METTLER TOLEDO

DIVA Service Manual

PSC 8500 Magellan Scanner

INTRODUCTION

This publication is provided solely as a guide for individuals who have purchased the METTLER TOLEDO DIVA scale product.

Information regarding METTLER TOLEDO Technical Training may be obtained by writing to:

METTLER TOLEDO
1900 Polaris Parkway
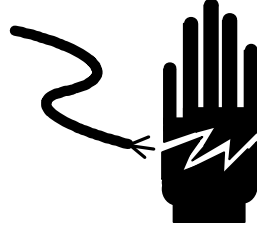Columbus, Ohio 43240-2020
(614) 438-4511
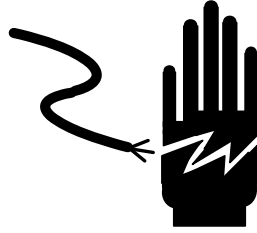
METTLER TOLEDO RESERVES THE RIGHT TO MAKE REFINEMENTS OR CHANGES WITHOUT NOTICE.

Precautions

⚠ **WARNING**

ONLY PERMIT QUALIFIED PERSONNEL 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.

⚠ **WARNING**

FOR CONTINUED PROTECTION AGAINST SHOCK HAZARD CONNECT TO PROPERLY GROUNDED OUTLET ONLY. DO NOT REMOVE THE GROUND PRONG.

⚠ **WARNING**

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING. FAILURE TO DO SO MAY RESULT IN BODILY INJURY OR PROPERTY DAMAGE.

⚠ **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 DIS-CONNECTIONS ARE MADE. FAILURE TO OBSERVE THESE PRECAUTIONS COULD RESULT IN DAMAGE TO OR DESTRUCTION OF THE EQUIPMENT OR BODILY HARM.

⚠ **CAUTION**

OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES.

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1 Introduction

The DIVA is designed to mount on the PSC 8500 Scanner and communicate with ECR and POS systems for weighing needs.

1.1 Reliability

The DIVA is developed, produced, and tested in a Mettler Toledo facility that has been audited and registered according to international ISO 9001 quality standards and ISO 14000 environment control program.

1.2 Standard Features

- Capacity: 6x0.002kg;15 x 0.005kg – dual-interval
      15x0.005lb; 30x0.01lb – dual-interval
- Platter: Stainless Steel: 260 x 280mm
- Tower Display: LCD with backlight, single-line for Weight Only applications and four-line for Price Computing applications
- LCD: 13.5mm high character weight (5 digits); unit price (6 digits); total price (6 digits).
- Keyboard: two keys, with tactile and tone feedback when pressing the key.
- Power supply: Power provided via connection with the scanner.
- A sealable Setup and Calibration button
- Basic functions: Zero; Tare
- RS-232 interface

1.3 Physical Dimensions

The dimensions of the scale with tower are as follows:

7.0" (17.78 cm)
10.75" (27.3 cm)
17.5" (44.5 cm)
5.0" (12.7 cm)
11.5" (29.2 cm)

5.0 in
127 mm

METTLER TOLEDO
0.000 kg
0.00 /kg
0.00 $
00.00 kg

16.7 in
424 mm
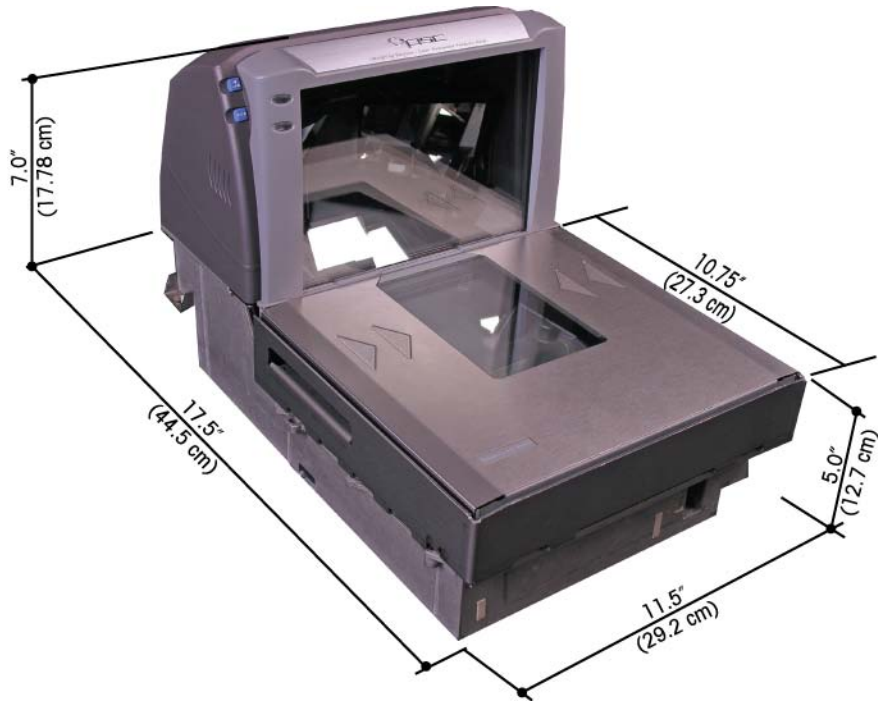
Price Computing Display

5.4 in
137 mm

0.000

10.6 in
269 mm

Weight Only Display

1.4 Power Requirements

Two different power options exist:

1. If the scanner is equipped for use with MT weighing modules, power will be supplied via a white FFC cable located in the front of the scanner.   The DIVA-P2 is equipped with an appropropriate FFC socket for this cable.   With this option, the scale is powered by the scanner's power supply.

2. The DIVA-P2 communication cable has an additional (moulded) socket that can be connected with the wall mount power supply that is supplied with the DIVA-P2. With this options, the scale and scanner are independently powered, and both have their own power supply.

3. The DIVA-P2 communication cable has an additional (moulded) socket that can be connected with the barrel plug of the Y-harness that is included in the box. The remaining plug of that Y-harness has to be connected to the scanner's power socket, the Y-harness' socket has to be connected to the scanner's power supply.

With both options the scale is powered by the scanner's power supply. Please refer to the DIVA-P2 installation guide for more details on powering up the system.

1.5 Temperature and Humidity

Working temperature range: -10 to +40 ^{o}C (+14 to +114F) at 10 to 85% humidity, non-condensing.

Storage temperature range: from -25 to +50°C at 10 to 85% humidity, non-condensing.

1.6 Weights and Measures Approval
*   EC Type-approval: T6941
*   EC Test Certicate: TC6942 (when the scale is used without the Mettler-Toledo displays
*   NTEP: Certificate of Conformance Number 06-024
*   Canadian Approval: AM #5591
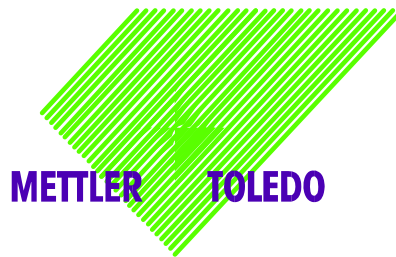
1.7 Option
*   Remote display bracket
*   Dual Display

Mettler-Toledo (ChangZhou) Scale & System Ltd.
Legal Metrology

Declaration of Conformity
Déclaration de conformité
Declaración de Conformidad
Conformiteitsverklaring
Dichiarazione di conformità

We/Wir/Nous/Nosotros/Noi

Mettler-Toledo (ChangZhou) Scale & System Ltd.
111 ChangXi Road, ChangZhou, JiangSu, 213001, P.R.China

declare under our sole responsibility that the product,
erklären, in alleiniger Verantwortung, dass dieses Produkt,
déclarons sous notre seule responsabilité que le produit,
declaramos, bajo nuestra sola responsabilidad, que el producto,
verklaren onder onze verantwoordelijkheid, dat het product,
dichiariamo sotto nostra unica responsabilitá, che il prodotto,

Model/Type: DIVA

To which this declaration relates , is in conformity with the following standard(s) or other normative document(s),
auf das sich diese Erklärung bezieht, mit der/den folgenden Norm(en) oder Richtlinie(n) übereinstimmt.
Auquel se réfère cette déclaration est conforme à la (aux) norme(s) ou au(x) document(s) normatif(s).
Al que se refiere esta declaración es conforme a la(s) norma(s) u otro(s) documento(s) normativo(s).
Waarnaar deze verklaring verwijst, aan de volende norm(en) of richtlijn(en) beantwoordt.
A cui si riferisce questa dichiarazione è conforme alla/e sequente/i norma/e o documento/i normativo/i.

EC Marking	EC Directive:	Applicable Standards:
C€	73/23/EEC Low Voltage Directive	EN60950
C€	89/336/EEC EMC Directive	EN61326:1997+A1+A2 (Class B) EN61000-3-2 EN61000-3-3
For non-automatic weighing instrument used in an Article 1,2.(a) application ,additional metrological marking according to Annex IV of Council Directive 90/384/EEC must be attached to the instrument		
C€ year 0103 **M**	90/384/EEC Non-automatic Weighing Instruments Directive	EN45501 1)

1)   valid only for "DIVA" base   in connection with approved terminal.
     zulässig nur für"DIVA" Waage zusammen mit zugelassenem Terminal
     valid only for la base "DIVA" dans connection with approved le terminal
     válido solamente para la base "DIVA" en la conexión con el terminal aprobado.
     valido soltanto per la base "DIVA" in relazione al terminale approvato.

ChangZhou, April 2006

Mettler-Toledo (ChangZhou) Scale & System Ltd.

Yang JiaWu, Quality Assurance Manager

Important notice for verified weighing instruments

Weighing Instruments verified at the place of manufacture bear the preceding mark on the packing label and a green "M" sticker on the descriptive plate. They may be set to work immediately.

Weighing Instruments which are verified in two steps have no green "M" on the descriptive plate and bear the preceding identification mark on the packing label. The second step of the verification must be carried out by the approved Mettler-Toledo service or by the W&M authorities. Please contact your Mettler-Toledo organization.

The first step of the verification has been carried out at the manufacturing plant. It comprises all tests according to EN 45501-8.2.2.
If national regulations in individual countries limit the period of validity of the certification, the operator of such a scale is himself responsible for its timely re-certification.

Wichtiger Vermerk für geeichte Wägeinstrumente in EU-Ländern

Werksgeeichte Waagen tragen vorstehendes Kennzeichen auf dem Packetikett und einen grünen "M"-Kleber auf dem Eichschild. Sie dürfen sofort in Betrieb genommen werden.

Waagen, die in zwei Schritten geeicht werden und kein grünes "M" auf dem Eichschild haben, tragen vorstehendes Kennzeichen auf dem Packetikett. Der zweite Schritt der Eichung ist durch den behördlich anerkannten Mettler-Toledo Kundendienst oder durch den Eichbeamten durchzuführen. Bitte nehmen Sie mit dem Mettler-Toledo Kundendienst Kontakt auf.

Der erste Schritt der Eichung wurde im Herstellerwerk durchgeführt. Er umfasst alle Prüfungen gemäß EN45501-8.2.2.
Sofern gemäß den nationalen Vorschriften in den einzelnen Staaten die Gültigkeitsdauer der Eichung beschränkt ist, ist der Betreiber einer solchen Waage für die rechtzeitige Nacheichung selbst verantwortlich.

Remarque Importante pour les Instruments de pesages vérifiés dans les pays membre de l'Union Européenne

Les instruments de pesage vérifiés en usine portent l'identification ci-contre sur leur emballage et un autocollant "M" vert sur la plaque d'identification. Ils peuvent être utilisés après leur installation.

Les instruments de pesage vérifiés en deux étapes portent l'identification ci-contre sur leur emballage et n'ont pas d'autocollant "M" vert sur la plaque d'identification. La seconde étape de la vérification doit être effectuée par le service technique Mettler-Toledo autorisé responsable. Veuillez s.v.p. contacter le service technique Mettler-Toledo.

La première étape de la vérification a été effectuée en usine. Cela comprend tous les essais suivant la norme EN45501-8.2.2.
Dans la mesure où la durée de la vérification est limitée en fonction des prescriptions nationales dans les différents pays, l'utilisateur d'une telle balance est lui-même responsable de la vérification ultérieure dans les délais.

Nota importante para básculas verificadas en paises de la UE

Las balanzas verificadas en origen llevan esta indicación en la etiqueta del embalaje y con la etiqueta "M" sobre londo verde en la placa de caracteristicas pueden ser utilizadas inmediatamente.

Balanzas cuya verificación se realiza en dos fases llevan esta indicación en la etiqueta del embalaje (ninguna etiqueta "M" verde en la placa de caracteristicas). La segunda fase de la verificación debe ser realizada por personal Mettler-Toledo acreditado, o por la autoridad competente. Rogamos contacten con el Servicio Técnico de Mettler-Toledo.

La primera fase de la verificación ha sido realizada en origen. Incluye todos los ensayos según lo norma EN45501-8.2.2.
Si el plazo de validez de la verificación está limitado por las normas nacionales de cada estado, el usuario será responsable de las verificaciones posteriores reglamentarias de su balanza.

Nota Importante per la balance approvate nei paesi UE

Le balance verificate in fabbrica portano questo contrassegno sull'etichetta dell'imballo e con il sigillo "M" su stando verde sulla targhetta metrological possono essere messe in uso immediatamente.

Le balance che vengono verificate in due fasi, portano questo contrassegno sull'etichetta dell'imballo e non portano il sigillo "M" sulla targhetta metrological. La seconda fase delia verifica dev'essere eseguita dal servizio assistenza Mettler-Toledo autorizzato, oppure dalla autorità competente. Prego contaltare il vostro servizio assistenza Mettler-Toledo.

La prima fase della verifica è stata eseguila dal produttore e comprende lutte le prove previste dalla norma EN 45501-8.2.2.
Se la durota di validità della verifica è limitata in accordo con le prescrizioni nazionali vigenti nei singoli paesi, l'utilizzatore stesso di una bilancia di tale tipa sorà responsabile dell'esecuzione, entro le date di scadenza previsle, delle verifiche periodiche.

2   Installation

2.1 Precautions

Before you install your DIVA scale, keep in mind the following factors, which might have a negative influence on the scale's operation:

- Vibration diminishes the scale's ability to measure accurately. Excessive vibration from equipment such as conveyors can cause inaccurate and non-repeatable readings.
- Be sure the scale is leveled properly.
- Air currents can also diminish a scales performance.   Avoid placing the scale in front of or directly under air vents.
- Other than items being weighed, keep the scale free from objects rubbing or pressing against the platter.

2.2 Contents of Packaging

Package contents for all DIVA units include:

- DIVA scale base
- Operation manual
- Optional display, including cable and sealing kit (only 4-line display)
- Wall mount power supply
- Communication cable

2.3 Setup

1. Open the box, carefully remove the packing material, take all items out of the carton.
2. Attach the display as described below, depending on which version of scale you ordered:

For Price Computing Version:

Tower base
Pin attachment holes
Attachment Screws (2)
Connector of cable
Attachment pins (2)
Tower Mounting Bracket
Table surface
Attachment wing nuts (2) for Attachment Screws
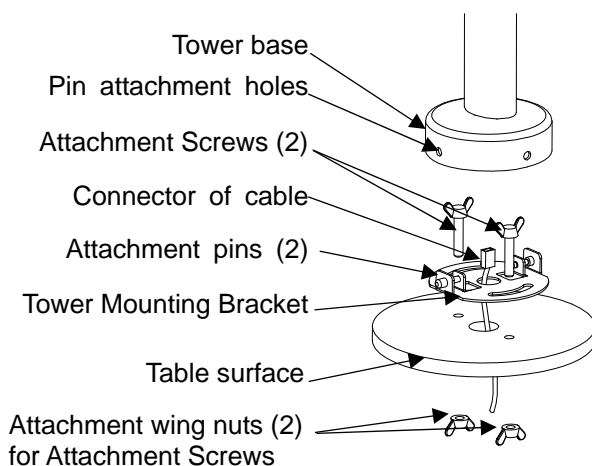
A: Pull the connector of the cable through the holes of the table surface and tower mounting bracket
B: Put (2) screws though the (2) arch holes on the bracket and (2) holes on the table surface
C: Attach cover to the surface of table with (2) nuts.
D: Connect the cable to the connector at the bottom of the tower display
E: Attach the base of the display to the mounting bracket by insuring that the (2) pins on the bracket are inserted in the holes of the base to attach the tower and snap the tower into place

For Weigh Only Version:
The Weigh Only version comes with a tower mount.

Assemble the Weight Only tower as is illustrated here:

Display

Display Cable

Display Bracket

Display Tower
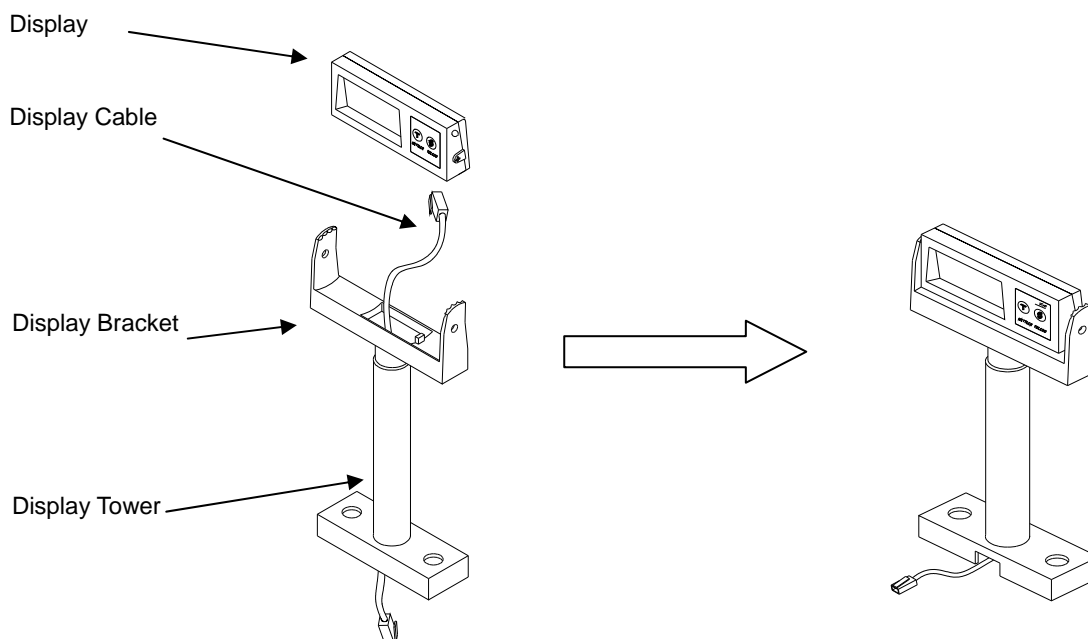
 Please refer to the Installation Guide for instructions on mounting the DIVA-P2 to the scanner.

1. Level the scale by turning the adjustable feet on the bottom of the unit. Adjust the feet until the level bubble is in the center of the circle.
     Bubble indicator:

Correct   Wrong

2. Put the platter on top of the DIVA scale.
3. Connect the tower display cable to the appropriate port on the scanner.
4. Connect the power cord from the wall transformer to the scanner as described in section 1.4.

2.4 Power up sequence

Note: Before powering on the DIVA scale, always make sure there is nothing on the platter.

Apply power to the scanner.   The scale will go through a series of self-tests and then will proceed to normal operating mode. The power-up sequence is as follows:

1. All segments of the display characters are lit*. This verifies operation of all segments.
2. The scale displays the country code and GEO code, software part number and revision.
3. The scale then captures zero and is ready for normal operation.

*If the display does not light up correctly the scale could be set up for a different (WO or PC) display. To change the scale to the correct display type hold down the tare button on the display while recycling power.

2.5 Sealing

After installation is complete, legal-for-trade applications require sealing so that the settings cannot be changed.

The label sealing sequence
Security Sticker 28x19mm, material Vinyl white 3690 E UL, text color black.

METTLER TOLEDO
SECURITY SEAL
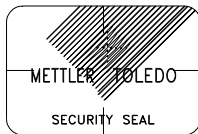
There are a total of three sealing labels, two of which are factory set.   The third sealing label is needed to seal the calibration button and can be placed only by authorized personnel.

Sealing Labels
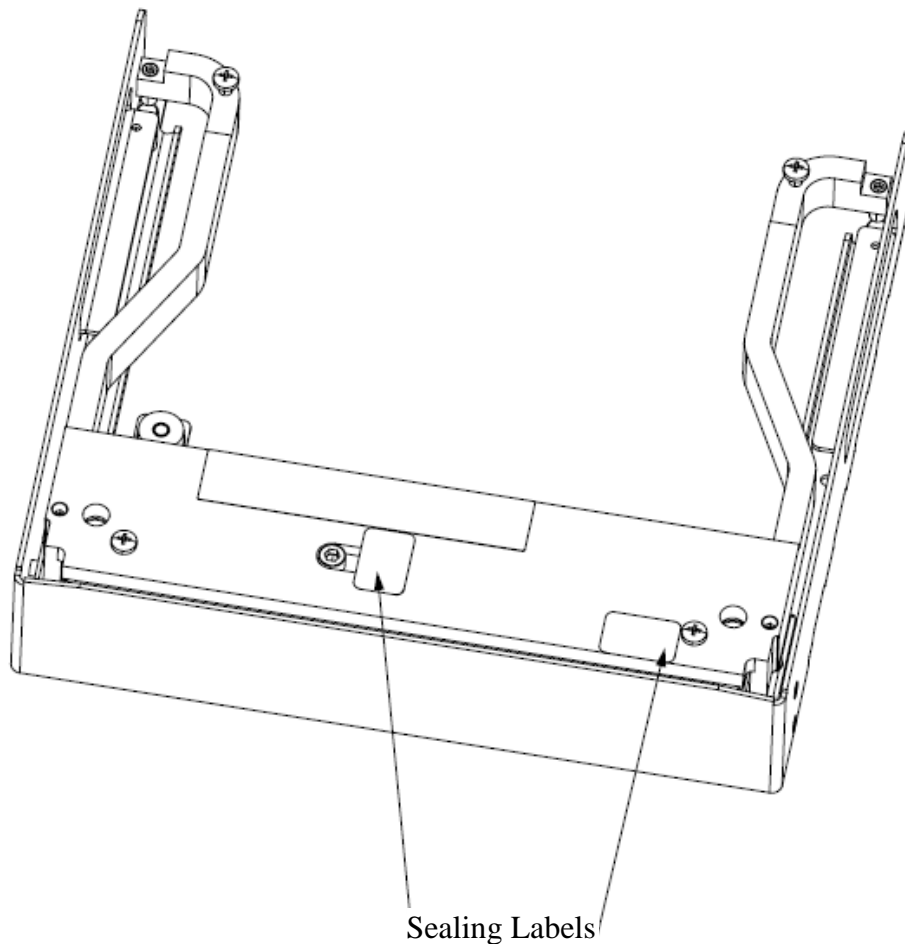
For your notes:

3 Set-up and Calibration

There are two types of setup modes. The first is called "Service Mode" and it allows full access to all soft switches and to calibrate the scale. The second is called "Master Mode" and it only allows access to soft switches that do not affect the metrology of the scale.

3.1 Service setup mode:

In order to access the Service Mode, break the seal and insert a thin, rod-like small screwdriver through the calibration hole and press the button as illustrated:

Thin Rod

Calibration button hole is located underneath the security label

Calibration Button
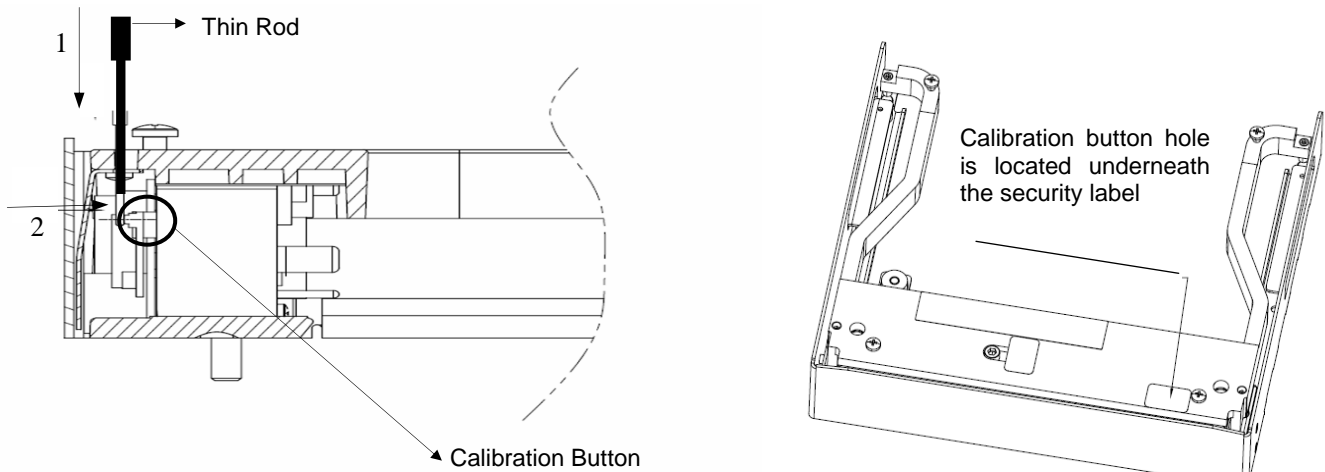
1. Insert a thin rod into the hole directly underneath the seal
2. Move the thin rod toward the level bubble on the scale until you feel the button depress

To change settings using the DIVA display follow the directions below.

At the beginning of the set up procedure the display will start off by showing the following.

Price Computing Version   **Weigh Only Version**

Press the Zero Key:

Price Computing Version   **Weigh Only Version**

You can press the Tare key to move to Grp 2, 3, or 4.   To go into a particular Group, press the Zero Key.   Below is what you will see when going into the first Step of Group 1.

Price Computing Version   **Weigh Only Version**

Refer to **Section 3.3 Setup and Soft Switch Default Table** for all available settings.

3.2 Master setup mode:

This mode allows an operator to change certain softswitches not protected by a seal.   To get into Master mode, press and hold **>T<** key for eight seconds until "Grp 1" is displayed. Refer to the **Section 3.3 Set Up Softswitch and Default Table** for the accessibility of softswitches via keyboard.

The scale can be configured for your specific needs through a special interactive set up procedure. In order to access the various prompts, you must utilize the following keys during the scale setup mode.

This key is used to accept a choice and then advance one softswitch at a time.

This key is used to step through the options.

3.3 Set up Soft Switch and Default Table

Group.Step	Function	Possible Selections	Master Mode Access
Group 1		**Press Zero to Enter** **Press Tare to go to Group 2**	
1.1	Country Select	**DE** (Germany) **FR** (France) **US** (USA) **CA** (Canada) **AT** (Austria and Croatia and Slovenia) **ES** (Portugal and Spain) **BE** (Belgium, Netherland, Poland and England) **IT** (Italy) **CH** (Kazachstan and Switzerland) **UA** (Ukraine) **RU** (Russia) **HU** (Hungary) **SK** (Slovakia) **CZ** (Czechia) **EXPORT** (General export) **CN** (China)	No
1.2	Initialize to Defaults	**YES** – Soft switches will be reset to factory defaults **NO** – Soft switches will remain in current configuration	No
1.3	Beeper	**0 –** Beeper will not sound at any time **1** – Scale will not "beep" when a key is pressed **2** – Scale will not sound when a key is pressed, but it will "beep" when sending command of NCI-ECR **3** – Scale will sound when a key is pressed, and it will "beep" when sending command of NCI-ECR	Yes
1.4	Zero cursor	**ON** – Display zero cursor. **OFF** – Disable zero cursor.	Yes
1.5	Decimal point	**ON** - . **OFF** - ,	Yes
1.6*	Decimal Position	**0 - 4** – Digits right of the decimal for Unit and Total Price fields.	No
1.7	Auto-clear of Tare	**ON** – Tare is automatically cleared when weight is removed. **OFF** – Tare is not cleared when weight is removed.	No
1.8	Weight unit	**1** – lbs range (0 to 30 lbs) **2** – kg range (0 to 15kg) **3** – kg multi-interval (0 to 6kg, 6 to 15kg) **4** – lbs multi-interval (0 to 15lb, 15 to 30 lb)	No
1.9	Expanded Weight Display	**ON** – Division quantity is displayed, Maximum is 30000. **OFF** – Weight is displayed in normal display increments.	No
1.10	Blank Weight Enable	**ON** – Display weight till weight is stable **OFF** – Display weight all the time	No
1.11	Main Calibration Button	**ON** – Calibration button on the Main PCB is Enabled **OFF** – Calibration button on the Main PCB is Disabled	No
1.12	Currency	**0 - 9** – This selection is used for VD	No

Group 2		Press Zero to Enter Press Tare to go to Group 3	
Group.Step	**Function**	**Possible Selections**	**Master Mode Access**
2.1	Tare Enable	**ON** – Enables tare function. **OFF** – Disables tare function.	Yes
2.2	Chain Tare Enable	**ON** – Enables multiple tares. **OFF** – Only one tare per transaction is allowed.	Yes
2.3*	Total Price Round (To Nearest 0 or 5)	**ON** – The total price will round up or down to 0 or 5. **OFF** – Total price will not be rounded.	No
2.4	Digital Filter Selection	**0 - 3** – Minimal to High	No
2.5	GEO	**0** through **31** – See GeoCal chart below	No
2.6	Calibration	**No** – Do not enter calibration mode **Yes** – Calibrate scale	No
2.7	Display (1 or 4 Line)	**0** – None **1** – 1 Line **2** – 4 Line	Yes
2.8	Display Update Rate	**0-100** – Adjust display rate	Yes
2.9	Enter Flash Mode	**ON** – Enter Flash Mode **OFF** – Do not enter Flash Mode	No
Group 3		**Press Zero to Enter** **Press Tare to go to Group 4**	
3.1	Baud rate	**0** – 1200 **1** – 2400 **2** – 4800 **3** – 9600	Yes
3.2	Parity	**0** – None **1** – Even **2** – Odd	Yes
3.3	Data	**0** – 7 data bit **1** – 8 data bit	Yes
3.4	Bit stop	**0** – None **1** – 1 stop bit **2** – 2 stop bit	Yes
3.5	Chose Protocol	**0** = Disabled **1** = NCI-ECR (WO) **2** = (reserved) **3** = 8217 Mettler-Toledo (WO) **4** = 8213 Mettler-Toledo (WO) **5** = EPOS 1 (WO) **6** = EPOS 2 (WO) **7** = (reserved) **8** = Dialog 06 (PC) **9** = Dialog 04/02 (PC) **10** = Extended Dialog 06 (PC) **11** = ICL (WO) **12** = Shekel (WO) **13** = RIVA 5462 (WO) **14** = IP3 (PC) **15** = (reserved)	Yes
Group 4		**Press Zero to Enter** **Press Tare to go to EXIT**	
4.1	Weight Change	**00** - No Weight Change Required **yy** - 01 to 99 weight change divisions required	No
4.2	Return to Zero	**0** - No Return to Zero Required **1** - Return to Zero Active	No

EXIT		**Press Zero to Enter** **Press Tare to go to Group 1**	
SAVE	Save or abort setting	**SAVE** – save all settings and return to weighing mode **ABORT** – abort all settings and return to weighing mode	Yes

* Used only on the 4 Line display
PC – Price Computing
WO – Weight Only

3.4 Country Defaults

Function	PC Germany/(Europe)	WO France	WO USA	WO Austria	WO Spain/Portugal	WO Belgium/Poland/England	WO Italy	WO Kazachstan/Swiss	WO Ukraine	WO Russia	WO Hungary	WO Slovakia	WO Czechia	WO General Export	WO China	WO Canada
Group 1																
1.1 Country Code	dE	fr	US	AT	ES	BE	iT	CH	UA	rU	HU	SK	C2	OrT	CN	CA
1.2 Initialize to Defaults	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
1.3 Beeper	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1.4 Zero Cursor	Off	Off	On	Off	Off	Off	Off	Off	Off	Off	On	Off	Off	On	On	On
1.5 Decimal Point	Off (.)	Off (.)	On (.)	Off (.)	Off (.)	Off (.)	Off (.)	Off (.)	Off (.)	Off (.)	On (.)	Off (.)	Off (.)	On (.)	On (.)	On (.)
1.6 Decimal Position($)	2	2	2	2	2	2	2	2	2	2	0	2	2	2	2	2
1.7 Auto Clear Tare	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On
1.8 Weight Unit	kg (3)	kg (3)	lb (1)	kg (3)	kg (3)	kg (3)	kg (3)	kg (3)	kg (3)	kg (3)	kg (3)	kg (3)	kg (3)	kg (3)	kg (3)	kg (3)
1.9 Expanded Display	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off
1.10 Blank Weight Display	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off
1.11 Main Calibration Button	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off
1.12 Currency	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off
Group 2																
2.1 Tare Enable	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On
2.2 Chain Tare Enable	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off
2.3 Total Price Round	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off
2.4 Digital Filter	1 (Low)	1 (Low)	1 (Low)	1 (Low)	1 (Low)	1 (Low)	1 (Low)	1 (Low)	1 (Low)	1 (Low)	1 (Low)	1 (Low)	1 (Low)	1 (Low)	1 (Low)	1 (Low)
2.5 GEO	20	19	15	18	15	15	17	18	21	23	19	19	20	12	12	15
2.6 Calibration	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
2.7 Display Type	2 (4Line)	1 (1Line)	1 (1Line)	1 (1Line)	1 (1Line)	1 (1Line)	1 (1Line)	1 (1Line)	1 (1Line)	1 (1Line)	1 (1Line)	1 (1Line)	1 (1Line)	1 (1Line)	1 (1Line)	1 (1Line)
2.8 Display Update Rate	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
2.9 Flash Mode Enable	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off
Group 3																
3.1 Baud Rate	3 (9.6kb)	3 (9.6kb)	3 (9.6kb)	3 (9.6kb)	3 (9.6kb)	3 (9.6kb)	3 (9.6kb)	3 (9.6kb)	3 (9.6kb)	3 (9.6kb)	3 (9.6kb)	3 (9.6kb)	3 (9.6kb)	3 (9.6kb)	3 (9.6kb)	3 (9.6kb)
3.2 Parity	2(odd)	1(even)	1(even)	1(even)	1(even)	1(even)	1(even)	1(even)	1(even)	1(even)	1(even)	1(even)	1(even)	1(even)	1(even)	1(even)
3.3 Data Bits	0 (7bits)	0 (7bits)	0 (7bits)	0 (7bits)	0 (7bits)	0 (7bits)	0 (7bits)	0 (7bits)	0 (7bits)	0 (7bits)	0 (7bits)	0 (7bits)	0 (7bits)	0 (7bits)	0 (7bits)	0 (7bits)
3.4 Stop Bit	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3.5 Protocol	8(Dialog06)	3(8217)	3(8217)	3(8217)	3(8217)	3(8217)	3(8217)	3(8217)	3(8217)	3(8217)	3(8217)	3(8217)	3(8217)	3(8217)	3(8217)	3(8217)
Group 4																
4.1 Weight Change	10	10	0	10	10	10	10	10	10	10	10	10	10	10	10	0
4.2 Return to Zero	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1

PC – Price Computing, WO – Weigh Only

3.5 GeoCal® Country Codes

Country	Geo-Value
Austria	18
Belgium	21
Bulgaria	16
Croatia	18
Czechia	20
Denmark	23
Estonia	24
Finland	25* 26
France	17 19*
Germany	20
Greece	15
Hungary	19
Ireland	22
Iceland	26
Italy	17
Kazakhstan	18
Latvia	23
Luxemburg	20

Country	Geo-Value
Liechtenstein	18
Lithuania	22
Netherlands	21
Norway	24* 26
Poland	21
Portugal	15
Romania	18
Russia	23
Sweden	24* 26
Switzerland	18
Slovakia	19
Slovenia	18
Spain	15
Turkey	16
United Kingdom	21* 23
Ukraine	21

Factory Default

3.6 GeoCal® USA State Location Codes

State	Code
Alabama Birmingham & North South of Birmingham	13 12
Alaska	See map
Arizona Phoenix & North South of Phoenix	12 11
Arkansas	13
California	See map
Colorado Denver & North South of Denver	13 12
Connecticut	16
Delaware	15
Florida West Palm Beach & North South of West Palm Beach	11 10
Georgia	12
Hawaii	9
Idaho North of Salmon River Mtns South of Salmon River Mtns	17 16
Illinois Bloomington & North South of Bloomington	16 15
Indiana North of Indianapolis Indianapolis & South	16 15
Iowa North of Des Moines Des Moines & South	17 16
Kansas	14
Kentucky	14

State	Code
Louisiana	12
Maine	18
Maryland	15
Massachusetts	17
Michigan Northwest of Lake Southeast of Lake	18 17
Minnesota	18
Mississippi Kosciusko & North South of Kosciusko	13 12
Missouri North of Springfield Springfield & South	15 14
Montana Helena & North South of Helena	18 17
Nebraska	15
Nevada	13
New Hampshire	17
New Jersey	16
New Mexico	11
New York Albany & North South of Albany	17 16
North Carolina Raleigh & North South of Raleigh	14 13
North Dakota	18
Ohio Akron & North South of Akron	16 15

State	Code
Oklahoma	13
Oregon Salem & North Between Oakridge & Salem South of Oakridge	18 17 16
Pennsylvania	16
Rhode Island	16
South Carolina	13
South Dakota	17
Tennessee	13
Texas Northeast of Colorado River Southwest of Colorado River	12 11
Utah	13
Vermont	17
Virginia	14
Washington, DC	15
Washington State	18
West Virginia	15
Wisconsin Green Bay & North South of Green Bay	18 17
Wyoming North of Casper Casper & South	15 14

Alaska

Maps provided for residents of
Alaska and California only.

27

26

ANCHORAGE

23

California

16

Redding

Chico

16

Woodland

Santa Rosa

FOLSOM

San Francisco

LIVERMORE

FRESNO

15

Toledo

PORTERVILLE

BAY AREA

Salinas

FRESNO

Visalia

Tulare

14

San Luis Obispo

BAKERSFIELD

Santa Maria

Lancaster

Lompoc

Santa Barbara

Sim Valley

GLENDALE

Rancho Cucamonga

San Buenaventura

Thousand Oaks

Palm Springs

13

Oceanside

Escondido

SAN DIEGO

El Cajon
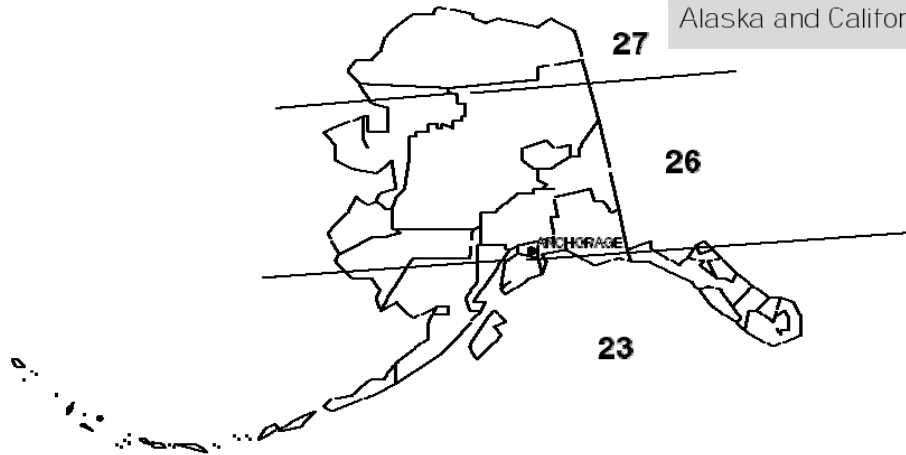
La Mesa
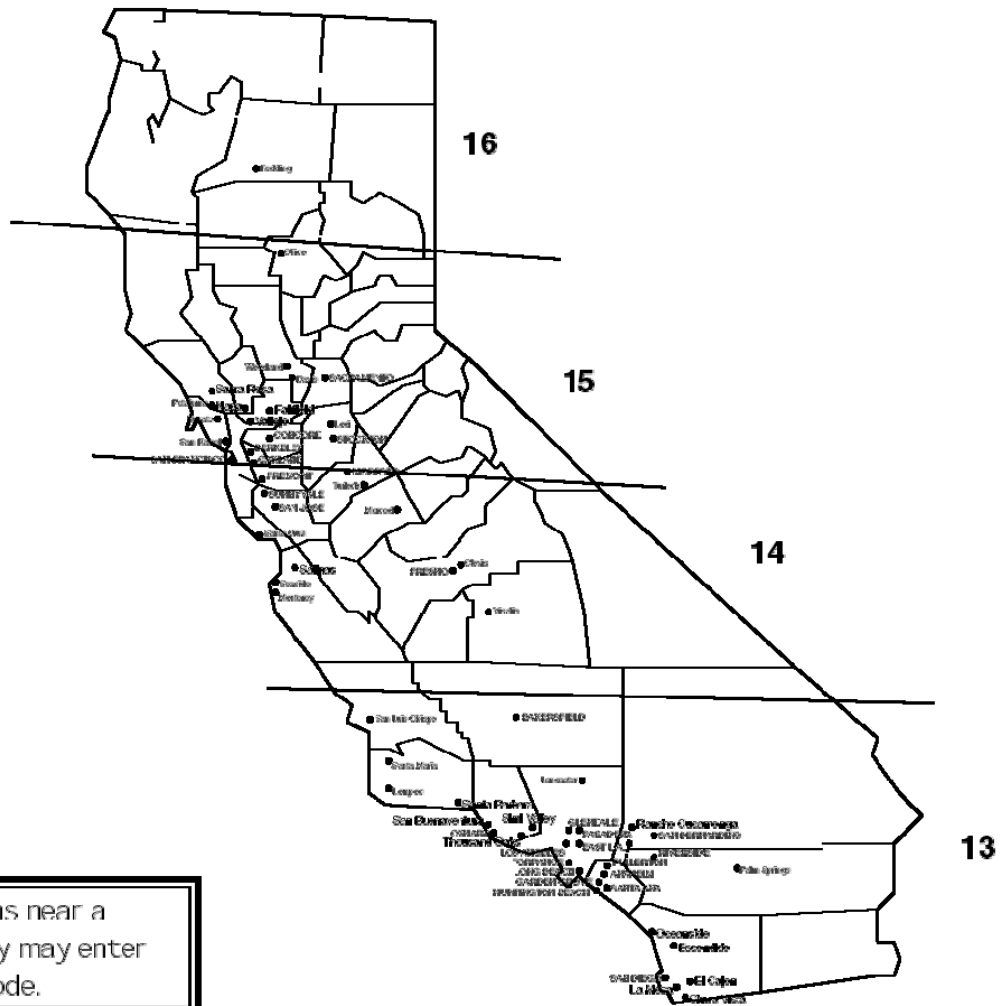
Locations near a
boundary may enter
either code.

3.7 Calibration

Note: These functions are directly related to the Weight & Measurement regulations in your country. Therefore they are protected by a sealed calibration button. The button is located as shown below. For the scale to be usable in a legal for trade application, the button must be sealed as is shown in section 2 after the calibration is complete.

To calibrate the scale, follow this sequence:

Calibration button hole covered with the security label
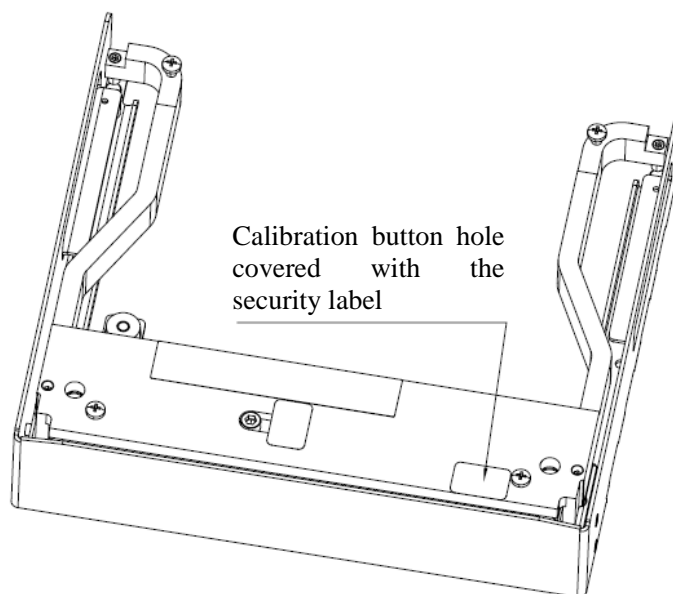
Note: Be sure that the scale has been placed in an area free from air currents or excessive vibration. The platter should also be clean from any debris and ready for use. Check to make sure the scale has been leveled properly.

1. Press the calibration button as is shown in section 3.1

2. Go to Group 2 Step 6 of the Service Mode (WO scale will show "26　no" on the display).

3. Press the Tare key to change the prompt to "Yes".

4. Press the Zero key to accept.

5. The display will briefly be blank and then display "- - - - -"

6. Clear the platter and Press the Zero key to accept the Zero Reading.

7. The display will now show "FULL CAP"

8. Place Full capacity onto the scale (30lb or 15kg)

9. Press the Zero key to accept.

10. The display will now show "NO LOAD".

11. Remove all weights. Press the Zero key to take the final reading.

> ***Note: If the scale is unable to complete calibration it will display "E 20". Cycle power to the scale and restart at Step 1 above.***

12. The scale will now save the calibration and cycle out of the Service mode and return to normal weighing mode.

13. Verify the calibration was successful with the calibrated weight. If for some reason the calibration was not successful, restart at Step 1.

14. If applicable, you should remove power from the scale and apply the appropriate calibration seal.

15. Place the scale into service!

Calibration Quick Reference Chart
1. Break the calibration seal and press the calibration button. 2. Select "Yes" in Group 2, Step 6 of the Service Mode. 3. Empty the scale and take the no load reading. 4. Place full load on the scale and take the reading. 5. Save the settings and verify the calibration in normal weighing mode.

4 Operating Instructions
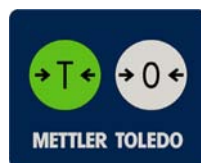
4.1 Displays

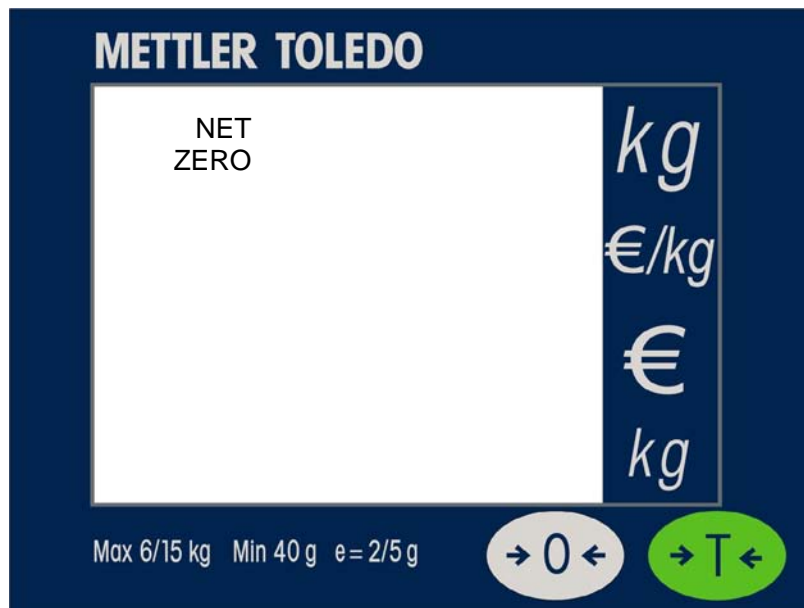72190532
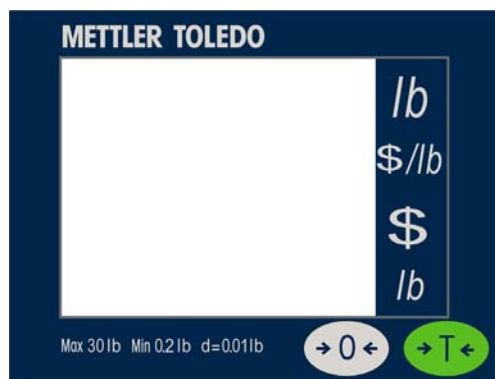
72190533

72187467

72187468

72188623

72190534

4.2 Keyboard

Key	Description
→0←	Used to return the scale to gross zero.
→T←	Tare key.

4.3 Cursors

Cursor	Description
NET	When tare is entered.
ZERO	When weight is gross zero.

4.4 Operations

4.4.1 Weighing and Communication

Place the item to be weighed on the platter, the weight will be displayed.

Remote ASCII commands can control the scale through the provided RS232 port. Commands include zero, tare, and other data functions depending on the protocol. See Section 6 for available protocols and their descriptions.

4.4.2 Backlight function

DIVA is equipped with a backlight for the display. If ambient lighting conditions are not sufficient, the backlight can be switched on to easily read the display.

To activate, Press and hold the Zero Key for about three seconds until a long beep is heard and the backlight turns on.

Use the same procedure to switch the backlight off.

When the scale is not used for 1 minute, the backlight will automatically switch off. When weight is placed on the platter or a key is pressed, the backlight will switch on again.

4.4.3 Zero Functions

There are two ways to re-zero the scale:

Power-up Zero
The scale will automatically capture zero when it is turned on. The power-up zero capture range is +/-10% of the scale capacity. When the scale is turned on with a weight on the platter of more than +/-10% of the capacity, the scale will not capture zero and the weight display will show "-----". After removing the weight, the scale will capture "zero".

Pushbutton Zero
The Zero Key zeros the scale within the range of +/-2% of the scale capacity. To use this function, the scale must be in the gross weighing mode (NET cursor must be off) and in a no motion condition. When the weight on the platter is more then +/-2% of the scale capacity, pressing neither the Zero Key nor a remote ASCII Zero command will be accepted.

4.4.4 Tare Function

The Tare Key allows you to subtract weight from the platter for items like containers that will be used to hold the item being weighed.
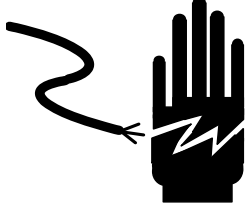
Place the empty container or wrapping material on the platter and Press the Tare Key.
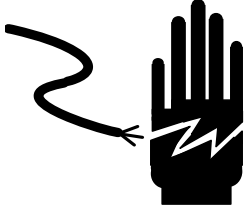
Place the item to be weighed in the container or on the wrapping material and onto the platter.

5 Service and Maintenance

This section provides information on servicing and maintaining the scale including:
- Cleaning and regular maintenance
- Troubleshooting

	⚠ **WARNING**
	ONLY PERMIT QUALIFIED PERSONNEL 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.

	⚠ **WARNING**
	DISCONNECT ALL POWER TO THIS UNIT BEFORE SERVICING OR CLEANING.

5.1 Cleaning and Regular Maintenance

Daily Maintenance:
Wipe the display area and weighing platter with a clean, soft cloth with water or a mild glass cleaner. Do not use any types of industrial solvents. These may damage the display and platter finish.

Weekly Maintenance:
Remove the platter, and clean out all loose particles and debris from around the scale base and spider arms. This needs to be done at least once a month, although it is recommended that this maintenance be performed on a weekly basis.

Regular maintenance inspections by a qualified service technician are also recommended every six months.

Note: It is necessary to ensure proper weighing after maintenance is performed on the scanner-scale. Place a test weight on the unit and verify that the scale is able to get a stable weight and a correct reading.

5.2 Troubleshooting

The following table lists error messages, descriptions, and corrective actions.

Error Codes and Actions

E10	Generic error	Cycle power to the scale. For continued problems contact METTLER TOLEDO for additional assistance.
E 11	RAM error	
E 16	ROM error	
E 18	EEPROM error	
E 20	Calibration error	Cycle power to the scale and restart calibration.
E 28	Transmission error	Reset scale.
nnnnnn In weight display	Over capacity	Remove weight from Platter. If this does not work, try cycling the power to the scale. For continued problems contact METTLER TOLEDO for additional assistance.
nnnnnn in total price display	Over 9999.99	
uuuuuu In weight display	Under zero	Place the platter on the scale. Either press the Zero Key or cycle power to the scale. For continued problems contact METTLER TOLEDO for additional assistance.

5.3 Flash Updating the Software

DIVA software can be flash updated through the serial communications port. You will need the standard DIVA communications cable and access to the Internet for downloading the software flash tool and latest software. Please contact Mettler-Toledo, Inc. Technical Support for detailed instructions.

5.4 Connections to a POS

5.4.1 Communications Pinout

For communications with the scale, you will need the appropriate communications cable. This cable will have an RJ45 connector on one end that is plugged into the appropriate port on the scanner. The other end will by DB9-F and is used for plugging into the POS.

DIVA DB9-F		
Pin#	Function	Description
2	TxD	Transmit Data
3	RxD	Receive Data
5	SGnd	Signal Ground

Note: All other pins should not be connected.

Should you need to construct your own communications cable.   The following is the pinout on the Dual 5 Connector directly on the scale.

| Dual 5 Connector Pin Descriptions and Positions				
(when looking directly at the pins)				
Pin 9 Status	Pin 7 RTS	Pin 5 TxD	Pin 3 +5V DC	Pin 1 +12V DC
Pin 10 Scale Zero	Pin 8 CTS	Pin 6 RxD	Pin 4 Gnd	Pin 2 Gnd

5.4.2 Handshaking

For PC DB25 serial port connector: Jumper 4 to 5, and 6, 8, & 20 together on the POS side.
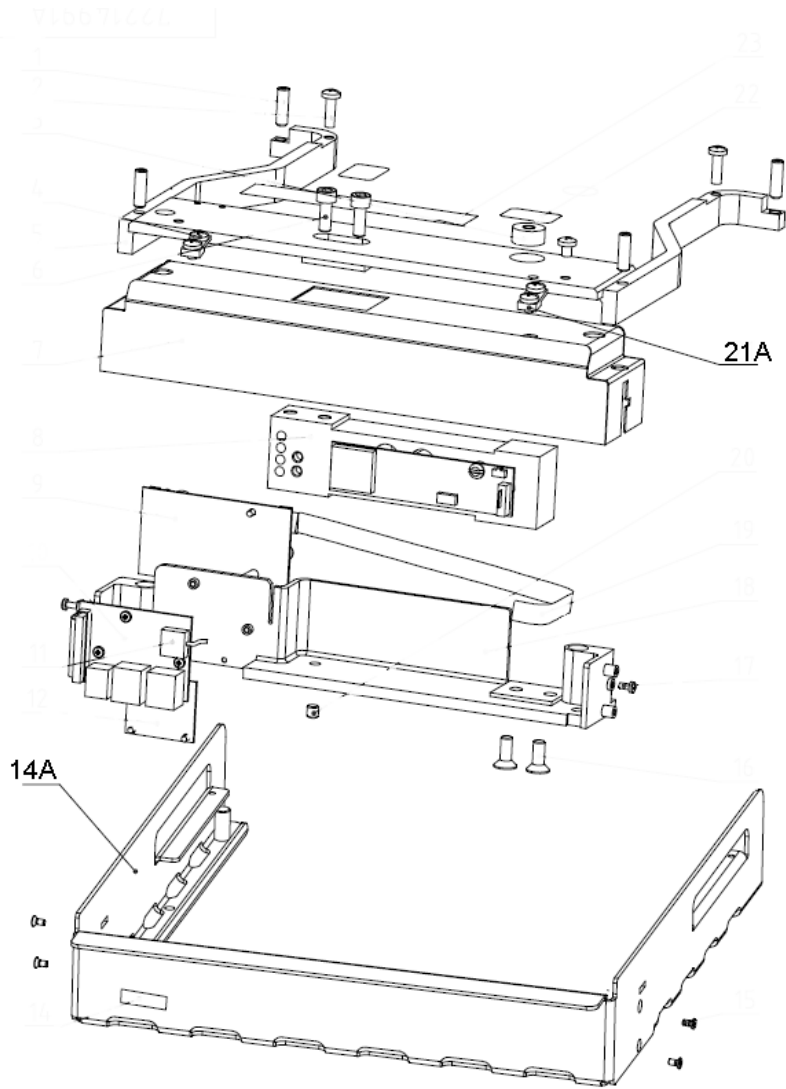For PC DB9 serial port connector: Jumper 4 to 6 and 7 to 8 together on the POS side.

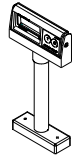# 5.5 Parts and Descriptions

General Exploded Diagram
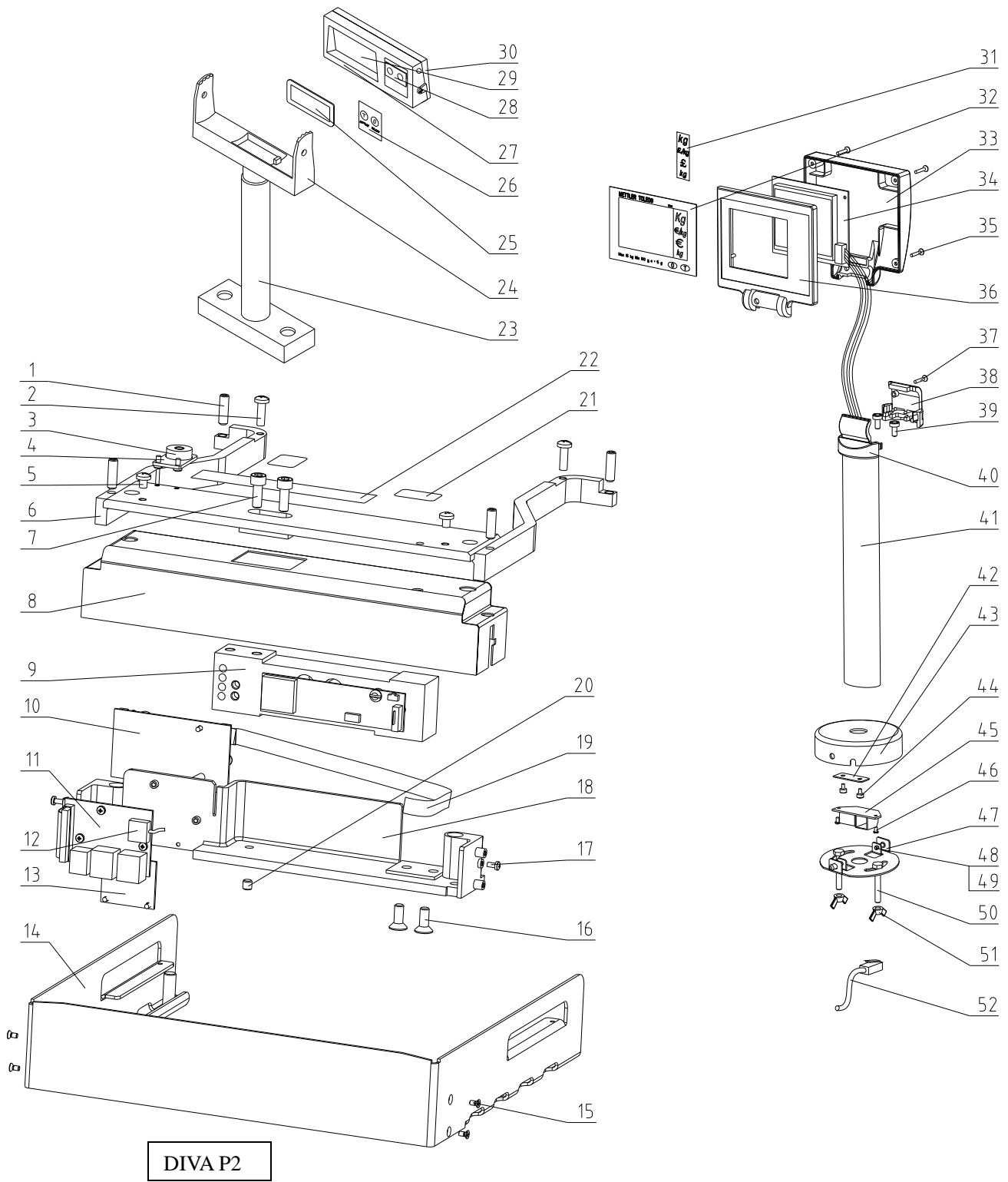
DIVA P2
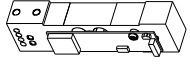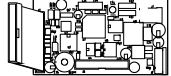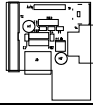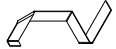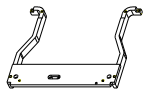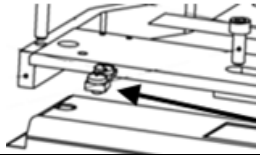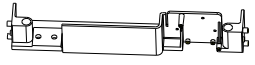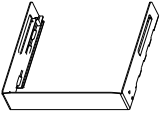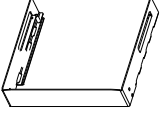
Diva P3

Consists of same parts as DIVA P2 with the exception of the parts labeled below

21A

14A
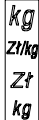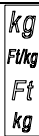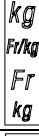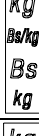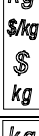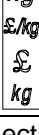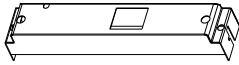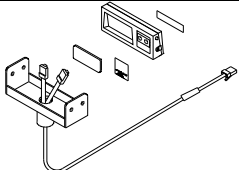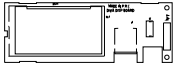
Note: Most parts are not available for individual replacement. This following chart and diagrams are only provided for reference.
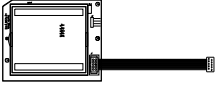
ID	Description	ID	Description
1	Screw,M6X20	26	Keyboard
2	Screw,M5X16	27	Front cover,WO
3	Bubble level	28	Film keyboard
4	Bracket,bubble level	29	PCB,display,WO
5	Screw,M5X8	30	Back cover,WO
6	Spider,Diva-P2	31	Currency sticker
7	Screw,M6X18	32	Lens,PC
8	Top cover	33	Back cover
9	LC	34	PCB,display,PC
10	PCB,main	35	Screw,M2.9X9.5
11	PCB,interface	36	Front cover
12	Harness,int-con	37	Screw,M2.9X19
13	PCB,connect	38	Half circle hoop,fixing
14	Outer sheet metal (DIVA P2)	39	Screw,M5x10
14A	Outer sheet metal (DIVA P3)	40	Display towre base,PC
15	Screw,M3X5	41	Display tower,PC
16	Screw,M6X16	42	Fixing plate,cable
17	Screw,M3X6	43	Tower base
18	Base,Diva-P2	44	Screw,M5X10
19	Harness,LC-Main	45	PCB,adapter board
20	Screw,M6x6	46	Screw,M4X6
21	Security lable	47	Tower base cover
21A	Connector (DIVA P3)	48	Spring
22	Data lable	49	Pin
23	Display tower base,WO	50	Bolt,M6X45
24	Display tower mounting,WO	51	Wing nut,M6
25	Lens,WO	52	Cable,display

5.6 Replacement Parts Order Numbers

Part Number	Exploded ID	Description	Picture
72191106	23-30	SL DISP,W/LENS&CABLE,MT,24P	
72191107	31-52	4 Line, MT, €/KG, 6/15x.002/.005KG,15P	
72187468	25	Lens, MT, 1 Line, 30 x .01LB	See Section 4.1
72187467	52	Lens, MT, 1 Line, 6/15 x .002/.005KG	See Section 4.1
71209948	44	Display Cable, 4 meters	
72197276	Not Shown	POS Comm, (Direct to Scale)	
42101395	9	Load Cell	
72190210	10	DIVA Main PCB (PSC)	
72192708	11	Interface PCB	
71208258	19	LC Flex Circuit	
72193915	6	Spider	
72208126	21A	DIVA P3: Connector (2) attaches to spider	
64053623	Not Shown	Power Y-Cable	
72193914	18	Base	
72193948	14	DIVA P2: Outer Sheet Metal	
72208127	14A	DIVA P3: Outer Sheet Metal (longer version)	

Part Number	Exploded ID	Description	Picture
68001451	21	Security Label	
72194083	Not Shown	Mounting Screw ,1/4"X3/4"	
72185768	31	Currency Sticker,Poland, 4 Line Display	
72185767	31	Currency Sticker,Czech, 4 Line Display	
72185766	31	Currency Sticker,Hungary, 4 Line Display	
71209973	31	Currency Sticker,Switzerland, 4 Line Display	
71209974	31	Currency Sticker,Venezuela, 4 Line Display	
71209972	31	Currency Sticker, $/kg, 4 Line Display	
71209975	31	Currency Sticker,UK,kg, 4 Line Display	
72190532	32	overlay,4l display,MT DIVA,6/15kg	See Section 4.1
72190533	32	overlay,4l display,MT DIVA,30lb	See Section 4.1
72188623	25	Lens,sl dis,MT DIVA	See Section 4.1
72200492	8	Top cover	
72190534	47	overlay,sl display,MT DIVA	See Section 4.1
72191416	Not Shown	KIT,WO DUAL DISP,30X.01LB	
72191417	Not Shown	KIT,WO DUAL DISP,6/15kgX2/5g	
71209947	29	PCB, SINGLE LINE DISPLAY	

Part Number	Exploded ID	Description	Picture
71209952	34	PCB, FOUR LINE DISPLAY	

6 Appendix

6.1 Protocols

The numbers correspond to the number that will show up in the Soft Switch settings in Group 3.5:

0. (Reserved)
1. NCI - ECR
2. (Reserved)
3. 8217 Mettler Toledo
4. 8213 Mettler Toledo
5. EPOS 1 (Weight Only)
6. EPOS 2 (Weight Only)
7. (Reserved)
8. Dialog 06
9. Dialog 04 / 02
10. Extended Dialog 06
11. ICL
12. Shekel (Weight Only)
13. Riva (Weight Only)
14. IP3 (Price Computing)
15. (Reserved)

6.1.1   NCI – ECR

6.1.1.1   OVERVIEW

The serial communications protocol is used to interface Weigh-Tronix/NCI POS (Point-of-Sale) scales to ECR (Electronic Cash Registers), or other computing equipment (eg. personal computers).

Baud rate and parity will be configurable. Start and stop bits will
each be fixed at one (1). Data bits will be fixed at seven.
Baud rates supported will be 1200, 2400, 4800, 9600 and 19200.
Responses to serial commands will be immediate, or within one weight meter cycle of the scale. One second should be more than adequate for use as a time-out value by the remote (controlling) device.

There are two types of serial commands: *mandatory* and *optional*. Mandatory commands must be supported by all products.

If weight is negative, in motion, over capacity or under capacity, or if a zero error exists, only the scale's status is returned in response to a weight ('**W**') command.

Status bytes are prefaced by the letter 'S'

Units of measure abbreviations are always upper case.

The weight is always positive, therefore there is no polarity byte

Key to symbols used:
      <ETX> End of TeXt character (03 hexadecimal).
      <LF> Line Feed character (0A hex).
      <CR> Carriage Return character (0D hex).
      <SP> Space (20 hex).
      x Weight characters from display including minus sign and out-of range
      characters.
      hh Two status bytes.
      UU Units of measure (LB, KG, OZ, G, etc., all upper case).

Mandatory Commands
Name: Request weight
Command: W<CR>
Response: Returns decimal weight, units and status. (see note 1 and 2)
                              <LF>xx.xxxUU<CR><LF>Shhhh<CR><ETX>

                              Returns lb-oz weight with units plus scale status.
                              <LF>xLB<SP>xx.xOZ<CR><LF>Shhhh<CR><ETX>

                              Scale status only if wt < 0, initial zero error, in motion or out of capacity.
                              <LF>Shhhh<CR><ETX>

Name: Request status
Command: S<CR>
Response: Returns scale status.
                              <LF>Shhhh<CR><ETX>

Name:	Zero the scale	
Command:	Z<CR>	
Response:	Scale is zeroed, returns scale status. (see note 4)	
	<LF>Shhhh<CR><ETX>	

Optional Commands

Name:	Request high-resolution weight
Command:	H<CR>
Response:	Returns decimal wt in 10x with units plus scale status. (see notes 2 and 3)
	<LF>xxx.xxxUU<CR><LF>Shhhh<CR><ETX>
	Returns lb-oz wt in10x with units plus scale status.
	<LF>xLB<SP>xx.xxOZ<CR><LF>Shhhh<CR><ETX>
	Scale status only if wt < 0, initial zero error, in motion or out of capacity.
	<LF>Shhhh<CR><ETX>

Name:	Change units of measure
Command:	U<CR>
Response:	Changes units of measure, returns new units and scale status.
	<LF>uu<CR><LF>Shhhh<CR><ETX>

Name:	Request metrology raw counts
Command:	M<CR>
Response:	Returns normalized raw counts and scale status.
	<LF>xxxxxxMM<CR><LF>Shhhh<CR><ETX>

Name:	unrecognized command
Command:	all others
Response:	Unrecognized command
	<LF>?<CR><ETX>

NOTES:
1) Weight field is always six characters (5 for weight, 1 for decimal point), regardless of display size.
2) Leading zeroes are not suppressed.
3) High resolution weight field is seven characters (6 for weight, 1 for decimal point), regardless of display size.
4) If scale is outside zero range or in motion the 'Z' command is ignored and scale status is returned without zero status flag set, i.e., scale not at zero.

Weight Command: W

This command causes the scale to return the displayed weight string in ECR format. The scale will usually return the displayed weight with leading zeroes (ie no leading zero suppression). However, if weight is negative, in motion, over capacity or under capacity, or if a zero error exists, the ECR protocol causes only the scale's status to be returned in response to a weight ('**W**') command.

The returned weight string will include decimal point plus units of measure. The length of the weight field will be equal to the length of the scale's display plus three (one for the decimal point, and two for the units, e.g., "LB"). For pounds-ounce weight, the length of the weight field will be equal to the length of the scale's display plus five (one for the decimal point, two for the "LB" and two for the "OZ"). Units of measure will appear in their ANSI standard abbreviated form ("LB" for pounds, "KG" for kilograms, etc.) in uppercase characters.

Zero Command: Z

If zeroing criteria are met, the scale is zeroed. In any case, scale status is returned.

High-Resolution Command: H

This is the same as the **W** command except that when weight is returned, it is returned with ten times the scale's displayed resolution.

Change Units Command: U

The effect of this command will be the same as if the *UNITS* key on the scale were pressed, causing the scale to change its units of measure. In response, the scale will return the new units of measure and scale status.

Metro Command: M

This command is optional. It will cause the scale to return normalized raw counts used for metrology verification. The count value is the same number displayed in the scale's division test in its diagnostics mode. For example, this number ranges up to 120,000 for the 67xx, 100,000 for the 78xx and 1,000,000 for QDT scales.

Scale Status Command: S

There will be at least two status bytes. If bit 6 of the second status byte is set then there will be a third byte. Bit 6 of each successive byte will indicate whether or not another status byte follows. The bit will be clear (0) in the last status byte. At this time only the first three bytes are defined. Others may be added in the future. Bit 0 is the least significant bit in the byte while bit 7 is the most significant bit.

The status bits are defined as follows:

Bit	Status Byte 1	Status Byte 2	Status Byte 3	Status Byte 4
0	1 = Scale in motion 0 = Stable	1 = Under capacity 0 = Not under capacity	00 = Low range 01 = (undefined) 10 = (undefined) 11 = High range	1 = Weight Change 0 = No Change
1	1 = Scale at zero 0 = Not at zero	1 = Over capacity 0 = Not over capacity		1 = Zero Detected 0 = No Zero Seen
2	1 = RAM error 0 = RAM okay	1 = ROM error 0 = Calibration okay	1 = Net weight 0 = Gross weight	1 = Metric 0 = English
3	1 = EEPROM error 0 = EEPROM okay	1 = Faulty calibration 0 = Calibration okay	Initial zero error	Unused
4	**Always 1**	**Always 1**	**Always 1**	**Always 1**
5	**Always 1**	**Always 1**	**Always 1**	**Always 1**
6	**Always 0**	1 = Byte follows 0 = Last byte	1 = Byte follows 0 = Last byte	1 = Byte follows 0 = Last byte
7	Parity	Parity	Parity	Parity

6.1.2 (Reserved)

6.1.3 8217 Mettler Toledo

6.1.3.1 Host Communications

The 8217 scale acts as a peripheral device when connected to a host computer. When the host requests weight data by sending an uppercase **W**, the scale will respond with the weight data or a status byte if the scale is in motion or an invalid state. The host can also request a scale zero operation, in which case the scale will respond with the scale status, so the host can determine if the scale is in zeroing range and/or if the scale is at zero. A scale confidence test can also be initiated by the host to cause the scale to perform RAM, ROM, and NOVRAM tests and put the results in a status byte for later underline interrogation by the host.

Data is transmitted and received by the scale using an RS232 voltage level interface in the following ASCII format: 7 bit even parity and one stop bit. Data transmission rates are 1200, 2400, 9600, or 19200 baud asynchronous. The host computer must send requests to the scale as specified single uppercase ASCII characters to have it perform various functions. The scale will send a response back to the host computer as a string of ASCII numeric digits or as an ASCII *?* followed by a status byte. There must be at least a 200-ms delay between commands to allow for processing data response time at the scale. The following table shows the standard commands and responses between the scale and host. If a confidence test results in an error, the scale will not respond to the **W** or **Z** commands until the error condition is corrected. An error will also cause the scale to halt any weighing operation until cleared.

6.1.3.2 Command Descriptions

ASCII Commands
(* MUST BE UPPERCASE CHARACTERS ONLY.)

*ASCII Command From Host	Scale Response	Description
W	STX WW.WW ^C_R STX WW.WWW ^C_R STX WW.WWN ^C_R STX WW.WWWN ^C_R STX?*status byte* ^C_R	Instructs scale to send weight data. (W=Weight Digit 0-9). The scale will respond as follows according to setup and status: Gross Weight Pounds. Gross Weight KG. Net Weight Pounds. ASCII N added after weight. Net Weight KG. ASCII N added after weight. Status byte is sent if scale is in motion, or is net/gross weight is negative or over capacity. Table "Scale Status Byte Bit Definitions" to determine status byte results.
Z	STX?*status byte* ^C_R	Zero scale command. On the next A/D reading, zero will be captured if the weight is stable, within capture range, and no tare is taken (gross weight mode.)
T^C_R	STX?*status byte* ^C_R	Tare item on platter command. The scale must be at gross zero before placing the item on the platter. Tare will be taken if weight is stable and non-zero. After 150 millisecond delay, the scale will respond with a status byte. (NOTE: Tare must be enabled in calibration mode or scale will not respond.).
TWWWWW ^C_R	STX?*status byte* ^C_R	Digital Tare Command. Known tare value can be sent to scale and must be transmitted as five digits. The scale assumes a decimal point of WWW.WW LB, or WW.WWW KG. (Note: Tare must be enabled in calibration mode or scale will not respond.)
C	STX?*status byte* ^C_R	Clear Tare Command (ignored if weight is not stable.) Scale status byte is sent after 150 ms delay.
A	STX ^C_R	Initiate Confidence Test Command. STXCR is sent indicating command was received.
B	STX?*status byte* ^C_R	Send Confidence Test Results Command. **A** must be sent prior to the Send Result command **B**. Results of the test are contained in a status byte. Use Table 12-c to determine test results. If all tests passed, the ASCII @ character will be returned.
E	STXE ^C_R	Start Echo Mode Serial Port Test Command. Scale will respond with an E indicating command received. Characters except F will be echoed back to the host.
F	STXF ^C_R	End Echo Mode Command. The scale will respond with an ASCII **F** indicating the command was received.

6.1.3.3 Status Byte Format

When the scale responds with STX?*status byte* ^C_R , this indicates a status byte. The status byte contains scale status information, which can include net/gross mode, zero status, etc. The actual status byte sent will be an ASCII character which must be converted to binary to decode the bits. The scale status bit definitions are shown in the following table.

Scale Status Byte Bit Definitions

Bit Number	Bit Description
7	7 Parity Bit (even).
6	1 = Normal. 0 = Bad Command from host.
5	1 = Net Weight, 0 = Gross Weight
4	1 = Center of zero. 0 = Not at center of zero.
3	1 = Outside zero capture range. 0 = Within range.
2	1 = Under zero. 0 = Within weighing range.
1	1 = Over capacity. 0 = Within weighing range.
0	1 = Scale in motion. 0 = Stable weight data.

6.1.3.4   Confidence Test Status Byte Format

When the scale responds with STX? *status byte* ^C_R, after requesting a confidence test (B), a confidence test status byte will be sent. The status byte contains scale status information, which can include net/gross mode, zero status, etc. The actual status byte sent will be an ASCII character which must be converted to binary to decode the bits. The confidence test status bits are shown in the following table. Bit 6 is set to 1 after a confidence test is performed and reset to 0 after the host reads the confidence test status byte. The Confidence Test Byte bit definitions are shown below.

Note: The ASCII @ (decimal 64) indicates all tests were passed. Repeated reads of the confidence byte for all test passed without initiating a new confidence test will result in an ASCII NULL (hex 00).

Scale Confidence Test Byte Bit Definitions

Bit Number	Bit Description
7	Parity Bit (even).
6	1 = New status data available. 0 = Host has read data.
5	Bit is always a 0.
4	1 = ROM test failed. 0 = ROM test passed.
3	1 = Processor RAM test failed. 0 = Processor RAM test passed.
2	1 = Ram Test Failed. 0 = Ram Test Passed.
1	1 = NOVROM test failed. 0 = NOVROM test passed.
0	Always 0.

6.1.3.5 Tare

Tare can be taken on an item two ways: Automatic or digital.

REMOTE TARE

The unknown weight of an object can be tared-off automatically by placing the object on the scale platter, then with the display in a stable non-motion and positive weight condition, sending an uppercase ASCII *T* character followed by ^C_R from the host will automatically subtract the weight. The tare function must be enabled. Chain tare is not permitted. A display triangle, located under the least significant weight digit on the scale display will illuminate to indicate net weight is displayed. Negative weight will cause dashes to be displayed and status byte will be sent to the host instead of weight data.

DIGITAL TARE

Keyboard tare is set in the scale when an uppercase ASCII T character, followed by five ASCII digits and a CR is sent by the host. The scale weight display must be positive and stable. The tare value input is limited to the scale capacity. In metric mode, the tare value must always end in 0 or 5.

CLEARING TARE

If auto tare clear is enabled, tare is automatically cleared whenever the scale returns to gross zero after having indicated a stable net weight at least one increment above net zero. If auto tare clear is disabled, tare can be cleared by sending an uppercase ASCII C from the host.

6.1.4   8213 Mettler Toledo

6.1.4.1   Host Communications

The 8217 scale acts as a peripheral device when connected to a host computer. When the host requests weight data by sending an uppercase **W**, the scale will respond with the weight data or a status byte if the scale is in motion or an invalid state. The host can also request a scale zero operation, in which case the scale will respond with the scale status, so the host can determine if the scale is in zeroing range and/or if the scale is at zero. A scale confidence test can also be initiated by the host to cause the scale to perform RAM, ROM, and NOVRAM tests and put the results in a status byte for later <u>interrogation</u> by the host.

Data is transmitted and received by the scale using an RS232 voltage level interface in the following ASCII format: 7 bit even parity and one stop bit. Data transmission rates are 1200, 2400, 9600, or 19200 baud asynchronous. The host computer must send requests to the scale as specified single uppercase ASCII characters to have it perform various functions. The scale will send a response back to the host computer as a string of ASCII numeric digits or as an ASCII *?* followed by a status byte. There must be at least a 200-ms delay between commands to allow for processing data response time at the scale. The following table shows the standard commands and responses between the scale and host.   If a confidence test results in an error, the scale will not respond to the **W** or **Z** commands until the error condition is corrected. An error will also cause the scale to halt any weighing operation until cleared.

6.1.4.2 Command Descriptions

ASCII Commands
(* MUST BE UPPERCASE CHARACTERS ONLY.)

*ASCII Command From Host	Scale Response	Description
W	STX 0WW.WW ^C_R STX WW.WWW ^C_R STX 0WW.WWN ^C_R STX WW.WWWN ^C_R STX?*status byte* ^C_R	Instructs scale to send weight data. (W=Weight Digit 0-9). The scale will respond as follows according to setup and status: Gross Weight Pounds. Gross Weight KG. Net Weight Pounds. ASCII N added after weight. Net Weight KG. ASCII N added after weight. Status byte is sent if scale is in motion, or is net/gross weight is negative or over capacity. Table "Scale Status Byte Bit Definitions" to determine status byte results.
Z	STX?*status byte* ^C_R	Zero scale command. On the next A/D reading, zero will be captured if the weight is stable, within capture range, and no tare is taken (gross weight mode.)
T^C_R	STX?*status byte* ^C_R	Tare item on platter command. The scale must be at gross zero before placing the item on the platter. Tare will be taken if weight is stable and non-zero. After 150 millisecond delay, the scale will respond with a status byte. (NOTE: Tare must be enabled in calibration mode or scale will not respond.).
TWWWWW ^C_R	STX?*status byte* ^C_R	Digital Tare Command. Known tare value can be sent to scale and must be transmitted as five digits. The scale assumes a decimal point of WWW.WW LB, or WW.WWW KG. (Note: Tare must be enabled in calibration mode or scale will not respond.)
C	STX?*status byte* ^C_R	Clear Tare Command (ignored if weight is not stable.) Scale status byte is sent after 150 ms delay.
A	STX ^C_R	Initiate Confidence Test Command. sTXCR is sent indicating command was received.
B	STX?*status byte* ^C_R	Send Confidence Test Results Command. **A** must be sent prior to the Send Result command **B**. Results of the test are contained in a status byte. Use Table "Scale Confidence Test Byte Bit Definitions" to determine test results. If all tests passed, the ASCII @ character will be returned. If a confidence test results in an error, the scale will not respond to the "W", "H", or "Z" command until the error condition is cleared. A confidence test error will also cause the scale weighing operation to halt until the error condition is cleared.
E	STXE^C_R	Start Echo Mode Serial Port Test Command. Scale will respond with an E indicating command received. Characters except F will be echoed back to the host.
F	STXF	End Echo Mode Command. The scale will respond with an ASCII **F** indicating the command was received.

6.1.4.3 Status Byte Format

When the scale responds with STX?*status byte* ^C_R , this indicates a status byte. The status byte contains scale status information, which can include net/gross mode, zero status, etc. The actual status byte sent will be an ASCII character which must be converted to binary to decode the bits. The scale status bit definitions are shown in the following table.

Scale Status Byte Bit Definitions

Bit Number	Bit Description
7	7 Parity Bit (even).
6	Always 1
5	1 = Net Weight, 0 = Gross Weight
4	1 = Center of zero. 0 = Not at center of zero.
3	1 = Outside zero capture range. 0 = Within range.
2	1 = Under zero. 0 = Within weighing range.
1	1 = Over capacity. 0 = Within weighing range.
0	1 = Scale in motion. 0 = Stable weight data.

6.1.4.4 Confidence Test Status Byte Format

When the scale responds with STX? *status byte* ^C_R, after requesting a confidence test (B), a confidence test status byte will be sent. The status byte contains scale status information, which can include net/gross mode, zero status, etc. The actual status byte sent will be an ASCII character which must be converted to binary to decode the bits. The confidence test status bits are shown in the following table. Bit 6 is set to 1 after a confidence test is performed and reset to 0 after the host reads the confidence test status byte. The Confidence Test Byte bit definitions are shown below.

Note: The ASCII @ (decimal 64) indicates all tests were passed. Repeated reads of the confidence byte for all test passed without initiating a new confidence test will result in an ASCII NULL (hex 00).

Scale Confidence Test Byte Bit Definitions

Bit Number	Bit Description
7	Parity Bit (even).
6	1 = New status data available. 0 = Host has read data.
5	Bit is always a 0.
4	1 = ROM test failed. 0 = ROM test passed.
3	1 = Processor RAM test failed. 0 = Processor RAM test passed.
2	1 = Ram Test Passed. 0 = Ram Test Failed.
1	1 = NOVROM test failed. 0 = NOVROM test passed.
0	Always 0.

6.1.5 EPOS 1

6.1.5.1 Data Format

2400 Baud (select 2400, 4800 or 9600)
7 data bits (select 7 or 8)
Even parity (select Even, None or Odd parity)
1 stop bit (select 1 or 2 stop bit)

6.1.5.2 Command Descriptions

Command	COMMENTS
ENQ (05h)	Starts the communication sequence
ACK (06h)	Data Available
CAN (18h)	Repeat weighing
NAK (15h)	No acknowledgement
NUL (00h)	No data available
DC1 (11h)	Data Request
STX (02h)	Start of text
ID	Information byte, broken down into the following bits: | Bit			Capacity
---	---	---	---
2	**1**	**0**	
0	0	1	15kg x 0.005kg
0	1	0	30lb x 0.01lb
0	1	1	6kg x 0.002kg	 **Bit 3** - Logic 1 **Bit 4** - Logic 1 means under/over range **Bit 5** - Logic 1 **Bit 6** - Logic 1 indicates non-AVR capacities
Weight	5 bytes with MSD first
BCC	Block Check Character calculated as the even column parity (Longitudinal Redundancy Check) of all characters except the STX and ETX.
ETX (03h)	End of text
STX Z NUL NUL NUL NUL NUL ETX BCC	Command String to Zero the scale from the EPOS, note that the BCC in this case will be "Z"
STX N NUL NUL NUL NUL NUL ETX BCC	Command String to Tare the scale from the EPOS, note that the BCC in this case will be "N"
CR (0dh)	Data received and compared correctly

6.1.5.3 Command Flow

ECR	Scale	COMMENTS
ENQ (05h)		

	ACK (06h)	Data Available.
		    Errors could be:
		    CAN - repeat weighing
		    NAK - no acknowledgement
		    NUL - no data available

DC1 (11h)		Data Request
		    Errors could be:
		    NAK – no acknowledgement

	STX ID W5W4W3W2W1 BCC ETX	Transmitted Data

STX ID W5W4W3W2W1 BCC ETX		Confirm Data
		    Errors could be:
		    ACK – Data not confirmed

	CR (0dh)	Data confirmed

Note: Spaces depicted in the description above are only used for ease of reading.   No space characters are used unless the BCC result yields the space character.

6.1.6   EPOS 2

6.1.6.1   Data Format

2400 Baud (select 2400, 4800 or 9600)
7 data bits (select 7 or 8)
Even parity (select Even, None or Odd parity)
1 stop bit (select 1 or 2 stop bit)

6.1.6.2   Handshaking

For PC DB25 serial port connector: Jumper 4 to 5, and 6, 8, & 20 together.
For PC DB9 serial port connector: Jumper 4 to 6 and 7 to 8.

6.1.6.3   Command Descriptions

Command	COMMENTS
ENQ (05h)	Starts the communication sequence
ACK (06h)	Data Available
NAK (15h)	No acknowledgement
NUL (00h)	No data available
DC1 (11h)	Data Request
STX (02h)	Start of text
ID	Information byte, broken down into the following bits: | Bit			Capacity
---	---	---	---
2	1	0	
0	0	1	15kg x 0.005kg
0	1	0	30lb x 0.01lb
0	1	1	6kg x 0.002kg	 **Bit 3** - Logic 1 **Bit 4** - Logic 1 means under/over range **Bit 5** - Logic 1 **Bit 6** - Logic 1 indicates non-AVR capacities
Weight	5 bytes with MSD first
BCC	Block Check Character calculated as the even column parity (Longitudinal Redundancy Check) of all characters except the STX and ETX.
ETX (03h)	End of text
STX Z NUL NUL NUL NUL NUL ETX BCC	Command String to Zero the scale from the EPOS, note that the BCC in this case will be "Z"
STX N NUL NUL NUL NUL NUL ETX BCC	Command String to Tare the scale from the EPOS, note that the BCC in this case will be "N"

6.1.6.4 Command Flow

ECR	Scale	COMMENTS
ENQ (05h)		

	ACK (06h)	Data Available.
		    Errors could be:
		    CAN - repeat weighing
		    NAK - no acknowledgement
		    NUL - no data available

DC1 (11h)		Data Request
		    Errors could be:
		    NAK – no acknowledgement

	STX ID W5W4W3W2W1 BCC ETX	Transmitted Data

Note: Spaces depicted in the description above are only used for ease of reading. No space characters are used unless the BCC result yields the space character.

6.1.7   (Reserved)

6.1.8   Dialog 06

With free programmable POS-Systems it is for a third party on principle possible, to manipulate parts of the software, which are obligate to verification.

For this reason certifying agencies expects appropriate protection against such inadmissible manipulations of third parties.

A protection against manipulations presents the Checkout-Dialogue 06 in conjunction with precautions taken at the POS-Software.

6.1.8.1   POS-Software

The parts of the POS-Software, which are obligated to verify, have to be protected with checksums (here called value CS), created by an appropriate method (for instance CRC16). These checksums CS have also to be protected with checksums (here called value KW), created by the CRC16-method in use with a polynomial P, which is known only by the manufacturers of the scale and the POS-system.   CS and KW both have a length of 16 bit. Remark: KW represents the rest of the polynomial-division   CS / P.

6.1.8.2   Checkout-Dialogue 06

The checkout-dialogue 06 presents for the scale the possibility, to request 1-5 pairs of values CS/KW in cyclic intervals from the POS-system and check their validity. In case of invalidity, no weight-results will be given from the scale to the POS-system, i.e. dealing with the scale is not possible.   With the request for the checksums, the scale sends a random number, which has to be used from the POS-system for encoding the checksums. This shall prevent a third party from monitoring valid checksums with simple measures.   The random number is an 8-bit-number, the higher nibble (here called Z1) is used for encoding the CS-values, and the lower nibble (here called Z2) is used for encoding the KW-values. The encoding of the CS-values has to be made by rotating them to the left for Z1 bits, the encoding of the KW-values by rotating them to the right for Z2 bits.

For checking the conformity of the used protocol version in POS-system and scale, the Checkout-Dialogue 06 presents for the POS-system the possibility to order the scale to display the version number of the protocol. If the POS-system also displays the version number, the conformity can be checked.

6.1.8.3   Command Descriptions

Records for Communications from a POS system to the Scale

Record 01:	Transmitting of unit price

```
EOT  STX  01  ESC  D5  D4  D3  D2  D1  D0  ESC  ETX
          \_/            _____/
         Record No.          Unit price 5/6 digits
```

Record 03:	Transmitting of unit price and tare value

```
EOT  STX  03  ESC  D5  D4  D3  D2  D1  D0  ESC  T3  T2  T1  T0  ETX
          \_/            _____/       _____/
         Record No.          Unit price 5/6 digits     Tare value 4 digits
```

Record 04:	Transmitting of unit price and text (TLU)

```
EOT  STX  04  ESC  D5  D4  D3  D2  D1  D0  ESC  A.................A  ETX
          \_/            _____/       _____/
         Record No.          Unit price 5/6 digits     Text 13 chars
```

Record 05:	Transmitting of unit price, tare value and text (TLU)

```
EOT  STX  05  ESC  D5 D4 D3 D2 D1 D0  ESC  T3 T2 T1 T0  ESC  A.................A ETX
          \_/       _____/       _____/       _____/
         Record No.     Unit price 5/6 digits    Tare value 4 digits    Text 13 chars
```

Record 08:	Status request after receiving <NAK>

```
EOT  STX  08  ETX
          \_/
         Record No.
```

Record 10:	Transmitting of checksums

```
EOT  STX  10  ESC  CS1  KW1  CS2  KW2  ..  CSn  KWn  ETX
          \_/       _____/  _____/  ....  _____/
        record        pair 1      pair 2           pair n
         No.                      CS/KW
```
Checksums must be transmitted as hexadecimal ASCII-chars.
Max. of "n" is 5   example: CS1 = 74AEH   --> 37H, 34H, 41H, 45H   ('7','4','A','E')

Record 20:	Version number on / off

```
EOT  STX  20  ESC  D0  ETX
          \_/        \
        record        \_____30H = off
         No.               31H = on
```

Record 80:	Display of piece article (weight display inactive)

```
EOT  STX  80  ESC  A.................A  ESC  P5 P4 P3 P2 P1 P0  ESC  B5 B4 B3 B2 B1 B0  V  ETX
          \_/       _____/       _____/       _____/  \
        record            text                price display  6 digits    amount display  6 digits  \
         No.             21 chars             (digits or spaces)         (Comma will be inserted)   \
                                                                                                     sign
       displaying of a piece article will be ended with                                          ('-' or ' ')
         - another Record 80, or Records 81, 01, 03, 04, or 05.
```

Record 81:	Deletion of piece article (weight display active)

```
EOT  STX  81  ETX
          \_/
         Record No.
```

Request for weight	

```
EOT  ENQ          scale answers with record 02
```

Resetting of scale interface	

```
EOT
```

Records for Communications from the Scale to a POS system

Record 02:   Result of weighing   (answer to records 01, 03, 04, 05)

```
STX  02  ESC  X  ESC  D4 D3 D2 D1 D0  ESC  D5 D4 D3 D2 D1 D0  ESC  D5 D4 D3 D2 D1 D0  ETX
     \_/       I        _____/            _____/            _____/
   Record      I           scale-weight                  unit price                     price to pay
    No.      status          5 digits                    5/6 digits                       6 digits
```

```
                    Scale status
              30H = lb. : oz   /   1/8 oz
              31H = lb. / 0,01
              32H = lb. / 0,005
              33H = kg
```

Record 09:   Status information   (answer to Record 08)

```
STX   09   ESC   S1 S0   ETX
      \_/          \____/
    Record           |
     No.              \            00    no error
                       \           01    general error
                        \          02    parity error or buffer overflow
                         \         10    invalid record no.
                          \        11    invalid unit price
                           \       12    invalid tare value
                            \      13    invalid text
                                   20    scale is still in motion    (no standstill)
                                   21    scale wasn't in motion since last operation
                                   22    measurement is not yet finished
                                   30    weight is less than minimum weight
                                   31    scale is less than 0
                                   32    scale is overloaded
```

Record 11:   Request of checksums   (or answer to Record 10)

```
STX   11   ESC   D0   Z   ETX
      \_/          \    _____   random number   (only if   D0 = 32H)
    Record          \
     No.             \          30H = checksums invalid
                      \         31H = checksums valid
                       \_____   32H = answer with rec. 10,   use random number   Z
```

Representation of random number Z like checksums   (hexadecimal ASCII-char)

6.1.8.4   Description of the Dialog

A dialogue will always be initiated by the POS-system.

Description of weighing operation
The POS-system transmits one of the **Records 01, 03, 04 or 05**.
The scale answers (if no errors) with **ACK** and displays the transmitted data.   The POS-system now can request the weighing result from the scale by transmitting **EOT ENQ**.   If the result is known the scale answers with **Record 02**.

If there is an error, the scale answers with **NAK**.   The cause of the error can be explained by the POS-system sending **Record 08** and receiving **Record 09**.   If the status is 20 or 22, the weighing results can be requested again by retransmitting **EOT ENQ**.   In the case of other errors, the operation has to be started at the beginning (records 01, 03, 04 or 05).

Description of weighing operation with request of checksums
At certain times, the scale will request from the POS-system the calculation and transmitting of checksums. This will happen in the course of a weighing operation after receiving of one of the records 01, 03, 04 or 05, and happens if one of the following events occurs:
- the scale was just powered on
- there was an error detected before
- 50 weighing operations have taken place
- the version number was displayed by the scale (record 20)

Order of events:
- The POS-system transmits one of the **Records 01, 03, 04 or 05**.
- The scale answers with **Record 11**.
- Example: STX 11 ESC 247 ETX (transmit record 10, use random number 47H)
- The POS-system now calculates the checksums, encodes and transmits them by **record 10** to the scale.
- The scale responds Record 10 first with **ACK**.
- The POS-system continues as with a normal weighing operation by transmitting **EOT ENQ**.
- Only now the scale responds the validity of the checksums by **Record 11**.
- If the checksums were valid, the scale transmits STX 11 ESC 1 ETX otherwise STX 11 ESC 0 ETX.
- Regardless whether the response was positive or negative, the POS-system has to repeat the original weighing operation.

Status information
The POS-system is able to get status information from the scale by record 08.

Version number on/off
The POS-system can display the version number of the software in the scale.   If the scale receives record 20 EOT STX 20 ESC **1** ETX, it will display the version number until it receives EOT STX 20 **0** ETX.   All other records will be ignored in between!

Please note that all dialogues must be initiated by the POS-system with **EOT**, **and** also every response of the scale has to be answered by the POS-system with **EOT** !

6.1.8.5 Flow Chart
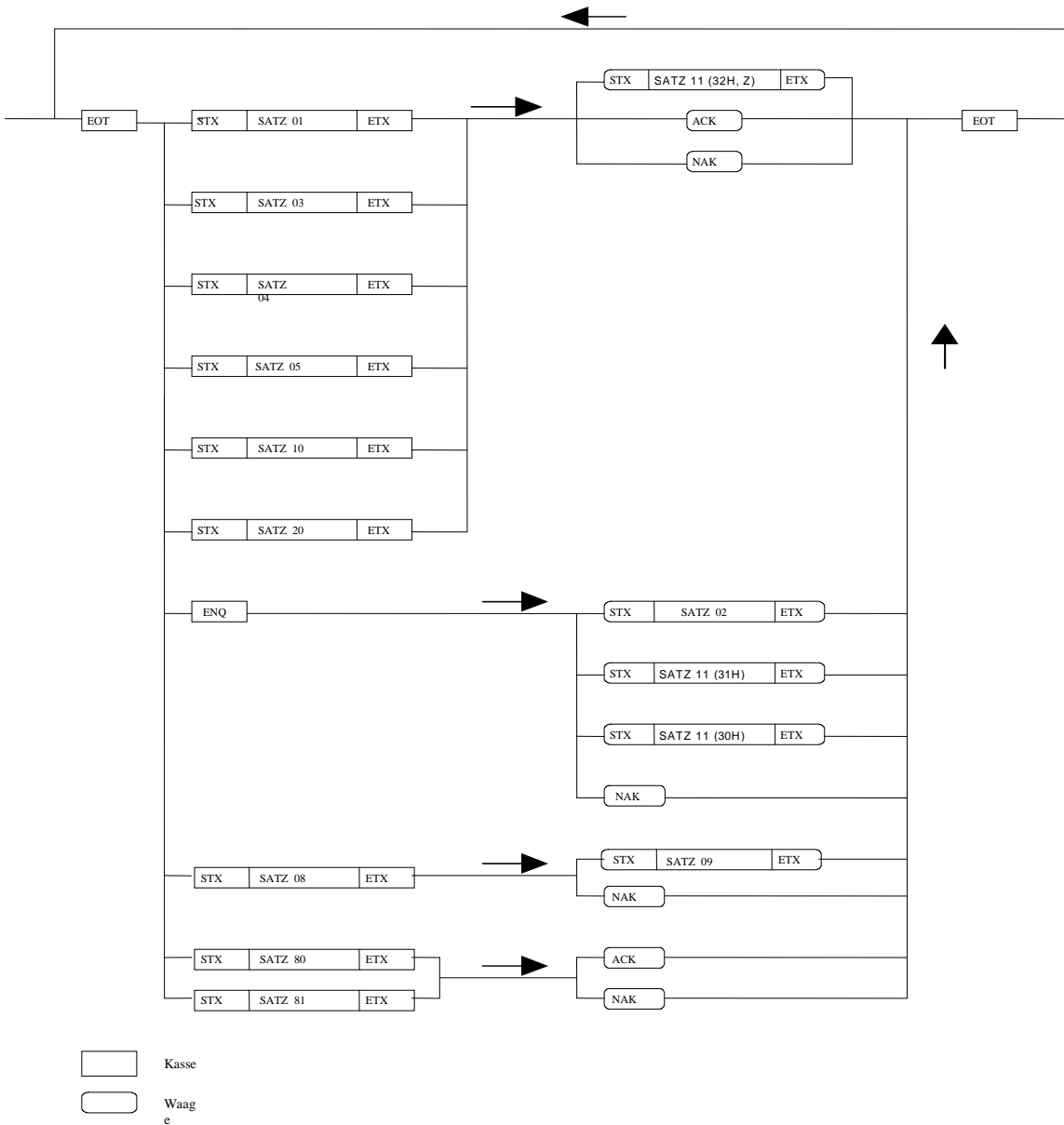
6.1.8.6 Data Format

Baud rate: 9600 Baud
Type of transmission: asynchronous
Data format: 7 Bit + Parity
Parity: odd
Stop bit: 1 Bit

6.1.9 Dialog 04 / 02

Note: To use Dialog 04, select this protocol but set the baud rate to 4800, for Dialog 02 the baud rate is set to 2400

6.1.9.1 Data Format

Baud rate: 2400 Baud
Type of transmission: asynchronous
Data format: 7 Bit + Parity
Parity: odd
Stop bits: 1 Bit
Connection

	Scale	**POS**
	TXD 3	2 RXD
	RXD 2	3 TXD
	GND 5	5 GND

6.1.9.2 Flow Chart
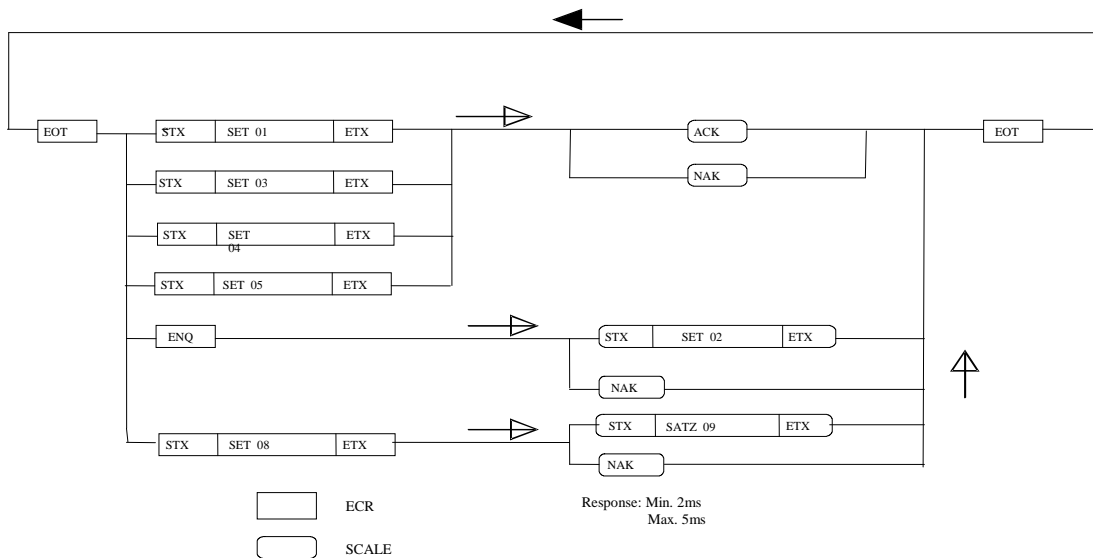
Note: The scale replies to ENQ with NAK when there is no load on the platter, the scale is in motion, under zero, or overcapacity.   NAK is sent in response to the setting strings if there is invalid data in the setting.

6.1.9.3   Command Descriptions

POS System Communications to a Scale

Setting number 01 - Basic Price

EOT	STX	30h 31h	ESC	D5 D4 D3 D2 D1 D0	ESC	ETX
		Setting number (01)		Basic Price 6 digits		

Setting number 03:   Basic Price, Tare Value

EOT	STX	03h 33h	ESC	D5 D4 D3 D2 D1 D0	ESC	T3 T2 T1 T0	ETX
		Setting number (03)		basic price 6 digits		tare value 4 digit	

Setting number 04:   Basic Price, Text

EOT	STX	30h 34h	ESC	D5 D4 D3 D2 D1 D0	ESC	A................A	ETX
		Setting number (04)		Basic price 6 digits		text 13 chars	

Setting number 05:   Basic Price, Tare value, Text

EOT	STX	30h 35h	ESC	D5 D4 D3 D2 D1 D0	ESC	T3 T2 T1 T0	ESC	A................A	ETX
		setting number (05)		Basic price 6 digits		tare value 4 digits		text 13 chars	

Setting number 08:   Status information Request

EOT	STX	30h	38h	ETX
		Setting number (08)		

Scale data reading

EOT ENQ

Scale Communications to a POS System

Setting number 02: Weight, Price, and Total Price

STX	30h 32h	ESC	X	ESC	D4 D3 D2 D1 D0	ESC	D5 D4 D3 D2 D1 D0	ESC	D5 D4 D3 D2 D1 D0	ETX
	___/		I		_____/		_____/		_____/	
	setting no.		status		scale - weight		Basic price		Price to pay	
	(02)				5 digits		6 digits		6 digits	

```
                                 30H = lb
                                 31H = lb. / 0,01
                                 32H = lb. / 0,005
                                 33H = kg
```

Setting number 09: Status information

STX	30h 39h	ESC	S1 S0	ETX
	___/		___/	
	setting no.		Status	
	(09)		I	

```
                        I
            Status: ASCII code 2 bytes
                 00    there is no error
                 01    general errors in the scale
                 02    parity error or more symbols that are permitted
                 10    invalid setting no.
                 11    invalid basic price
                 12    invalid tare value received
                 13    invalid text received
                 20    scale is still in motion    (no standstill)
                 21    scale wasn't in motion since last operation
                 22    there is still no price calculation
                 30    weight is less than minimum weight
                 31    scale is less than 0
                 32    scale is overloaded
```

6.1.10 Extended Dialog 06

The Extended Dialog 06 protocol is for use with communication between the DIVA and the METTLER TOLEDO VCODisp module.

6.1.11 ICL

6.1.11.1 Data Format

9600 Baud (select 2400, 4800 or 9600)
7 data bits (select 7 or 8)
Even parity (select Even, None or Odd parity)
1 stop bit (select 1 or 2 stop bit)

6.1.11.2 Handshaking

For PC DB25 serial port connector: Jumper 4 to 5, and 6, 8, & 20 together.
For PC DB9 serial port connector: Jumper 4 to 6 and 7 to 8.

6.1.11.3 Command Descriptions

Command	COMMENTS
ENQ (05h)	Starts the communication sequence
ACK (06h)	Data Available
CAN (18h)	Repeat weighing
NAK (15h)	No acknowledgement
NUL (00h)	No data available
DC1 (11h)	Data Request
STX (02h)	Start of text
ID	Information byte, broken down into the following bits: Bit / Capacity table: <table><tr><th colspan="3">Bit</th><th>Capacity</th></tr><tr><th>2</th><th>1</th><th>0</th><th></th></tr><tr><td>0</td><td>0</td><td>1</td><td>15kg x 0.005kg</td></tr><tr><td>0</td><td>1</td><td>0</td><td>30lb x 0.01lb</td></tr><tr><td>0</td><td>1</td><td>1</td><td>6kg x 0.002kg</td></tr></table> **Bit 3** - Logic 1 **Bit 4** - Logic 1 means under/over range **Bit 5** - Logic 1 **Bit 6** - Logic 1 indicates non-AVR capacities
Weight	5 bytes with MSD first. If the scale registers underweight or overweight a data string with data of zero (00) will be transmitted with bit 4 (X) of the ID byte set to 1. In cases where MSD or LSD are not required a `NUL' character will be transmitted in the unused position.
BCC	Block Check Character calculated as the even column parity (Longitudinal Redundancy Check) of all characters except the STX and ETX.
ETX (03h)	End of text
CR (0dh)	Data received and compared correctly

6.1.11.4 Command Flow

ECR	Scale	COMMENTS
ENQ (05h)		

	ACK (06h)	Data Available.
		    Errors could be:
		    CAN - repeat weighing
		    NAK - no acknowledgement
		    NUL - no data available

DC1 (11h)		Data Request
		    Errors could be:
		    NAK – no acknowledgement

	STX ID W5W4W3W2W1 BCC ETX	Transmitted Data

STX ID W5W4W3W2W1 BCC ETX		Confirm Data
		    Errors could be:
		    ACK – Data not confirmed
		    NAK – receive error or scale
		    error detected.

	CR (0dh)	Data confirmed, CAN response to ENQ is activated until current transaction is cleared.

Note: The POS can request and receive additional weight data from the scale before returning the verification weight but the verification weight must equal the last weight sent by the scale.

Note: Spaces depicted in the description above are only used for ease of reading.   No space characters are used unless the BCC result yields the space character.

6.1.12 Shekel (WO)

6.1.12.1   Command Flow

ECR	Scale	Comment
S<CR><LF>		
	S_XXXXXXXXXX_g_<CR><LF>	Scale sends valid (>= 0, no overload) and stable weight
	SI_<CR><LF>	Sent if no valid and stable weight available for 2 sec. after S-command has been received from the ECR

Remarks: <CR>   Carriage return (0Dh)
        <LF>   Line feed (0Ah)
        XXXXXXXXXX   10 digits weight, leading zeroes
        _   Space character (20h)

6.1.13 RIVA 5462 (WO)

6.1.13.1   Data Format

2400 Baud
7 data bits
Odd parity
2 stop bit

Weight request: <Stx>W<Etx> (W Upper case, AscII 57H)
Response: <Stx>wbbbbbbbkg000000000000C<Etx>
Receipt: <Ack>   Legible response
                        <Nak>   Repeat transfer

Character footnote

Character	Definition
<Stx>	02H
bbbbbbb	Weight (7 characters including decimal point)
kg	Unit (2 characters)
000000000000	Status characters
C	Check sum (XOR of all charcters except Stx, Etx, and check sum)
<Etx>	03H
<Ack>	06H
<Nak>	15H

Status character

1 = unstable	7 = Promerror
2 = Unloaded	8 = Cal error
3 = Less than zero	9 = Spare
4 = Tared	10 = Spare
5 = Negative	11 = Spare
6 = Overload	12 = Spare

A status character is set if the position does not contain 30 H (AscII 0).Response time maximum 300 ms.

6.1.14 IP3 (PC)

6.1.14.1 Data Format

9600 Baud (typical)
7 data bits (typical)
Even parity (typical)
1 stop bit (typical)

6.1.14.2   Command Descriptions

ECR	Time out	Scale	COMMENTS
STX (02h)			
	500ms		
		ACK (06h)	
@ (40h) 1 (31h) P4 (30h to 39h) P3 " " P2 " " P1 " " P0 " " CR (ODh) LF (0Ah)			The cash register sends the unit price (P1-4) to the scale. When received, the scales send back the weight, the unit price and the price to pay. All information are memorized in the cash register (PLU, Totals etc..).
STX (02h)			The dialogue begins with STX and ACK if no answer occurs, STX can be sent 8 times with a delay of 500ms.
	500ms		
		ACK (06h)	
1 (31h) 0 (30h) CR (0Dh) LF (0Ah)			
	100ms/300ms		
		STX (02h)	
ACK (06h)			
		W4 (30h to 39h) W3 " " W2 " " W2 " " W1 " " W0 " " UP4 (30h to 39h) UP3 " " UP2 " " UP1 " " UP0 " " PtP5 (30h to 39h) PtP4 " " PtP3 " " PtP2 " " PtP1 " " PtP0 " " 0 (30h) CR (0Dh) LF (0Ah)	Note: When the cash register requests the weight information, unit price, price to pay, the scale sends back the data when the weight is stabilized. So, it can last up to 1 or 2s. P = Unit Price W= Weight UP= Unit Price PtP=Price to Pay
			If information is not available (too much weight, nul unit price, etc…) the scale sends the error code "3Ch" in W4

6.1.15 (Reserved)

METTLER TOLEDO
1900 Polaris Parkway
Columbus, Ohio 43420-2020

P/N: 72191204