions and safety precautions carefully. Installation and service procedures should be performed only by authorized personnel .

Kingbird Overview

The KINGBIRD terminal provides the solution to customer with the right mix of attributes. Key attributes designed into the Kingbird includes ease-of-installation, ease-of - use, flexibility and reliability.

Ease-of-installation

Multi-Voltage Power Supply --- The Kingbird terminal can be ordered with one of three different power supplies. 100VAC, 120VAC and 220VAC are available. The correct power supply is defined by the destination market . The correct power supply is installed when you order the unit.

Simple Mounting ----- The Kingbird terminal may be used at desk-top, Column mount and wall mount (with optional mounting bracket).

Plug and play ---- The Kingbird terminal uses female D subminiature connector to the load cell and RS232 .

Ease- of –Use

Operator Display --- The bright vacuum fluorescent display provides easy viewing in even the poorest lighting conditions.

Keyboard --- Kingbird 's tactile –feel keyboard has large , easy-to-target keys . The function keys can be used to access various functions in the Kingbird. The key overlay is constructed of a durable polyester material that resist physical wear and chemical attack.

Flexibility

Configuration ---- An advanced " Program block " menu tree allows the Kingbird to be configured quickly to fit a wide variety of applications. Navigation in the menu tree is simple and consistent.

Versatile weighing mode ---- Through the different setting in the setup menu, the Kingbird terminal may be configured as auto-print, auto-accumulation, and animal weighing , counting , hold etc.

Reliability

ISO 9001 Quality ---- The Kingbird was developed , produced , and tested in a Mettler-Toledo facility that has been audited and registered according to international ISO 9001 quality standards .

Factory Assembly ---- Factory assembled models will be tested as a system , including all internal functions and communication , and shipped ready for installation " out of the box " .

Serviceability ---- Extensive hardware and software diagnostics make internal or external problems easy to identify and correct .

Performance Standards ---- The Kingbird is designed to meet all international weights and measures and electrical safety standards . It also has high immunity to external influences such as radio frequency and eletromagnetic interference and static discharge .

Model Identification

Use the information below to confirm the correct model number for the KINGBIRD terminal with which you will be working. The model number is found on the data plate.

K TG N ---1 0 0 0 --- X X X

Kingbird Terminal

Scale Interface
(1= Analog L/C)

Unuse

Market
(Country finish code)
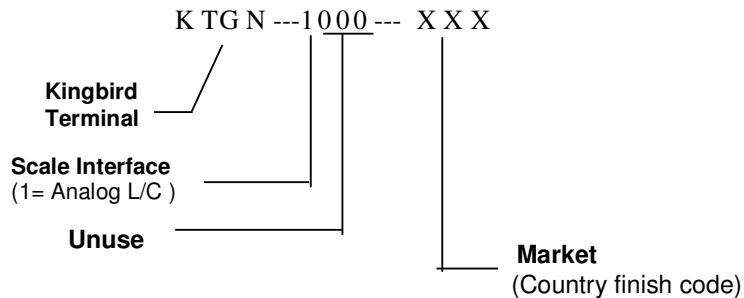
Specification

The KINGBIRD conforms to the specifications listed in this chapter.

Standard Features

- Scale functions

Analog (up to 4 x 350ohm cells) scales supported
10,000d display resolution
A/D conversion rate : 20 times/ second
Pushbotton tare
Automatic tare above threshold
Automatic clear to gross below threshold
Automatic zero maintenance
Units switching (lb,kg,g , Newton)
TraxDSP vibration rejection
Manual and auto accumulation

- Weighing functions

Animal weighing
Basic counting
Hold
Manual and Auto-print
Accumulation

- Serial data functions

Output on demand and continuous mode
Print interlock to prevent duplicate prints

Physical Dimensions

The KINGBIRD terminal measures: 230mm wide x 172mm high at the front of the terminal and is 157mm deep.

Display and Keyboard

The display is a seven-character, seven-segment, 0.55in (12.7mm) vacuum fluorescent numeric display.
The keyboard consists of a membrane spring switch covered with the domed polyester overlay.
The lens are polyester and have hardcoating to resist damage to the lens.

Power Requirements

The KINGBIRD is provided with a universal (manually selectable) power supply which operates from 85 to 264VAC. The supply operate with a line frequency of 49 to 63Hz. Power consumption is 12 Watts maximum. The factory pack the product according the country finish code to determine they power voltage and power cord type.

The integrity of the power ground for equipment is important for both safety and dependable operation of the KINGBIRD and its associated scale base . A poor ground can result in an unsafe condition if an electrical short develops in the equipment . A good ground connection is needed to assure extraneous electrical noise pulses are minimized . It is important that equipment doesn't share power line with noise generating equipment like heavy load switching , motor starter circuit , RF thermal heaters , inductive loads and the like .

2 Installation

This chapter gives detailed instructions and important information you will need to install the Kingbird terminal successfully. Please read this chapter thoroughly before you begin installation.

Location/Environment

The first step in installing the KINGBIRD terminal is to select the best location. Placing the KINGBIRD terminal in an appropriate location will enhance its longevity and operation. Keep in mind the following when choosing a location for the KINGBIRD terminal:

- The KINGBIRD terminal can be operated between a temperature range of –10° C to 45° C at 10% to 95% humidity, noncondensing.

- The storage temperature range is from –40° C to 60° C at 10% to 95% humidity, noncondensing.

- The KINGBIRD terminal enclosure meets IP4X , it can NOT be used at washdown application , **only be located at dry area** .

- **The KINGBRID terminal is not intrinsic safe !** Contact your authorized METTLER-TOLEDO representative about hazardous area applications.

Inspection and Contents Checklist

Please follow the procedures listed below to check the contents of the product package:

- If the KINGBIRD terminal's shipping container appears damaged upon delivery, check inside for damage. File a freight claim with the carrier if necessary.

- If the container was undamaged, unpack the container if you have not already done so. Keep the original packing material for future use.

- Make sure the KINGBIRD terminal package contains the following :

- ✍ KINGBIRD terminal (indicator)

- ✍ The Service manual

- ✍ The Operation Card

- ✍ Security Seal

- ✍ Capacity Sheet Labels

- ✍ Accessory bag

Electrical Connections

The KINGBIRD terminal provides "plug-n-play "type electrical connection , please see the below drawing to find the location of the connection port :
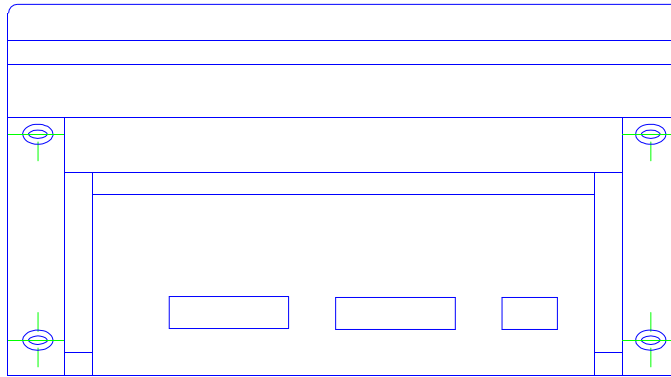
COM1 : one 25 pin female D subminiature for RS232 serial port
Load Cell : one 9 pin female D subminiature for load cell connection .

Connect the load cell

The analog load cell connector to the terminal is a female 9-pin D subminiature connector. The following diagram shows the pins assignments for 9 pin D subminiature connector.

Standard 6-wire cable

+EXC ------ 1

+SEN ------ 2

SHLD ------3

-SEN   ------ 4

-EXC   ------ 5

+SIG   ------ 7

-SIG   ------ 8

The maximum cable length for analog load cell connections to the Kingbird terminal depends on the total scale resistance (TSR) of the scale base. To calculate TSR:

$$TSR= \frac{\text{Load cell Input Resistance (Ohms)}}{\text{Number of Load cells}}$$

This chart gives recommended cable lengths based on TSR and cable gauge. The Kingbird terminal can power up to four 350 Ohm analog load cells.

Recommended Maximum Cable Length			
TSR (Ohms)	24 Gauge (feet)	20 Gauge (feet)	16 Gauge (feet)
350	800	2000	4000
87	200	600	1000

Minimum Increment Size for Analog Scale Input.

The minimum increment size selection for an analog scale input is determined by calculating the microvolts per increment for the desired build. To calculate the microvolts per increment, solve the following equation for μV per increment.

$$\mu VperIncrement = \frac{\text{Increment Size x cell output x5000}}{}$$

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The increment size, scale capacity, and load cell capacity must all be measured in the same weight units, lb or kg. If the weight units for any of these variables are listed in kg units, multiply by 2.2046 to convert to lb units for the purposes of this calculation.

Load cell output is rated in mV/V (millivolts per volt of excitation), marked on load cell data tag. Mettler Toledo load cells are typically 2 mV/V. Other load cells can range from 1 mV/V to 4.5 mV/V.

The load cell capacity is the rated capacity marked on load cell data tag. The ratio is the total number of load cells in the system or the total lever ratio (if scale is a mechanical lever system conversion).

Sample Calculation

1. Refer to the following example of µV per increment calculation for a Model 2158 floor scale installation.

Scale Capacity 5000 lb

Increment Size 1.0 lb

Load Cell Capacity 2500 lb

Number of Cells 4

Cell Output 2 mV/V

Excitation Voltage 5 VDC

2. Use the following formula to calculate the µV per increment:

$$\mu V\,perIncrement = \frac{\text{Increment Size} \times \text{cell output} \times \text{excitation (mV)}}{\text{Load Cell Capacity} \times \text{Ratio}}$$

Substituting the 2158 parameters in the formula:

$$\mu V\,perIncrement = \frac{1.0\ lb \times 2\ mV/V \times 5000}{2500\ lb \times 4\ load\ cells} = 1.0\mu V/inc$$

The KINGBIRD terminal is approved as legal-for-trade at a minimum of 1 µV per increment. Acceptable weighing performance for non-legal-for-trade applications can be obtained when a minimum of 0.6 µV per increment is provided. At full scale, the maximum load cell output may not exceed 10 mV in the 2 mV/V jumper position or 15 mV in the 3 mV/V jumper position.

Serial Port COM1 Connection

The KINGBIRD terminal provides one standard RS232 serial communication port, and it is female 25 pin D subminiature connector. Below diagram is the pin assignment.

The maximum recommended cable length for RS-232 interface is 50 feet.

COM1/SIGNAL	PIN
TXD (RS232)	2
RXD (RS232)	3
SIGNAL GROUND	7

3   Programming and Configuration

The KINGBIRD operating functionality is determined by how you configure individual parameters of " Program blocks " in setup mode. This chapter discusses basic features of program blocks and how to configure the specific parameters (" sub-block ") of each . The following diagram gives an overview of the program blocks and sub-blocks :

```
                              ┌─────────────────┐
                              │   Setup Mode    │
                              └─────────────────┘
                                      │
   ┌──────────┬──────────────┬────────┼────────┬──────────────┬──────────────┐
   ▼          ▼              ▼        ▼         ▼              ▼
┌────────┐ ┌────────────┐ ┌─────────┐ ┌──────┐ ┌──────────┐ ┌──────────┐
│ F1 Scale│ │F2 Application│ │F3 Configure│ │ F4  │ │   F5    │ │   F6    │
│interface│ │ Environment │ │  COM1   │ │(Reserved)│ │Weigh mode│ │Diagnostics│
└────────┘ └────────────┘ └─────────┘ └──────┘ └──────────┘ └──────────┘
```

F1.2 CAL units	F2.1 Alternate Units	F3.1 COM1		F5.1 Weigh mode	F6.1 Expanded Display
F1.3 Capacity	F2.3 Tare function	F3.1.1 Baud rate		F5.1.1 Sample interval	F6.2 Calibratio Factors
F1.4 Increment size	F2.4 Zero function	F3.1.2 Data bits		F5.2 Accumulation	F6.4 Print setup
CAL	F2.4.1 PB Zero	F3.1.4 Parity		F5.3 Consecutive number	F6.5 Reset to factory
F1.6 Zero Adjust	F2.4.2 AZM	F3.1.5 Checksum			F6.6 COM1 test
F1.7 Span Adjust	F2.4.3 AZM Net	F3.1.6 STX			F6.7 Keyboard test
F1.8 Gravity Adjust	F2.4.4 Zero cursor	F3.2 Manual/Auto print			
	F2.4.5 Negative blanking	F3.3 Language			
	F2.5 Motion Sensitivity	F3.4 Output mode			
	F2.5.1 Motion blanking	F3.4.1 Data format			
	F2.6 Low pass Filter				
	F2.6.1 Noise filter				

General Information

The KINGBIRD setup parameters are divided into five program blocks. each program block is divided into sub-blocks where you select and configure individual operating parameters . This chapter describes each program block and sub-block in detail . You should read through this chapter and configure each parameter before you begin using the KINGBIRD indicator .

The KINGBIRD program blocks use several standard conventions . This section gives general information on keystroke functions , navigation procedures , and program block access and exit .

Keystroke Functions
The following keys are used to configure the program blocks when in setup mode .

Zero   ZERO Backup to the previous step.

Tare   TARE Moves the blinking edit cursor left one digit.

Clear   CLEAR Resets a numeric data entry value to zero and/or allows programmer to skip to the end of setup.

Total   TOTAL Moves the blinking edit cursor right one digit.

Mode   MODE Increments the numeric data entry digit and/or allows the programmer to view the next in a selection list.

Enter Print   ENTER Accepts/terminates a data entry.

Master and Service Mode

The Master and Service mode is two setup modes which the KINGBIRD terminal provides to customer and service person.

The master mode allows you to match your scale to your specific weighing needs, In the Master mode you can change the settings of your scale and activate functions .The master mode contains all the program block except the F1 block, since the parameter in this block will impact to the scale weighing accuarcy performance .

The Service mode allows the W&M and the service person to enter to calibrate the scale, it contains all the program blocks .

Please see the following description of how to enter into the master and service .

Program Block Access
(Master and Service mode)

In order to configure the program blocks the programmer must enter the setup mode. The difference between Master and Service mode is determined by the SW1-1 , if the SW1-1 is in OFF position , that will allow you to enter into Service mode , otherwise is the Master mode .

Open the KINGBIRD terminal and select the position of the SW1-1 and press the ENTER and ZERO keys simultaneously.

W&M seal

In order to secure the KINGBIRD terminal from accidental or unintentional changes in setup mode to impact the weighing accuracy performance , turn switch SW1-1 off.

In legal-for-trade applications, after checking for correct operation and turning switch SW1-1 off, the KINGBIRD terminal enclosure must be "sealed." , loop the wire through the hole in the bottom case and the one in the W&M screw , and secure it with a seal.

After accessing the setup mode, each program block and sub-block can be configured according to the procedure outlined in the following pages. If the terminal is being configured for the first time it is recommended that the programmer configure each program block to assure the terminal is setup correctly as the application and/or environment dictates.

Once the F1 prompt is displayed, the MODE key will skip to the next block and the ENTER key will enter the block.

Once ENTER is pressed, the KINGBIRD advances to the first parameter in the block. The display shows the sub-block number and the current value setting. Press ENTER to accept the value and advance to the next sub-block or press the MODE key to toggle through the choices until the desired selection is displayed. After the desired selection is displayed press the ENTER key to accept the value. Continue this procedure throughout the setup routine until all changes required have been made.

Program Block Exit

To exit setup, press the CLEAR key to advance to the CALOFF display. then ENTER key. The KINGBIRD terminal will exit setup and return to the normal operation mode. At this point, the switch S1-1 can be turned off to secure the terminal.

Default Settings

The following is a list of the factory default setup parameters in the terminal.

	State	Description
F1.2	2	Calibration Units = kg
F1.3	100	Scale Capacity
F1.4	0.01	Scale Increment Size
F1.6		Zero Adjust, no default
F1.7		Span Adjust, no default
F1.8	16	Geo Value
F2.1	0	Alternate Units = None (unit switching disable)
F2.3.1	1	Tare Enabled
F2.3.2	0	Tare Interlock Disabled
F2.3.3	0	Auto Tare Disabled
F2.3.4	0	Auto Clear Tare Disabled
F2.4.1	1	Pushbutton Zero Enabled, 2% range
F2.4.2	1	Auto Zero Maintenance Enabled within 0.5d window
F2.4.3	0	Auto Zero Maintenance in Net Mode Disabled
F2.4.4	1	Zero Cursor Enabled
F2.4.5	0	Display the negative weights
F2.5	1	Motion Sensitivity ± 0.5 increments
F2.5.1	0	Blanking Disabled in motion
F2.6	2.0	Filter Corner Frequency
F2.6.1	0	Noise Filter Disabled
F3.1	1	COM1
F3.1.1	1200	Baud Rate
F3.1.2	7	Data bits
F3.1.4	2	Even Parity
F3.1.5	0	Checksum Disabled
F3.1.6	0	STX Disabled
F3.2	0	Manual print w/ interlock
F3.3	0	Print in English
F3.4	1	Demand output
F3.4.1	0	Print Format = Displayed Weight Only
F5.1	0	Indicator Weighing Mode , normal weighing
F5.2	0	Manual accumulation
F5.3	0	Disable consecutive number
F6.1	0	No Expanded Display Mode
F6.2	xxx	Edit Cal. Factors, no default
F6.4		Print Setup, no default

F6.5	0	Reset to Factory, no default
F6.6	0	RS232 serial port test
F6.7	0	Keyboard test

F1 Scale Interface Program Block

The scale interface program block allows the user to set and calibrate the features that affect weighing performance.

Press **Mode** to skip to the next program block. Press **Enter** to access the scale interface program block and configure the sub-blocks.

F1.2 Calibration Units
Sub-block

[F1.2 X]   CALIBRATION UNITS : Enter the value for X that corresponds to the type of test weights that will be used for calibration .

X = 1   lb
X = 2   kg
X = 3   g
X = 10   Newton

F1.3 Scale Capacity
Sub-block

 [F1.3]   SCALE CAPACITY

[XXXXX] Current scale capacity , available for numeric entry editing , Note that only legal scale capacities from the capacity table in chapter one are permitted .

Increm-ent size	ANALOG LOAD CELL SCALE CAPACITIES (lb or kg)										
	1000	1500	2000	2500	3000	4000	5000	6000	7500	8000	10000
0.001	1	-	2	-	3	4	5	6	-	8	10
0.002	2	3	4	5	6	8	10	12	15	16	20
0.005	5	-	10	-	15	20	25	30	-	40	50
0.01	10	15	20	25	30	40	50	60	-	80	100
0.02	20	30	40	50	60	80	100	120	150	160	200
0.05	50	-	100	-	150	200	250	300	-	400	500
0.1	100	150	200	250	300	400	500	600	-	800	1000
0.2	200	300	400	500	600	800	1000	1200	1500	1600	2000
0.5	500	-	1000	-	1500	2000	2500	3000	-	4000	5000
1	1000	1500	2000	2500	3000	4000	5000	6000	-	8000	10000
2	2000	3000	4000	5000	6000	8000	10000	-	-	-	20000
5	5000	7500	10000	-	15000	20000	25000	30000	-	40000	50000
10	10000	15000	20000	-	30000	40000	50000	60000	-	-	-
20	20000	30000	40000	50000	60000	-					

F1.4 Increment Size
Sub-block

[F1.4   ]   INCREMENT SIZE

Current Increment Size is displayed for Selection List editing . Press MODE key to toggle through the valid selections .

Calibration Sub-block

[CAL   X] SCALE CALIBRATION PROCEDURE

X = 0   Skip calibration procedure

X = 1   Continue calibration

[E SCL] Empty scale platform and press ENTER to continue .

[15 CAL] Delay while initial is et (display counts down) . If the motion sensitivity is not disabled and motion is detected at this step , the display returns to the [E SCAL] prompt .

[Add Ld] Place test weight on the scale platform , and press ENTER .

['0'0000] Enter test weight value .No decimal point is permitted . Maximum test weight is 105% of full scale capacity .

[15 CAL] Delay while span is et (display counts down) . If the motion is detected at this step then the display returns to the [Add Ld] prompt .

[CAL d] " Calibration done "is displayed momentarily .

F1.6 Zero Calibration Adjust Sub-block

[F1.6 X] ZERO CALIBRATION ADJUST

X = 0 Skip zero adjustment

X = 1 Store current initial on scale as zero.

[15 CAL] If zero calibration adjust is selected the display counts down from 15 to 0 while scale reading are being taken.

Scale motion causes the countdown re-start from 15. Pressing CLEAR at anytime during the countdown aborts zero adjust so that the motion sensitivity selection can be modified. When the countdown reaches "0," the scale reading is adjusted to the new zero reading.

F1.7 Span Calibration Adjust Sub-block

[F1.7 X] SPAN CALIBRATION ADJUST

X = 0 Skip span calibration adjust

X = 1 Perform span calibration adjustment.

['0'0000] Numeric data entry of current scale test load. If the ENTER key is pressed with the display showing " 0" then span adjust is aborted.

[15 CAL] After valid (non-zero) data entry, the display counts down from 15 to 0 while scale readings are taken. Scale motion causes the countdown to restart from 15. Pressing CLEAR during the countdown aborts span adjust so that the motion sensitivity selection can be modified. When the countdown reaches "0," an attempt is made to calculate the span calibration. If the weight is negative, over-capacity or in expand mode, "E 35" is displayed to show that span adjustment cannot be performed. If the entered weight is more than twice the original displayed weight, "E 35" is displayed. Press any key to clear "E 35" and proceed to the end of setup.

F1.8 Geo Code Sub-block

[F1.8 X X] GEO CODE

Values from 00 to 31 are accepted. The Geo Code is used to compensate for differences in the

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acceleration of gravity due to latitude and elevation if the scale was calibrated in one location then moved to another. Gravitational acceleration decreases with increasing height above sea level by approximately 0.2 parts per thousand every 1000 meters. The Geo Code has 32 settings with an increment

size of 0.2 parts per thousand. The default Geo Code is 16 .

F2 Application
Environment Block

[F2] APPLICATION ENVIRONMENT

Press MODE to skip to [F3].

Press ENTER to continue.

F2.1 Alternate Units
Sub-block

[F2.1 X] ALTERNATE UNITS: Enter a value for X that corresponds to the unit of measure desired as a secondary unit.

X = 0   None

X = 1   lb

X = 2   kg

X = 3   g

X = 10   Newton

F2.3 Tare Operations
Sub-block

[F2.3] TARE OPERATIONS

Press MODE to skip to [F2.4], press ENTER to continue.

[F2.3.1 X] ENABLE TARE : Enter a value for X that will enable or disable Tare.

X = 0 Tare disabled

X = 1 Only Pushbutton Tare enabled

[F2.3.2 X] TARE INTERLOCK: The tare interlock feature, if enabled, places certain limitations on how tare values can be cleared and entered in legal-for-trade applications. Specificaly, tare interlock meets legal-for-trade requirements by making the following restrictions:

- Tare weights can be cleared only at gross zero (with the scale empty)

- Tare can be entered only when the scale is in gross mode

- Previous tare values must be cleared before a new tare value can be entered (chain tare disabled)

X = 0 Tare Interlock disabled

X = 1 Tare interlock enabled

[F2.3.3 X] AUTO TARE

X = 0 Auto Tare disabled

X = 1 Auto Tare enabled after no motion following > 5d when in GROSS mode

[F2.3.4 X] AUTO CLEAR TARE

X = 0 Auto Clear Tare disabled

X = 1 Auto Clear Tare enabled, tare automatically clears at gross zero

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F2.4 Zero Operations Sub-block
[F2.4] ZERO OPERATIONS
Press MODE to skip to [F2.5], press ENTER to continue.

[F2.4.1 X] PUSHBUTTON ZERO ENABLE
X = 0   Pushbutton zero disabled
X =1Enable pushbutton zero and AZM within ±2% FS range
X =2Enablepushbutton zero and AZM within ±20% FS range
[F2.4.2 X] AUTOZERO MAINTENANCE: Auto Zero Maintenance (AZM) automatically compensates for small changes in zero resulting from material build-up lets you select the weight range (+/-) around gross zero within which KINGBIRD will capture zero . If residual weight on the scale exceeds the weight range, the KINGBIRD terminal will not capture zero.

X =   0 No AZM or zero capture at power-up

X = 1 AZM within 0.5 d window and power-up zero capture ±2%.

X = 2 AZM within 1d window and power-up zero capture ±5%.
X = 3 AZM within 3d window and power-up zero capture ±10%.

[F2.4.3 X] AZM IN NET MODE
X = 0 Disable AZM in net mode
X = 1 Enable AZM in net mode

[F2.4.4 X] ZERO CURSOR
X = 0 No Zero cursor
X = 1 Zero cursor enabled

[F2.4.5 X] UNDER ZERO BLANKING
X = 0 No Under Zero blanking
X = 1 Blank Display and internal signal "Under Capacity" if gross weight is greater than 5d under zero.

F2.5 Motion Sensitivity Selection Sub-block

[F2.5 X] MOTION SENSITIVITY SELECTION: The motion detection feature determines when a no-motion condition exists on the scale platform. The sensitivity level determines what is considered stable. Printing, pushbutton zero, and tare entry will wait for scale stability before carrying out the command.
Stability detection occurs over a predefined period of time and allows a predetermined "acceptable" amount of motion (in scale increments).
X = 0 Motion detector disabled
X = 1 1.0 d motion sensitivity
X = 2 3.0 d motion sensitivity

[F2.5.1 X] MOTION BLANKING
X = 0 Blanking disabled
X = 1 Blank the weight display during motion

F2.6 Low Pass Filter
Corner Frequency
[F2.6 X.X] LOW PASS FILTER CORNER FREQUENCY
X.X is the numeric data entry for the low pass filter corner frequency (0.5-9.9Hz).

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[F2.6.1 X] NOISE FILTER ENABLE/DISABLE
X = 0 Disable noise filter
X = 1 Enable noise filter

F3 Configure
Serial I/O Block

[F3] CONFIGURE SERIAL I/O

Press MODE to skip to [F5].

Press ENTER to continue.

F3.1 Select Serial Port
Sub-block

[F3.1]   COM1 CONFIGURATION :
X = 0   Skip to [F3.2]
X = 1   Enter into the block to configure the parameters

[F3.1.1] DATA RATE
[XXXX] Select 300, 1200, 2400, 4800, or 9600 baud

[F3.1.2] DATA BITS
X = 7   7 data bits
X = 8   8 data bits

[F3.1.4 X] PARITY
X = 0   No parity
X = 1   Odd parity
X = 2   Even parity

[F3.1.5 X] CHECKSUM
X = 0   No checksum sent
X = 1   Checksum enabled

[F3.1.6 X] STX setting
X = 0   No STX
X = 1   Send STX

F3.2 Manual and Auto
Print

[F3.2   ]   MANUAL AND AUTO PRINT
X = 0   Manual print and disable print interlock
X = 1   Manual print and enable print interlock , threshold is 10 d display weight
X = 2   Enable Auto print interlock , threshold is 10d display weights

---

F3.3Language Selection

[F3.3   ] LANGUAGE SELECTION :
X = 0   Printout in English
X = 1   Printout in Chinese

F3.4 Serial Data Out
Sub-block

[F3.4 X] SERIAL DATA OUT
X = 0 Continuous mode. If continuous mode, the display skips to [F5].

X = 1 Demand mode. Continue to next step.
X = 2 SICS Protocol. If 2 is selected, the display skips to [F5].

[F3.4.1 X] DATA FORMAT (Demand Mode output only) X
= 0 Single line. Displayed weight only
X = 1 Single line , gross , tare and net .
X = 2 Multiple line , gross , tare and net .
X = 3 Ticket format , determined by selected weighing mode.

F5 Weigh Mode Block

[F5] WEIGH MODE
Press ENTER to continue.
Press MODE to skip to [F6].

F5.1 Enter Weigh Mode
Sub-block

[F5.1 X] WEIGH MODE SELECTION X
= 0 Normal weighing. Skip to [F5.2] X =
        1 Animal weighing, skip to [F5.1.1]
X = 2 Counting , skip to [F5.2]
X = 3 Hold , skip to [F5.2]

Refer to Chapter 4 for detail of each weighing mode .

[F5.1.1] ANIMAL WEIGHING SAMPLE INTERVAL

Press MODE key to toggle 3, 5 and 10 seconds and ENTER key for acknowledgement .

_____

F5.2 Accumulation
Sub-block

     [F5.2 X] ACCUMULATION
     X = 0 Auto-accumulation disable
     X = 1 Auto-accumulation enable

     Accumulation function is not available at HOLD weighing mode.

_____

F5.3 Consecutive Number Sub-block
     [F5.3 X] CONSECUTIVE NUMBER
     X = 0 Consecutive number disable
     X = 1 Consecutive number enable

F6 Diagnostics Block

     [F6] DIAGNOSTICS
     Press MODE to skip to [CAL OFF].
     Press ENTER to continue

_____

F6.1 Expanded Display
Sub-block

     [F6.1 X] EXPANDED DISPLAY.
     X = 0 Normal display mode
     X = 1 Weight displayed in minors (1d = 10 minors)

_____

F6.2 Edit Calibration Factors Sub-block

          [F6.2 X] EDIT CALIBRATION FACTORS

          X = 0 Skip this block

Note : please don't change the factors , otherwise will impact the scale performance , suggest to record that figure for later service .

          X = 1 Edit calibration factors

          [123456]   Zero factor, available for numeric data editing
          [123456] Span factor,available for numeric data editing, page 1
          [123456] Span factor, available for numeric data editing, page 2

          [F6.4 X] PRINT SETUP X
            = 0 Skip this sub-block
         X = 1 Print setup report

_____

F6.5 Reset to Factory Defaults
     [F6.5 X] RESET SOFTSWITCH CONFIGURATION TO FACTORY SETTINGS

     X = 0 Skip this sub-block

     X = 1 Restore all settings to factory defaults

     [LOAd 0] Are you sure prompt. Toggle to "1" for yes, "0" to abort, then press ENTER . If "yes", soft switches are now set to the factory default values.

F6.6 COM1 Serial Port Test Sub-block
     [F6.6 X] COM1 SERIAL PORT TEST

X = 0 Skip this sub-block

X = 1 Continue to test the COM1

The Serial Interface Test tests the serial ports COM1. Shorten TXD and RXD, Press ENTER to start the test , left two digits show the transmitted data, the right two digits show the received data.
8142Pro scrolls from 1 to 99. If the data is equal , that means the serial port is working fine . The serial interface test is useful in hardware diagnostics. Press ZERO key for exit the test .

F6.7 Keyboard Test Sub-block
   [F6.7 X] KEYBOARD TEST

   X = 0   Skip this sub-block

   X = 1   Continue to test the keyboard

4   Kingbird Operation

This chapter provides general information that an operator will need to become familiar with the terminal and to perform its functions , and step-by-step instructions describing each operator function .

Kingbird Display Area

The KINGBIRD has a single 7-segment numeric display where scale data and operational messages are presented .The display is pictured below :
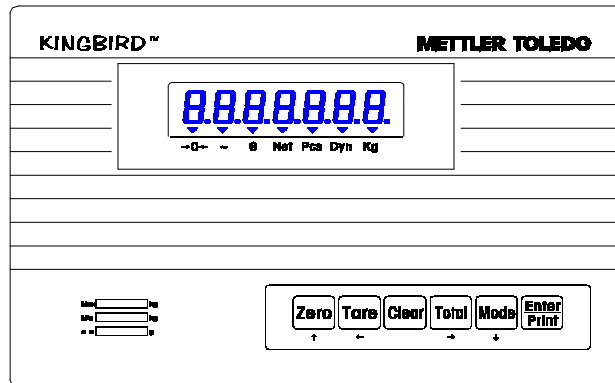
The display indicates scale weight unless you are in setup mode programming the KINGBIRD or using prompting . Error messages are displayed as they occur .

Annunciators point to labels in the legend directly below the display area . Annunciators indicates :

- **Center-of-Zero (0   ) :** $\Rightarrow$ $\Leftarrow$
The Center-of-zero annunciator indicates that the scale is within +/- 1/4 increment of gross zero .

- **Scale instability (~)**
The scale instability annunciator indicates that the scale is in motion . The annunciator will turn off when the scale is stable . The sensitivity of motion detection is adjustable in setup.

- **Weighing mode (G**ross and **N**et **)**

The Kingbird will be in net mode when a tare is active . Tare may be automatically acquired when you press the TARE key or enable the automatically tare function . If no tare is active the KINGBIRD will be in gross mode .

- **Special weighing mode (Animal weighing and Counting)**

The Kingbird provides animal weighing and Counting special weighing mode . When select the counting mode , the " **Pcs** " annunciator will be turned on , and the display is the quantity of the parts .

The " **Dyn** " annunciator stands for the animal weighing , after the sampling period in the animal weighing mode , indicator will display the animal's "stable " weight, and turn on the "**Dyn**" annunciator as well as .

- **Kg**

The annunciator will be turned on when the unit of the weight is kg .

Terminal Keypad

Zero

The Zero key is used to compensate for small changes in weight when the scale platform is empty. These changes in weight are most often caused by material spilling onto the weighing platform. To zero the indication of weight, press this button. The Zero range is programmed in the setup .

Tare

The Tare key is used to subtract the weight of the object on the scale platform from subsequent indications of weight. This is most often the weight of an empty container. Once this value is "tared", the indication of weight will change to indicate net weight. To tare the scale, place an empty container on the scale and press this button.

Clear

The Clear key is used to clear a previously entered tare value. To clear the tare value, press this button. The indication of weight will return to the gross mode, showing the total weight of the objects on the scale platform.

Total

The Total key is used to accumulate the weight , press the key will accumulate the weight on the platform to the accumulation register , and the weight will blink once to acknowledge the accumulation is done. And long press Total for recalling the summary.

Mode

The Mode key function is different in each weighing mode :
(1). F5.1=0 Normal weighing . It allows the operator to switch between the primary and secondary weighing units. To change weighing units, press this button. Each initiation of this button will either switch the display units from the primary to the secondary units, or back to the primary from the secondary.
(2).F5.1=1 Animal weighing . Initiate the weighing cycle .
(3).F5.1=2 Counting . Short press for set the sample parts quantity ; Longer press for recall the

corresponding weights .
(4).F5.1=3 Hold . Initiate the cycle .

Enter Print

The Transact (Print) key is used to initiate a serial output of the weight data. To request this transmission of data, press this button. The actual format of the data string is determined in set-up. This key is also used to accept a response to a setup or programming question.

Operator Functions

Zero the Scale

Zero

If the scale platform is empty and the NET cursor is NOT lit, press the Zero button to compensate for any material which may be on the scale platform. The zero button is limited to compensating weight that is between ±2% (or ±20%, if programmed accordingly) of the scale's weighing capacity.

Tare Operations

Tare

Determine the weight of the material inside a container, weighing in the NET mode
1. Place an empty container on the scale platform
2. Press the Tare button
3. Fill the container or place a filled container of equivalent weight on the scale
4. The indicator will display the net weight and the NET cursor will light.

Clear

Clearing a tare weight:
With the scale in the net weight mode (a tare weight previously entered), press the Clear key. The net cursor will go out and the net weight will be displayed.

Print Operations

Enter Print

Printing a weight:
1. If desired, tare the weight of an empty container using the steps described above.
2. Place a load on the weighing platform.
3. Press the Transact (Print) key.

Accumulate Operations

Total

Accumulate the weight if disable the autoprint function :
1. If want to have the summary of the all transaction or some of them , you may set [F5.2] to 0 , that means you may initiate the command by press the Total key .

2. When the weight is stable , initiate the command and the weight on the window will blink once , that stands for the data is summarized .

Advanced Operator Functions

The following paragraph will introduce the detail operation in each weighing mode . And each weighing mode is determined by F5.1 . MODE key is designated as special function key in each mode .

Normal weighing mode

Basiclly , the KINGBIRD Terminal can be used at simple weighing application ([F5.1=0]) .

1. Mode key is acted as unit switch .
2. Serial port communication : both Continuous and demand output are available . The demand output format are selectable in F3.4.1 . Refer to Appendix 1 for all the output format .
3. In this mode , accumulation may be set to manual or auto .
4. The print out also may be set to manual print or automatic print out .

Animal weighing

Note: the feature of print &accumulation are not available for the " Normal" weight data in the animal weighing mode .

The weight data may be unstable when weighing the livestock , the KINGBIRD terminal is provided with the capability of animal weighing feature , it will capture the weighing data in certain sample interval and display the average weight until press ENTER or MODE to continue next cycle .

1. Set [F5.1]=1 , enable the animal weighing , and this will automatic change the printout format to animal weighing ticket format .
2. After set the [F5.1] to 1 , [F5.1.1] will be available for you to press MODE key to select the sample interval , 3,5 or 10 seconds . Then exit the setup mode . Start the animal weighing
3. Move the livestock to the platform and press MODE key to initiate the weight sampling . The display shows " **DynA** " for the certain interval time .
4. After the sampling , the display shows a stable weight , that is the average of all the sampled weight during the interval time .
5. The printout is determined by F3.2 , if it is automatic printout , KINGBIRD will send out the weight in ticket format through RS232 , otherwise , press ENTER/PRINT will initiate the print and return back to "normal " weighing.
6. The accumulation is determined by F5.2 , if it is automatic accumulation , after showing the stable weight and the data will be accumulated automaticly. If the auto-accumulation is disabled , and when display the stable weight , press ENTER/PRINT key will accumulate the weight .
7. Come back to number 3 for another weighing cycle .
8. Refer to the left side for the standard ticket printout , KINGBIRD is compatible with the 16-column mini-printer .

```
Ticket format :


 Animal Weighing

CN          3
GROSS       342.0kg
TARE        110.5kg
NET         231.5kg
```

Counting

GROSS   168.5kg

```
Ticket Format :

Piece Counting

CN          5
```

The KINGBIRD is provided with the capability basic parts counting function .

1. Set [F5.1] =2 , the printout is automatic changed to parts counting ticket format .

2. After exit the setup mode , KINGBIRD will judge the APW (average piece weight) already exist or not , if yes , the display is the quantity of the weight on the platform which is based on the APW ; if not , the display will show " Set PC " , that means put the same quantity of the parts as the number showed in the display on the platform . Press MODE key to select from 5 ,10 , 20 ,50 and 100 . Press ENTER for acknowledgement to establish the APW .
3. Then , the display is the quantity of the parts .
4. If want to change the APW , short press the MODE key , display shows " Set PC " , then repeat the Number 2 procedure .
5. Long press MODE key will recall the corresponding weight or the quantity .
6. The printout is determined by F3.2 , if it is automatic printout , KINGBIRD will send out the weight in ticket format through RS232 , otherwise , press ENTER/PRINT will initiate the print .
7. The accumulation is determined by F5.2 , if it is automatic accumulation, after it is stable , the quantity will be accumulated automaticly . If the auto-accumulation is disabled , and when display the stable quantity , press ENTER/PRINT key will accumulate the quantity .
8. Refer to the left side for the standard ticket printout , KINGBIRD is compatible with the 16-column mini-printer .

Note: the feature of print &accumulation are not available for the recalled weight in the counting mode .

Peak Hold

Ticket format :

Maximum Weight

CN   6
Max   359.0kg

With this feature , KINGBIRD can be used at the tension or force test system , KINGBIRD will compare each sampled weight and hold the maximum weight in the test duration .
1. Set [F5.1] = 3 and exit .
2. Press MODE key will start the hold function .
3. ENTER/PRINT key for print a ticket and return to " normal " weighing , MODE key for initiate another cycle .
4. Refer to the left side for the standard ticket printout , KINGBIRD is compatible with the 16-column ticket printer .

Controller PCB Switches and Jumpers

SW1 Switch Settings
1   Setup/Calibration Enable = On
     Normal Operation = Off
2   Display Comma Tail = On
3   Not Used (Should be Off)
4   Test Mode (Must be Off)

Jumper W1 (Analog Version)
Installed = 2 mV/V Load Cells
Not Installed = 3 mV/V Load Cells

5   Troubleshooting

Procedures

If operational difficulties are encountered, first obtain as much information as possible regarding the problem. Failures and malfunctions often may be traced to simple causes such as loose connections, improper setup, etc. If simple causes cannot be found, additional troubleshooting is best performed by substitution. Replacing the suspect part with known good part .

Error Code

The following table lists the error codes, description, and corrective measures.

Error Code	Description	Corrective Measures
E1	Program Memory Error	1. Check power supply voltages 2. Replace main logic PCB
E2	Internal RAM Error	1. Check power supply voltages 2. Replace main logic PCB
E3	EEPROM Memory Error	1. Check power supply voltages 2. Reprogram, recalibrate 3. Replace main logic PCB
E4	External RAM Error	Replace main logic PCB
E7	A/D Circuit Malfunction or No Analog Load Cell Connected	1. Program for correct load cell type 2. Check load cell and cables 3. Check power supply voltages 4. Replace main logic PCB
E16	Internal Math Error	Press Clear to acknowledge, unit will reset.
E32	Insufficient Test Weight Used for Calibration	Recalibrate using more test weights
E34	Test Weight Exceeds 105% of Capacity	Use less than 105% of capacity press Clear and re-enter
E35	Span Calibration Error	Recalibrate. If error persists, check programming or replace load cell
E36	Analog Load Cell Out of Range	1. Recalibrate 2. Replace load cell
E50	Weight Can't be Displayed in Alternate Units	Some alternate units combinations are illegal. Choose another scale build or disable alternate units
EEE	Positive more than Zero Capture Limit of 2% of Scale Capacity	1. Remove material from scale base 2. Disable AZM in setup 3. Cycle power
-EEE	Negative more than Zero Capture Limit of 2% of Scale Capacity	1. Disable AZM in setup 2. Calibrate scale 3. Cycle power
------	No Analog Load Cell Detected	1. Check load cell wiring 2. Replace load cell 3. Replace main PCB

Voltage Checks

AC Power Test

Use a multi-meter to check the AC input power. Input power must be within -15% and +10% of the nominal AC line voltage.

Main Logic PCB Voltage test

Verify voltage of 5VDC between + and – Excitation. If the Kingbird Terminal has power and there is no excitation voltage, replace the PCB.

RS232 Serial Output Test

Use the following test procedure whether the RS232 serial port is operational.

1. Remove power from the Kingbird Terminal and disconnect the data cable from the printer.
2. Set the volt meter to read 20 volts DC.
3. Connect the red lead to pin 2 of the printer end of the data cable and connect the black lead to pin 7.
4. Apply power. The meter should read as follows:
   ▪ In Demand mode, the meter should read between –5 and –15 with no fluctuation.
   ▪ In Continuous mode, the meter should fluctuate between –5 and +5 continuously. The constant fluctuation on the meter display on the meter display indicates the scale/indicator is transmitting information.

To test the Demand baud rates, press the Transact (Print) key. The display should fluctuate between -5 volts to +5 volts for the duration of the transmission, then become stable again. This indicates the terminal has transmitted data.

Another way to diagnose the serial port is to utilize the Kingbird 's self-diagnostic . connect the pin2 and 3 together and   set the [F6.6] to 1 , press ENTER to continue the checking , if the two digits shows on the display is same . that means the RS232 is working fine .

6   Spare Parts

Recommended spare Parts

To minimize down-time, METTLER TOLEDO recommends that you keep spare parts on hand:

Order No.	Description
131113	Overlay and keyboard assembly
132085	Kingbird , print circuit board assembly
125111	Kingbird , Transformer
100841	Kingbird , VFD tube

Appendix IRS232 Serial Interface

The Kingbird terminal has a bi-directional RS-232 port that may be programmed for several functions. The output can be configured as demand mode for simple output to a printer or continuous output mode to computer, or remote display.

Serial Data Output in Demand Mode

The KINGBIRD terminal will transmit RS232C serial data when a print command is issued using the ENTER/PRINT pushbutton, The data format, baud rate, checksum, parity, etc. are selectable in the setup mode. The serial data is output in an 10-bit ASCII frame which includes: 1 start bit, 7 data bits, 1 parity bit, and 1 stop bit. Parity is selectable as none, odd, or even using F3.1.4. Checksum and STX can be enabled or disabled using F3.1.5 and F3.1.6. All demand mode printing is inhibited during motion and when the weight is under gross zero. Printing is allowed on power-up whether or not zero is captured if AZM is enabled (parameter or sub-block F2.4.2). The available formats are:

SINGLE LINE DISPLAYED WEIGHT FORMAT

DATA	STX	X	X	X	X	X	X	SP	LB	SP	N	CR	CHK	LF
NOTES	B	C	D	D	D	D	D	E	F	G	G	I	J	K

NOTES

B -STX = Start of Text character (optional). If F3.1.5 = 1, STX and checksum characters will be sent in this position.
C -X = weight data digit, minus sign (-) for negative weight or tare, or space character will be sent in this position.
D -X = Weight data digit or decimal point character. E
-SP = Space character.
F - "LB" sent for pounds when F1.2 = 1, "kg" sent for kilograms when F1.2 = 2, "g" sent for grams
G -Space character and N will be sent if displayed weight is a net weight. Space character and G will be sent if the displayed weight is gross.
I -CR = carriage return character.
J -CHK = checksum character (optional). Checksum will be sent with STX if F3.1.5 = 1.
K -LF = line feed character..Chapter 10: Appendices

SINGLE LINE GROSS/TARE/NET FORMAT

DATA	STX	*	X	X	X	X	X	x	SP	LB	SP	G	SP	*	*	X	X	X	X	X	SP	LB	SP	T	SP	*	X	X	X	X	X	SP	LB	SP	N	CR	CHK	LF
NOTE	A	B	B	B	B	B	B	B	C	D	C	E	C	F	F	F	F	F	F	F	C	D	C	G	C	I	I	I	I	I	I	I	C	D	C	J	L	M	N

NOTES
A -STX = Start of Text character (optional). If F3.1.5 = 1, STX and checksum characters will be sent in data string
B -Gross weight data field (7 characters). (* = digit, minus sign (-), or space, X = digit or decimal point.)
C -SP = Space character
D - "LB" = pounds when F1.2 = 1, "kg" sent for kilograms when F1.2 = 2, "g" sent for grams
E -G = Character for gross weight.
F -Tare weight data field (7 characters). (* = digit, space, X = digit or decimal point)
G -T = characters for tare weight
I -Net weight data field (7 characters), (* = digit, minus sign (-), or space, X = digit or decimal point.)
J -N = characters for net weight
L -CR = carriage return character
M -CHK = checksum character (optional). Checksum will be sent with STX if F3.1.5 =1
N -LF = line feed character.

THREE LINE GROSS/TARE/NET FORMAT

LINE 1
GROSS WEIGHT

Line One Data	STX	X	X	X	X	X	X	X	SP	LB	SP	G	CR	CHK	LF
NOTES	A	B	B	B	B	B	B	B	C	D	C	E	F	G	H

LINE 2
TARE WEIGHT

Line two data	X	X	X	X	X	X	X	SP	LB	SP	T	CR	CHK	LF
NOTES	I	I	I	I	I	I	I	C	D	C	J	F	G	H

LINE 3
NET WEIGHT

Line three data	X	X	X	X	X	X	X	SP	LB	SP	N	CR	CHK	LF
NOTES	L	L	L	L	L	L	L	C	D	C	M	F	G	H

NOTES
A -STX = Start of Text character (optional). If F3.1.5 = 1, STX and checksum characters will be sent in data string.
B -Gross weight data field (7 characters). (* = digit, minus sign (-), or space, X = digit or decimal point.)
C -SP = Space character
D - "LB" = pounds when F1.2 = 1, "kg" sent for kilograms when F1.2 = 2, "g" sent for grams
E - G = Character for gross weight
F -CR = carriage return character
G -CHK = checksum character (optional). Checksum will be sent with STX if F3.1.5 = 1
H -LF = line feed character

I -Tare weight data field (7 characters), (* = digit, space, X = digit or decimal point)
J -T = characters for tare weight
L -Net weight data field (7 characters), (* = digit, minus sign (-), or space, X = digit or decimal point)
M -NET = characters for net weight

Serial Data Output in Continuous Mode

A 300-9600 baud continuous output may be selected instead of the print on demand output. This data consists of 16 or 18 bytes transmitted in a 10-bit ASCII frame consisting of: 1 start bit, 7 data bits, 1 even parity bit, and 1 stop bit.The format is:

Character	Function
1	STX (Start of text - Optional)
2	Status Word A
3	Status Word B
4	Status Word C
5	Weight MSD
6	Weight
7	Weight
8	Weight
9	Weight
10	Weight LSD
11	Tare Weight MSD
12	Tare Weight
13	Tare Weight
14	Tare Weight
15	Tare Weight
16	Tare Weight LSD
17	CR (carriage return)
18	CKSM (Checksum – Optional)

Non-significant weight data and tare data digits will be transmitted as spaces. A description of the status words A, B, and C is shown in below Tables .

Status Byte Definition

Status Word A			
Bits0,1,2			
0	1	2	Decimal point
0	0	0	XXXX00
1	0	0	XXXXX0
0	1	0	XXXXXX
1	1	0	XXXXX.X
0	0	1	XXXX.XX
1	0	1	XXX.XXX
0	1	1	XX.XXXX
1	1	1	X.XXXXX
Bits3,4			
3	4		Increment size
1	0		X1
0	1		X2
1	1		X5
Bit5			Always 1
Bit6			Always 0

Table A-1 : Status Word A Bit Definitions

Status Word B	
Bits	Function
Bit0	Gross=0 , Net=1
Bit1	Positive = 0, Negative = 1
Bit2	Overcapacity (or under zero)=1
Bit3	Motion=1
Bit4	Unit : kg=1
Bit5	Always = 1
Bit6	Power up =1

Table A-2 : Status Word B Bit Definitions

Status Word C	
Bit0	Always 0
Bit1	Always 0
Bit2	Always 0
Bit3	Print request =1
Bit4	Expanded weight =1
Bit5	Always 1
Bit6	Always 0

Table A-3 : Status Word C Bit Definitions

Appendix IIGravity Compensation Factors - GEO Values

Gravitational Acceleration Forces

Since the acceleration due to the earth's gravity depends on the location, the following causes and relations apply:

Owing to the centrifugal force and the flattening of the earth, the acceleration due to gravity is approximately 5 parts per thousand less at the equator than it is at the north and south poles. Therefore, a scale calibrated with a 10kg load at the North Pole will read 50 grams lighter at the equator (same altitude at each location).

The acceleration due to the earth's gravity also decreases with increasing height above sea level by approximately 0.2 parts per thousand for every 1000 meters. Therefore, a scale calibrated with a 10kg load at sea level will read 2 grams light on top of a 1000 meter (3281 feet) mountain.

Irregularities such as uneven density distribution in the earth's crust or special surface structures also influence the gravitational acceleration.

Gravitational Force Adjustment

The KINGBIRD indicator has built in compensation provisions to allow factory calibration any place in the world with destination correction capabilities to compensate for variances on gravitational forces. If the scale is subjected to a different gravitational force at its destination location, this can be compensated electronically by adjusting the geo value. The geo value has 32 settings with each increment size equal to 0.2 parts per thousand.

Geo Value

Please contact your local Weights & Measures authority for the geo value of the location where the scale is installed and used. If you can't get the geo value, you have to recalibrate the scale.

Northern and	**Height above sea-level in meters**										
southern latitude	0 325	325 650	650 975	975 1300	1300 1625	1625 1950	1950 2275	2275 2600	2600 2925	2925 3250	3250 3575
in	**Height above sea-level in feet**										
degrees and minutes	0 1060	1060 2130	2130 3200	3200 4260	4260 5330	5330 6400	6400 7460	7460 8530	8530 9600	9600 10660	10660 11730
0° 0′ —5° 46′	5	4	4	3	3	2	2	1	1	0	0
5° 46′ — 9° 52′	5	5	4	4	3	3	2	2	1	1	0
9° 52′ — 12° 44′	6	5	5	4	4	3	3	2	2	1	1
12° 44′ — 15° 6′	6	6	5	5	4	4	3	3	2	2	1

Northern and southern latitude in degrees and minutes	Height above sea-level in meters										
	0 325	325 650	650 975	975 1300	1300 1625	1625 1950	1950 2275	2275 2600	2600 2925	2925 3250	3250 3575
	Height above sea-level in feet										
	0 1060	1060 2130	2130 3200	3200 4260	4260 5330	5330 6400	6400 7460	7460 8530	8530 9600	9600 10660	10660 11730
15° 6′ — 17° 10′	7	6	6	5	5	4	4	3	3	2	2
17° 10′ — 19° 2′	7	7	6	6	5	5	4	4	3	3	2
19° 2′ — 20° 45′	8	7	7	6	6	5	5	4	4	3	3
20° 45′ — 22° 22′	8	8	7	7	6	6	5	5	4	4	3
22° 22′ — 23° 54′	9	8	8	7	7	6	6	5	5	4	4
23° 54′ — 25° 21′	9	9	8	8	7	7	6	6	5	5	4
25° 21′ — 26° 45′	10	9	9	8	8	7	7	6	6	5	5
26° 45′ — 28° 6′	10	10	9	9	8	8	7	7	6	6	5
28° 6′ — 29° 25′	11	10	10	9	9	8	8	7	7	6	6
29° 25′ — 30° 41′	11	11	10	10	9	9	8	8	7	7	6
30° 41′ — 31° 56′	12	11	11	10	10	9	9	8	8	7	7
31° 56′ — 33° 9′	12	12	11	11	10	10	9	9	8	8	7
33° 9′ — 34° 21′	13	12	12	11	11	10	10	9	9	8	8
34° 21′ — 35° 31′	13	13	12	12	11	11	10	10	9	9	8
35° 31′ — 36° 41′	14	13	13	12	12	11	11	10	10	9	9
36° 41′ — 37° 50′	14	14	13	13	12	12	11	11	10	10	9
37° 50′ — 38° 58′	15	14	14	13	13	12	12	11	11	10	10
38° 58′ — 40° 5′	15	15	14	14	13	13	12	12	11	11	10
40° 5′ — 41° 12′	16	15	15	14	14	13	13	12	12	11	11
41° 12′ — 42° 19′	16	16	15	15	14	14	13	13	12	12	11
42° 19′ — 43° 26′	17	16	16	15	15	14	14	13	13	12	12
43° 26′ — 44° 32′	17	17	16	16	15	15	14	14	13	13	12
44° 32′ — 45° 38′	18	17	17	16	16	15	15	14	14	13	13
45° 38′ — 46° 45′	18	18	17	17	16	16	15	15	14	14	13
46° 45′ — 47° 51′	19	18	18	17	17	16	16	15	15	14	14
47° 51′ — 48° 58′	19	19	18	18	17	17	16	16	15	15	14
48° 58′ — 50° 6′	20	19	19	18	18	17	17	16	16	15	15
50° 6′ — 51° 13′	20	20	19	19	18	18	17	17	16	16	15
51° 13′ — 52° 22′	21	20	20	19	19	18	18	17	17	16	16
52° 22′ — 53° 31′	21	21	20	20	19	19	18	18	17	17	16
53° 31′ — 54° 41′	22	21	21	20	20	19	19	18	18	17	17
54° 41′ — 55° 52′	22	22	21	21	20	20	19	19	18	18	17
55° 52′ — 57° 4′	23	22	22	21	21	20	20	19	19	18	18
57° 4′ — 58° 17′	23	23	22	22	21	21	20	20	19	19	18
58° 17′ — 59° 32′	24	23	23	22	22	21	21	20	20	19	19
59° 32′ — 60° 49′	24	24	23	23	22	22	21	21	20	20	19
60° 49′ — 62° 9′	25	24	24	23	23	22	22	21	21	20	20
62° 9′ — 63° 30′	25	25	24	24	23	23	22	22	21	21	20
63° 30′ — 64° 55′	26	25	25	24	24	23	23	22	22	21	21
64° 55′ — 66° 24′	26	26	25	25	24	24	23	23	22	22	21
66° 24′ — 67° 57′	27	26	26	25	25	24	24	23	23	22	22
67° 57′ — 69° 35′	27	27	26	26	25	25	24	24	23	23	22
69° 35′ — 71° 21′	28	27	27	26	26	25	25	24	24	23	23
71° 21′ — 73° 16′	28	28	27	27	26	26	25	25	24	24	23

Northern and southern latitude in degrees and minutes	Height above sea-level in meters										
	0 325	325 650	650 975	975 1300	1300 1625	1625 1950	1950 2275	2275 2600	2600 2925	2925 3250	3250 3575
	Height above sea-level in feet										
	0 1060	1060 2130	2130 3200	3200 4260	4260 5330	5330 6400	6400 7460	7460 8530	8530 9600	9600 10660	10660 11730
73° 16′ — 75° 24′	29	28	28	27	27	26	26	25	25	24	24
75° 24′ — 77° 52′	29	29	28	28	27	27	26	26	25	25	24
77° 52′ — 80° 56′	30	29	29	28	28	27	27	26	26	25	25
80° 56′ — 85° 45′	30	30	29	29	28	28	27	27	26	26	25
85° 45′ — 90° 00′	31	30	30	29	29	28	28	27	27	26	26