METTLER TOLEDO Xpress

STANDARD INDICATOR

OPERATION & SERVICE MANUAL

Models XIS

ABOUT THIS MANUAL AND MT EXPRESS

Thank you for purchasing an **MT Xpress** product.

All of our equipment is assembled and packed with great care. If you should find any incorrect item, please contact your **Xpress** Dealer immediately.

MT Xpress products are Weights & Measures approved precision weighing instruments. However, you may want to obtain official certification through your supplier or local Weights & Measures office.

This **MT Xpress** product was 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. Properly used and maintained, this product will provide years of accurate weighing. Handle it as you would any piece of fine electronic equipment.

Please READ this manual BEFORE operating or servicing this equipment. Follow the instructions carefully and save this manual for future reference.

We at **MT Xpress** want to make sure you received the product you expected. It is important to us that you are satisfied with your purchase. If there is anything we can help you with, or if you are not satisfied with either your product or the services received from the **Xpress** representative, let us know.

How can you reach us?

XPRESS CUSTOMER CARE CENTER, USA

24/7 Information and Support: www.mt.com/xpress
xpress@mt.com

8 AM to 8 PM EST Toll Free: 1-866-MTXPRESS

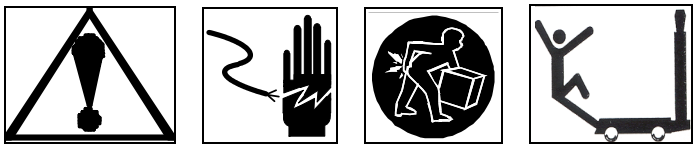
Xpress
Mettler-Toledo, Inc.
60 Collegeview
Westerville, OH 43081

FCC Approval

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CONTENTS

PRECAUTIONS



Product safety is a fundamental concern at MT Xpress. Use common sense and follow the simple precautions listed below to ensure your safety and to optimize the use and performance of this product.

- Read this manual before operating or servicing this product. Save this manual for future reference.
- Observe safety warnings located throughout this manual.
- Use caution when lifting or moving heavy equipment.
- This product should only be serviced by qualified personnel. Exercise care when moving, testing, or adjusting this product.
- Disconnect all power to this product before installing, servicing, or cleaning.
- Use only **MT Xpress** parts for repair.
- Observe electrostatic handling precautions for electronic components. Allow at least 30 seconds after power disconnection to allow charges to dissipate before servicing any electronic components.
- Allow the product to adjust to room temperature before connecting the power source.

FAILURE TO FOLLOW THESE PRECAUTIONS COULD RESULT IN DAMAGE TO OR DESTRUCTION OF THE EQUIPMENT, OR BODILY HARM.

PREPARING THE SCALE FOR USE

The **Xpress** Standard Indicator is a rugged, reliable electronic weighing indicator in an IP65 washdown enclosure designed for easy operation in washdown applications.

This manual provides essential information for installing, programming, and maintaining your indicator. Please review the manual carefully.

This chapter gives detailed instructions and important information regarding the successful installation of the **Xpress** Indicator.

ENVIRONMENT

Before you install the scale, identify the best location for the equipment. The proper environment enhances its operation and longevity. Keep in mind the following factors, which might have a negative influence on the scale's operation:

Vibration: Vibration diminishes the scale's ability to measure accurately. Electrical machinery such as conveyors and drill presses can cause inaccurate and non-repeatable readings. The scale may also read inaccurately if it is not leveled properly.

Air currents: Moving air can cause the scale to read wind movement as an additional force and cause inconsistency in the weighing results.

Friction: A scale cannot measure accurately if an object is rubbing or pressing against the scale platform.

UNPACKING AND ASSEMBLY

Please inspect the package immediately upon receipt. If the box is damaged, check for internal damage and file a freight claim with the carrier if necessary. If the container is undamaged, open the box, remove the scale and place it on a solid, flat surface. Please keep the packing material and shipping insert in case you need to return the scale to an **Xpress** representative.

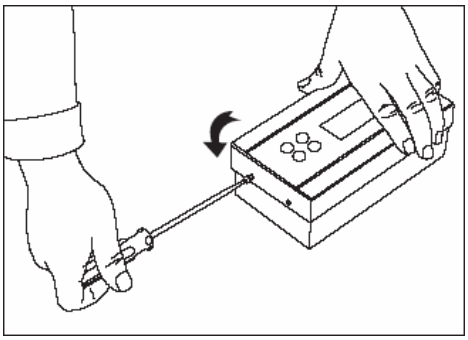
Package contents for all **Xpress** Standard Indicators include:

Product
- **Xpress** Standard Indicator
- Wall/desk mounting bracket
- Accessory bag (4 seal screws, 2 lead seal wires, 2 leads)

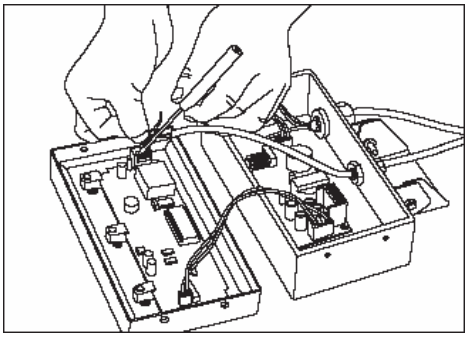
Documents
- Quick Start Guide
- Installation Instructions

CD-ROM
- Operation & Service Manual

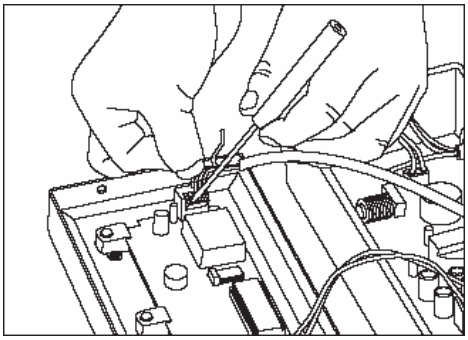
1. Open the stainless steel enclosure by unscrewing four flat Philips screws located on each side.



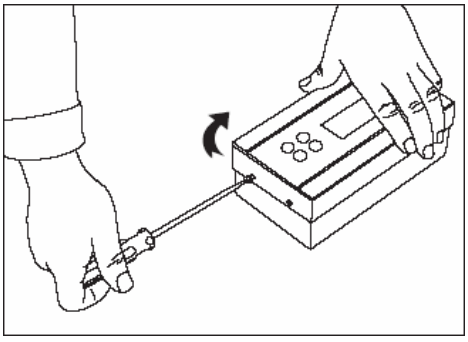
2. Lead the loadcell cable through PG7 connector



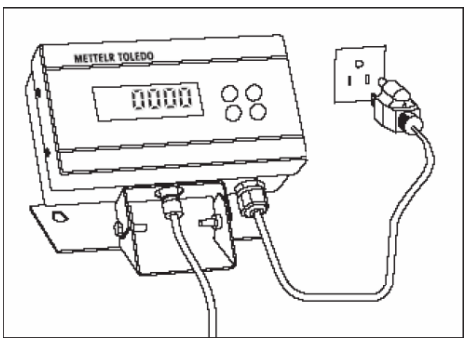
3. Wire loadcell cable onto Main PCB correctly according to cable color code.



4. Close the enclosure by screwing four flat Philips screws.



5. Power on the indicator.



POWER UP/DOWN SEQUENCE

Power Up: Press the power key to turn on the **Xpress** Standard Indicator. It goes through a series of self-tests when it is turned on. The scale performs diagnostics on its internal memory, and precedes to normal the operating mode. The power up sequence is as follows:

- All segments of the display segments and cursors light to verify operation.
- Next the unit displays the software part number; revision number, geo value and country one by one.
- The unit captures zero and is ready for normal operation.

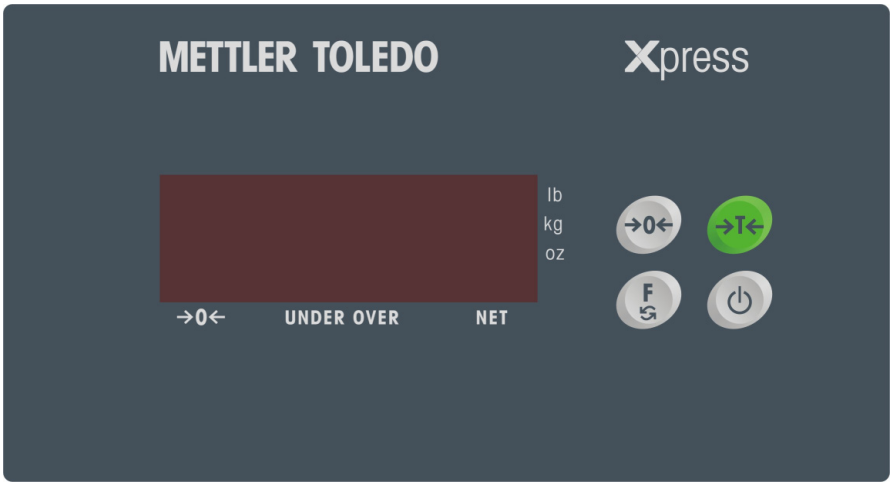
Note: Before switching on the scale, always make sure there is nothing on the platter. If you have powered up the unit with something on the scale, the scale may not find the zero value, and shows "------". To clear this condition remove the item, press the power key until the unit displays "off", then press the power key again, the scale will then capture the correct zero value.

Power Down: Press the power key until "OFF" is shown on the display to turn off the scale.

For detailed product information, please consult the Operation & Service Manual provided on the CD-ROM.

YOUR XPRESS SCALE AT A GLANCE

DISPLAY



KEYPAD

Key	Name	Function	Over/Under Setting
→0←	Zero Key	To return the scale to gross zero	Setting complete exit
→T←	Tare Key	To tare the scale. Pressing this key at zero clears the tare value from memory	Increment digit 1, 2, 3….. ↑
F	Function Key	To enter Over/Under Mode	Increment to next digit right →
⏻	Power key	To turn the scale on or off	Confirm choice

CURSORS (LED)

Cursor	Description
>0<	Illuminates when weight is gross zero (0)
UNDER	Illuminates when the weight is less than the programmed 'Under' value
OVER	Illuminates when the weight is more than the programmed 'Over' value
Net	Illuminates to indicate the displayed value is net weight (gross minus tare)
lb, kg, oz	Indicates current weight unit associated with the displayed value

OPERATING YOUR SCALE

STRAIGHT WEIGHING

Place the item to be weighed on the platter.
Remove the item from the platter, display will return to 0.000.

RE-ZERO FUNCTION

There are two ways to re-zero the scale:

1. 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.

   Note: When the scale is turned on with a weight on the platter is more than 10% of the capacity, the scale will not capture zero (the weight display will show "-----") to indicate that the scale will not be ready for use. After removing the weight the scale will capture "zero".

2. Push-button Zero: →0← The ZERO key sets the gross zero value over a range of +/-2% of the scale capacity. To use this function, the scale must be in the gross weighing mode (NET cursor dark) and in a no-motion condition. When the weight on the platter is more then +/-2% of the scale capacity depressing the zero key will not yield a result until the weight is removed and the Zero key has been depressed a second time

TARE FUNCTION

The →T← key subtracts the weight of the container or wrapping material placed on the scale prior to weighing a desired item.
The →T← key subtracts the weight of the container or wrapping material placed on the scale prior to weighing a desired item.

1. Place the empty container or wrapping material on the platter, e.g. 5 lb.
2. Press the →T← key. It shows net weight 0 lb then the net weight cursor should light.
3. Place the item to be weighed onto the platter or into the container (or wrapping material).
4. Note the net weight value and record it if necessary.
5. Remove the weighed and container or wrapping material from the platter, the display will show the negative net weight of the container, e.g. –5 lb. This indicates the net weight of the container.
6. Press →T← key to return the scale back to gross weighing mode, proper execution of this function is indicated when the net cursor is not illuminated.

SPECIAL MODES - OVER/UNDER

OVER/UNDER SETUP MODE

Press F key to access to Over/Under Zone Setup Mode. The display will show the default 0.000.

- The digits on the both sides of the decimal point vary with the capacity and resolution.
- Over/Under values will reset to zero if you change the scale's resolution.
- The Standard Indicator will only permit over under values conforming to the minimum resolution of the scale.
- The Over cursor will light to select the "Over" value, and the Under will light to select the 'Under' value.

FUNCTION OF THE KEYS

In Over/Under Setup Mode the functions of the keys will be as follows:

Key	Function	Description
F	Start, then Increment digit	Choose Over/Under Setup Increment the flashing digit one right
→T←	Increment	Increase the value in selected digit
⏻	Confirm choice	Confirm the choice and step forward
→0←	End Setup	End Setup mode and return the scale to weighing mode

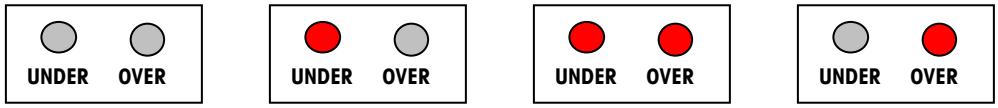
SET OVER AND UNDER VALUES

Example: 5 lb scale, the over value is 0.506 lb, under value is 0.400 lb:

The Procedure	Display	Cursor	Action
1) Press F to access to Setup Mode	[0.000]	OVER	Enable setup
2) Press F 1 time	[0.000]	OVER	Increment digit right
3) Press →T← 5 times	[0.500]	OVER	Increase digit value
4) Press F twice	[0.500]	OVER	Increment to the next digit
5) Press →T← 6 times	[0.506]	OVER	Increase digit value
6) Press ⏻ to proceed	[0.000]	UNDER	Select UNDER range
7) Press F 1 time	[0.000]	UNDER	Increment digit right
8) Press →T← 4 times	[0.400]	UNDER	Increase digit value
9) Press →0← to back to Weighing Mode	[0.000]		Ready to weigh

At zero both the Over and Under Cursors are dark. At the first increment over zero the Under cursor will light.

OVER AND UNDER CURSORS



Scale at Zero	UNDER	Ok	OVER
[0.000]	[≤0.399]	[0.400]⇔[0.506]	[0.507 ≤]

OPERATION

When an Over/Under value exists, the Standard Indicator will beep to indicate the condition provided that the function is enabled in the scale setup. The below table is a matrix of possible conditions:

Setup	S3 is 1	S3 is 2	Cursor
Condition			
Actual weight greater than the OVER value	-	Beep	OVER
Actual weight less than the UNDER value	-	Beep	UNDER
Actual Weight between Over Under Limits*	Beep	-	OVER and UNDER

*When both the Over and Under values set to 0.000 the cursors and beeper do not function.

INDICATOR SOFTWARE SETUP

Several parameters in the indicator can be changed to enable you to Setup the Indicator to your individual needs.

ACCESS TO SETUP MODE

1. Turn off the scale by pressing the Power key until the display displays "off"; the display should be dark.
2. Press the Power key while continuously pressing the →0← until "S1 OFF" is displayed.

FUNCTION OF THE KEYS

Key	Name	Function
→0←	Finish key	Finish Setup
→T←	Toggle key	Chose parameter
F	Back key	Move backwards to last (previous) step
⏻	Accept key	Confirm choice and move forward to the next step

PARAMETER LIST

Soft-Switch	Description	Available Parameter				Default
S3	Beep range	0: No beep 1: Beep when weight is between over and under value. 2: Beep when weigh is out of range of over and under				0
S4	Filter strength	0 = light	1= normal	2 = strong	3 = very strong	2
S5	Weight unit	lb/kg/oz				lb
S6	LED brightness	0 = normal. Each additional value yields a dimmer display				0
S7	Display type	Off: continuous display update; On: quick weight				Off

EXIT SETUP MODE

Press finish key →0← to finish Setup. "SAVE" is display to save all changes. Press →T← to toggle between "SAVE" (Save changes) and "Abort" (Abort all changes). Press ⏻ to return the scale to Weighing Mode.

CLEANING AND MAINTAINING YOUR SCALE

CLEANING AND MAINTENANCE

- DO NOT allow untrained personnel to operate, clean, inspect, maintain, service, or tamper with this equipment.
- DO NOT attempt to remove the cover or to perform service/maintenance on the internal parts of the Indicator.
- ALWAYS DISCONNECT this equipment from the power source before cleaning or performing maintenance.
- KEEP the indicator clean. Periodically clean the keyboard and cover with a soft clean cloth that has been dampened with a mild window cleaner or detergent. DO NOT USE ANY TYPE OF INDUSTRIAL SOLVENT OR CHEMICALS. DO NOT SPRAY CLEANER DIRECTLY ONTO THE UNIT.

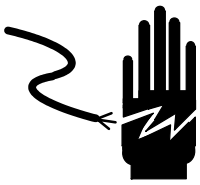
TROUBLESHOOTING

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, or improper setup.

Additional troubleshooting can be performed by your authorized Xpress Service representative.

SERVICING YOUR INDICATOR

⚠ For the following services, please contact your **Xpress** representative at www.mt.com/xpress.



⚠ WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE INSTALLING, SERVICING, CLEANING, OR REMOVING THE FUSE. FAILURE TO DO SO COULD RESULT IN BODILY HARM AND/OR PROPERTY DAMAGE.

⚠ CAUTION

BEFORE CONNECTING OR 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 DISCONNECTION'S ARE MADE. FAILURE TO OBSERVE THESE PRECAUTIONS COULD RESULT IN DAMAGE TO OR DESTRUCTION OF THE EQUIPMENT, OR BODILY HARM.

VOLTAGE CHECKS

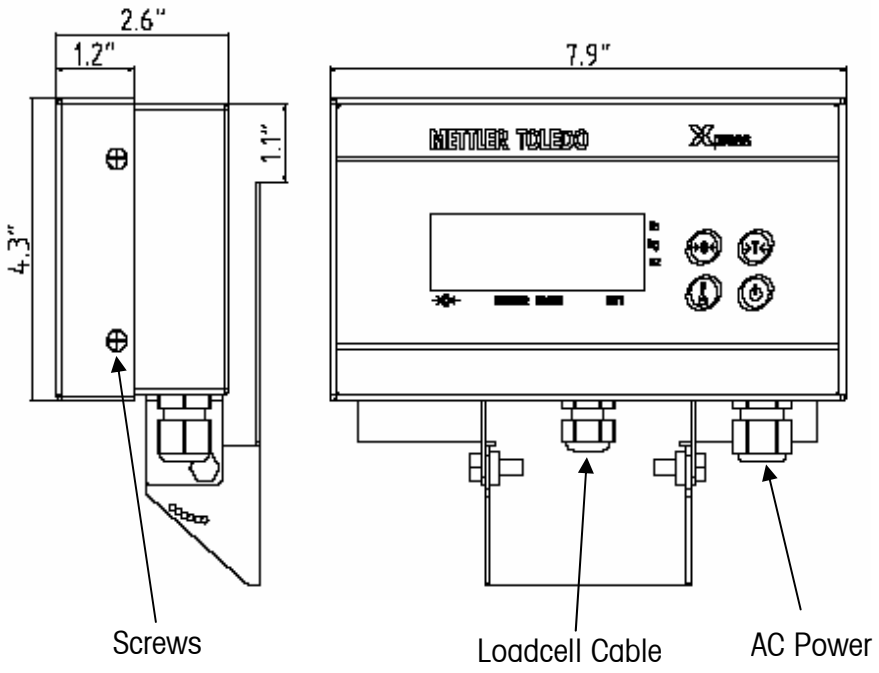
AC Power Test: Using a Multi-meter, check the AC input power. Input power must be within -15% and +10% of the nominal AC line voltage.

Controller PCB Input Voltage Test: Confirm the universal power supply is outputting a voltage of at least 12 VDC. If the XIS indicator has power and the Controller PCB does not function properly, replace the PCB.

OPENING THE INDICATOR

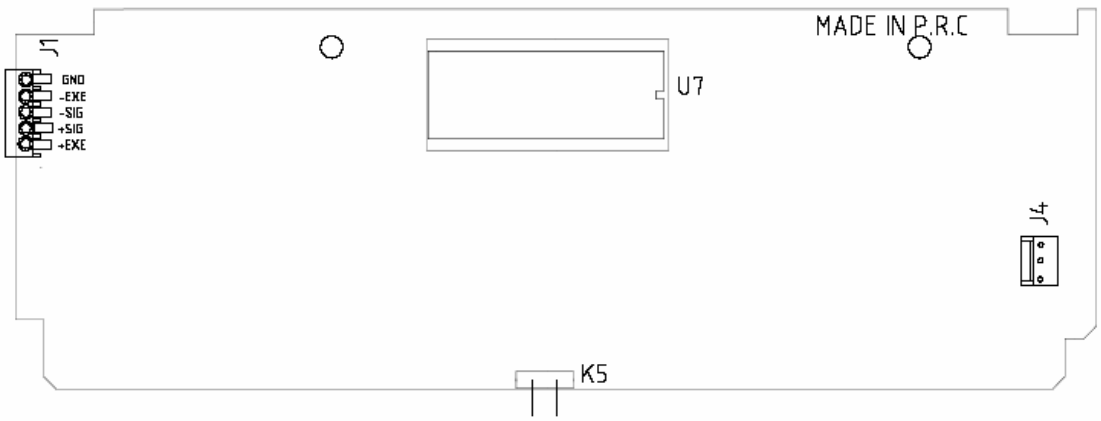
To access the Controller PCB for internal wiring and switch setting:

1. Unscrew the four flat Phillips located on the each side of enclosure and separate the front panel from the enclosure.
2. The figure on the right shows the location of the screws and the Load Cell and AC power cable connections.

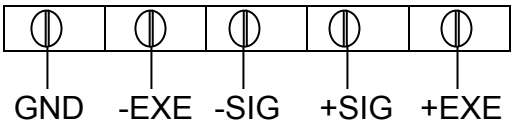


LOAD CELL WIRING

After opening the XIS terminal enclosure, the main circuit board is mounted on the front panel. Refer to the figure for the detail cable connection:



The following diagrams show the load cell terminal strip wiring for the XIS terminal on connector J-1.



KEYBOARD REPLACEMENT

- Disconnect the AC power adapter.
- Remove the four screws securing the front and back portions of the cover.
- Unscrew the controller PCB from the old front cover.
- Replace the new front cover assembly (including keyboard) and secure controller PCB on it.
- Secure the front cover to the back cover with the four screws.
- Apply power then press and hold the **ON/OFF** key for three seconds.
- Test the operation of the new keyboard.

CONTROLLER PCB REPLACEMENT

If the Controller PCB is suspected to be faulty, use the following procedure to replace the PCB.

- Disconnect the AC power.
- Remove the four screws securing the front and back halves of the cover.
- Disconnect the power harness from the Controller PCB and set the front cover aside.
- Remove the four screws that secure the Controller PCB to the front cover.
- Using proper static electricity precautions carefully remove the Controller PCB and place it in a protective static bag.
- Install the new Controller PCB using the same four screws removed in the previous step.
- Reconnect the AC adapter harnesses removed previously.
- Secure the front cover to the back cover with the four screws.

- Apply power to the XIS indicator then press and hold the ON/OFF key for three seconds.
- Reprogram, recalibrate, and test the operation of the new Controller PCB.

ACCESSING THE SERVICE MODE

The Service Mode allows an authorized **Xpress** Dealer to access the Service Mode switches in the software setup.

Open the terminal enclosure by unscrewing the four Phillips screws. Shorten the two pins of K5 on the main board. The display will show "SETUP" for a short time, and then show "DEF NO". It means the scale has accessed the Service Mode.

FUNCTION OF THE KEYS

Key	Name	Function
→0←	Finish key	Finish Setup
→T←	Toggle key	Chose parameter
F	Back key	Step backwards to last step
⏻	Accept key	Confirm choice and step forwards to next step

PARAMETER LIST

Soft-Switch	Description	Available Parameter	Default
Def	Initiate default	No: don't initiate the default; Yes: Initiate the default	No
S3	Beep range	0: No beep 1: Beep when weight is between over and under value. 2: Beep when weigh is out of range of over and under	0
S4	Filter strength	0 = light | 1=normal | 2 =strong | 3 = very strong	2
S5	Weight unit	lb/kg/oz	lb
S6	LED brightness	0 = normal. Each additional value yields a dimmer display	0
S7	Display type	Off: continuous display update; On: quick weight	Off
S8	Resolution	On: 10000 / 12500 (for oz: 8000); Off: 5000 (for oz: 4000)	Off
S9	Access to S8 in setup mode	On: Enable; Off: Disable	Off
S10	Expanded display	On: Expanded display (50000 quantity) Off: Normal display	Off
GEO	GEO	0~31	12
Cal	Calibrate	YES: Calibrate scale; NO: Don't calibrate scale	no

CALIBRATION

Example using a 50 lb scale:

Step	Operation	Display	Description
		{CAL YES}	
1	Press ⏻	[LB]	Default calibration weight unit
	Press →T←	[KG]	Choose suitable parameter
2	Press ⏻	[5]	Capacity of the scale
	Press →T←	[50]	Choose suitable parameter
3	Press ⏻	[LIN NO]	Choose non-linearity calibration
	Press →T←	[LIN YES]	Choose linearity calibration
3.1	If choose NO		
3.1.1	Press ⏻	[------]	Capture zero, make sure the platter is empty before press [>0<]
3.1.2	Press ⏻	[5]	The scale count down from 5 to 0, if the scale isn't stable, it will count again until find stable zero.
3.1.3		[LO 25]	Put the weight of 25 lb (1/2 of the full capacity) on the platter
	Press →T←	[LO 30]	Choose the suitable weight value you prefer, can be 1/2, 3/5 or full capacity
3.1.4	Press ⏻	[5]	The scale count down from 5 to 0, if the scale isn't stable, it will count again until find stable zero.
3.2	If choose YES		
3.2.1	Press ⏻	[------]	Capture zero, make sure the platter is empty before press [>0<]
3.2.2	Press ⏻	[5]	The scale count down from 5 to 0, if the scale isn't stable, it will count again until find stable zero.
3.2.3		[30]	Put the weight of 30 lb (3/5 of the full capacity) on the platter
3.2.4	Press ⏻	[5]	The scale count down from 5 to 0, if the scale isn't stable, it will count again until find stable zero.
3.2.5		[50]	Put the weight of 50 lb (full capacity) on the platter
3.2.6	Press ⏻	[5]	Capture span. The scale count down from 5 to 0, if the scale isn't stable, it will count again until find stable zero.
4		[SAVE]	Save calibration and all setting changes
	Press →T←	[ABORT]	Abort calibration and all setting changes
5	Press ⏻	[0.00]	Finish calibration and enter into weigh display mode

The lines highlighted in grey are for reference of parameter choice.

*The available capacities calibrated in **pounds** (lb) are as follows:

Capacity (lb)	5	10	25	50	100	250	500	1000
Normal Resolution	5000	5000	5000	5000	5000	5000	5000	5000
Increment size (lb)	0.001	0.002	0.005	0.01	0.02	0.05	0.1	0.2
High Resolution	10,000	10,000	12,500	10,000	10,000	12,500	10,000	10,000
Increment size (lb)	0.0005	0.001	0.002	0.005	0.01	0.02	0.05	0.1
Required added weight when choose non-linearity calibration								
1/2 FS (lb)	-	5	-	25	50	125	250	500
3/5 FS (lb)	3	6	15	30	60	150	300	600
FS (lb)	5	10	25	50	100	250	500	1000
Required added weight when choose linearity calibration								
First point (3/5 FS)	3	6	15	30	60	150	300	600
Second point (FS)	5	10	25	50	100	250	500	1000

* The available capacities calibrated in **kilogram** (kg) are as follows:

Capacity (kg)	2.5	5	10	25	50	100	250	500
Normal Resolution	5000	5000	5000	5000	5000	5000	5000	5000
Increment size (kg)	0.0005	0.001	0.002	0.005	0.01	0.02	0.05	0.1
High Resolution	12,500	10,000	10,000	12,500	10,000	10,000	12,500	10,000
Increment size (kg)	0.0002	0.0005	0.001	0.002	0.005	0.01	0.02	0.05
Required added weight when choose non-linearity calibration								
1/2 FS (kg)	-	-	5	-	25	50	125	250
3/5 FS (kg)	1.5	3	6	15	30	60	150	300
FS (kg)	2.5	5	10	25	50	100	250	500
Required added weight when choose linearity calibration								
First point (3/5 FS)	1.5	3	6	15	30	60	150	300
Second point (FS)	2.5	5	10	25	50	100	250	500

* The available capacities displayed in **ounces** (oz) are as follows:

Capacity (oz)	80	160	400	800	1600	4000	8000	16000
Normal Resolution	4000	4000	4000	4000	4000	4000	4000	4000
Increment size (oz)	0.02	0.05	0.1	0.2	0.5	1	2	5
High Resolution	8000	8000	8000	8000	8000	8000	8000	8000
Increment size (oz)	0.01	0.02	0.05	0.1	0.2	0.5	1	2

GRAVITY ADJUSTMENT

The Standard Indicator has built in compensation provisions to allow factory calibration with destination correction capabilities to compensate for variances on gravitational forces. If the Standard Indicator is subjected to a different gravitational force at its destination location, this can be compensated for electronically by adjusting the geo value. The GEO value has 32 settings. The GEO value for any world location can be found in the GEO value table in the Appendix as long as the geographical coordinates and elevation above sea level is known.

APPENDIX

ERROR MESSAGES

The XIS indicator will display an error message if a problem or incorrect keyboard entry is sensed. The error codes are:

E 11	RAM error	1. Power off and power up again. 2. Recalibrate the scale. 3. Replace the main board or loadcell.
E 16	ROM error	
E 18	EEPROM error	
E 48	Alarm setup error	Review setup.
ERROR	Software running error	Restart the scale by pressing the power key.
------	Unsteadily or can't find zero	1. Power-up when the platter is empty. 2. Recalibrate the scale. 3. Replace the main board or loadcell.
nnnnn	Overload indication	Weight is more than full capacity plus 9d. Remove items from platter and re-zero the scale.
uuuuu	Underload indication	Weight on scale is below gross zero by more than 9d. Increase load on scale.
Dark display	No Power	Check that the transformer is plugged in the wall.
		Insure that the transformer is plugged in the scale.

INDICATOR SPECIFICATIONS

Feature	**Description**
Displayed Resolution	Up to 12,500d
Physical Dimensions (*w* x *d* x *h*)	7.9″ x 2.6″ x 4.3″mm
Construction	304 Stainless Steel
Power	100~240VAC universal power supply, 50~60Hz
Environmental Protection	- Equal to IP65 - The indicator is NOT intrinsically safe!
Display	6 digits, 12mm height, bright red LED
Scale Type	Analog: Suitable for 2mV/V and 3mV/V load cells Can power up to one (1) 350 ohm load cells
Keypad	4 membrane keyboard: ON/OFF, ZERO, TARE, FUNCTION
Operating Temperature	-10°C to 40°C (14°F to 104°F) with10 to 95% relative humidity, non-condensing
Storage Temperature	-20°C to 60°C (-4°F to 140°F) with 10 to 95% relative humidity, non-condensing
Data Output	None
Weighing Units	pounds, kilograms and ounce

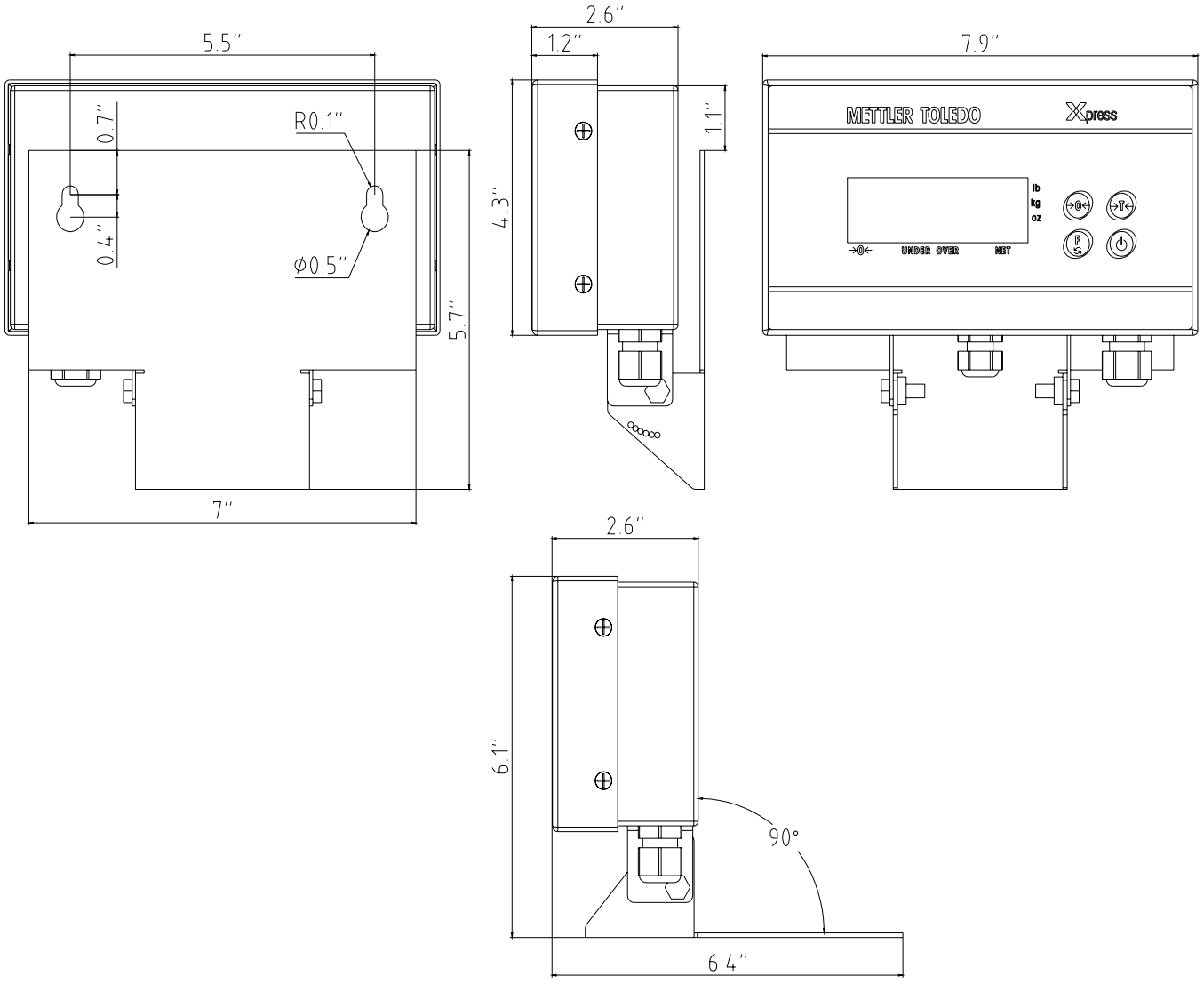
Specifications are subject to change without notice.

GEO VALUE TABLE

Use the following geo codes if you relocate the XIS scale to a site other than the original location where it was calibrated.

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
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
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
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

PHYSICAL DIMENSIONS



Notes

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