Weighing Momentum

Release 1.1

Instruction Manual

June 2, 2000

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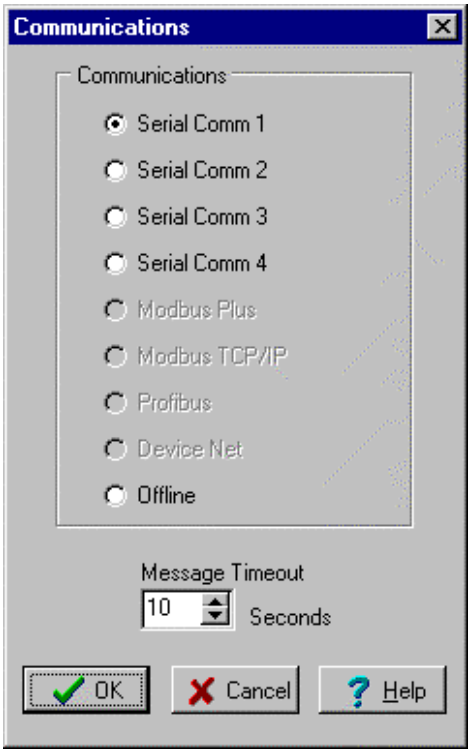
Communications Settings

Communications Settings

Upon executing the ISP Weighing software, the Communication Setting window appears prompting the user to select the type of connection that will be established:



The available options for Communication Settings are:

??Modbus Plus

??Serial Communications Port (RS-232, Port # 1, 2, 3, or 4)

??Modbus TCP/IP (not available in first release)

??Offline

The Offline option allows users the opportunity to browse the menus of the application without a remote connection to the weighing device.

Calibration

Calibration

Calibration of the analog measurement system consists of setting a specific known weight value and its corresponding electrical signal from the load cells to yield the correct digitized result from the weighing module. This is done on site, during installation, and is absolutely necessary to ensure that the measurement is valid.

All uncalibrated modules are in uncalibrated mode and the data returned has no significance.

It is possible to perform re-calibration during the life of the module. The electronic characteristics do not require regular re-calibration. However, the legal requirements or mechanical characteristics of the application may require this calibration, especially for commercial transactions.

The three types of calibration are:

- Normal calibration (the calibration function must be executed with a standard load ??75% the maximum range)
- Downgraded calibration (if, for whatever reason, the calibration cannot be executed in the conditions described above)
- Forced calibration (to recover adjustments executed on a different module for maintenance or duplication purposes)

Calibration is executed in two stages:

??Zero (zero load)

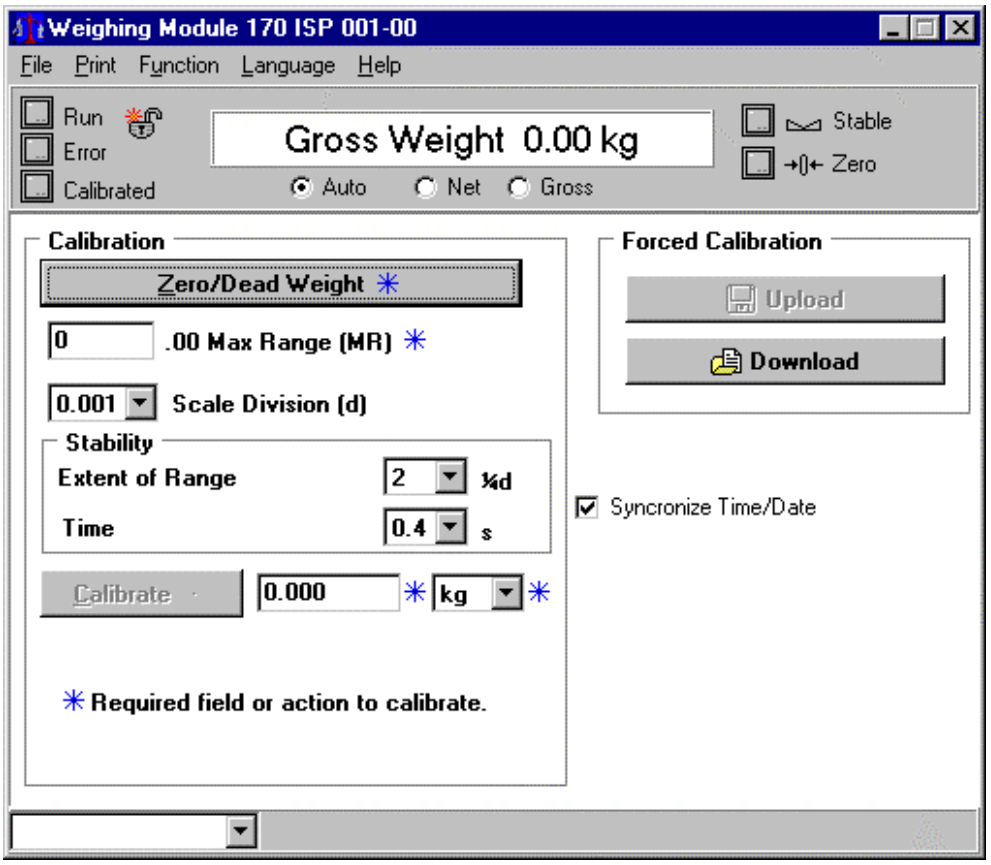
??Standard load

Calibration Operating Mode

While the module is calibrating, the data returned from the module has no significance.

Calibration Procedure

1. Enter the Maximum Range of the load cell employed for the application in the Max Range field.
2. Select scale division granularity, stability extent of range, and stability time parameters OPTIONAL).
3. With the Load cells at the required Zero weight and the stable virtual LED illuminated, press the Zero Dead Weight button (wait for the process to complete).
4. Place a known weight on the scale/load-measuring platform and ensure that the measurement has stabilized (stable virtual LED illuminated).
5. Enter the known weight value into the entry field, and select the Calibrate button.



Notes:

?? Calibration can be performed only when the weight output reading is stable. If a stable output cannot be obtained, the reading can be stabilized using the filters located on the Configuration window.

?? The calibration weight should be at least 75% of the target weight in order to guarantee accuracy over the full measurement range.

?? It is recommended to power up the weighing module and load cell system for two hours prior to performing the calibration procedure in order to allow for complete thermal stabilization of the system.

?? Any interruption in the load cell supply during the calibration procedure requires full re-calibration.

?? Upon successful completion of the calibration procedure, Data values entered on the Calibration screen overwrite associated values in the Configuration window. This data is automatically stored in non-volatile memory.

Calibrate

The Calibrate button completes Calibration of the weighing module at the specified weight (the calibration weight). The calibration weight should be at least 75% of the maximum range in order to guarantee accuracy over the full measurement range.

Forced Calibration

Forced Calibration allows the user the following options:

??Upload

??Download

After a successful calibration the parameters can be saved to computer disk using the Upload button. In the event of replacement of the weighing module the saved calibration data can be restored using the Download button. Calibration files have the file extension .wcf .

Notes:

- ?? Forced Calibration causes the calibration virtual LED to light yellow.
- ?? Forced calibration, when downloaded to a different physical module from that used to generate the file, has an accuracy of roughly 3%.
- ?? It is not possible to upload calibration data from a module that has been force calibrated.
- ?? It is not possible to download calibration data to a locked module.

Synchronize Time/Date

The Synchronize Time/Date check box allows the user to synchronize the time and date of the weighing module with the time and date of the computer running the Momentum application.

Click on the check box ☑ to enable time/date synchronization.

Zero/Dead Weight

The Zero/Dead Weight button initiates calibration. It establishes the zero balance condition for the weighing system.

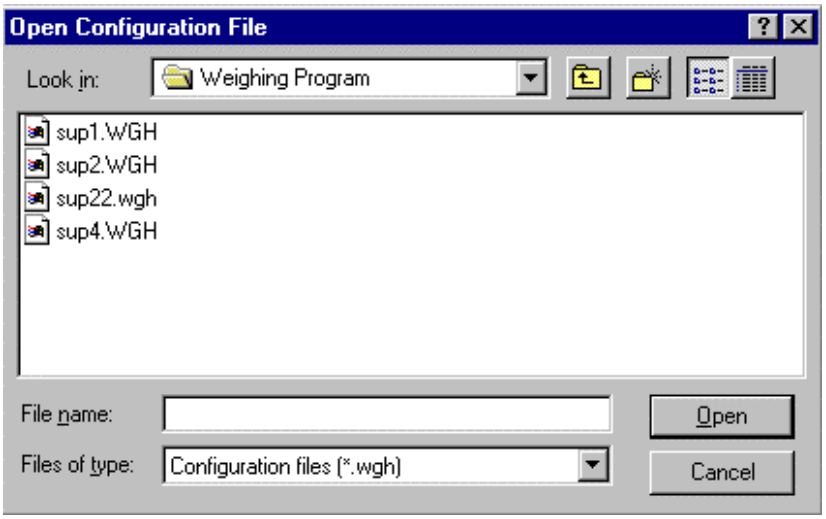
Max Range

Max Range is the maximum weight allowed by the load cell employed in the application.

Note: The maximum functioning resolution (combination of Max Range divided by Scale Division) is 50,000 increments (or 50,000 scale divisions).

Configuration File (Opening)

Select **File | Cfg Open** from the menu to open an existing Configuration file. The Open Configuration File window appears:



Configuration files have the file extension .wgh. Select a configuration file and click on the Open button. The configuration is loaded into the application.

The following settings and parameters are saved in a configuration file:

??Units

??Overload threshold

??Scale Divisions

??Zero settings

??Stability settings

??Filter parameter

??Sample rate

??Display format settings

??Predefined tare value

??Flow calculation parameters

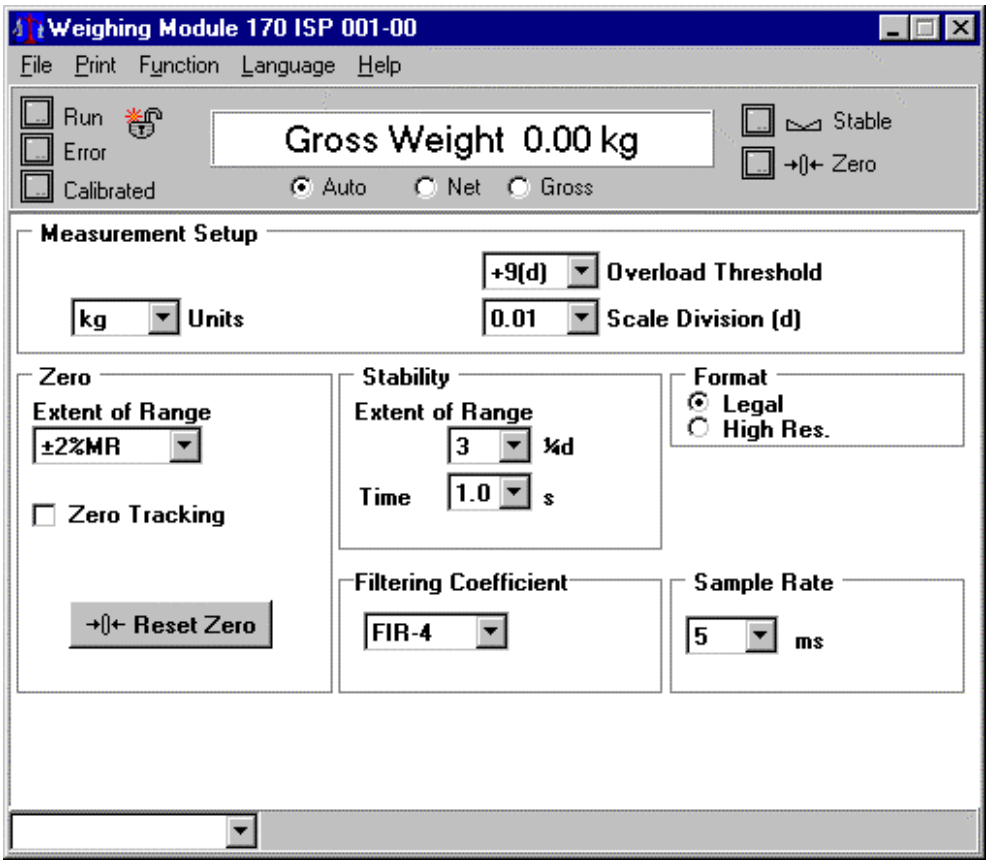
??Threshold checking settings/parameters

Note: The Configuration file does not contain calibration data. Calibration data is stored in a calibration file with the file extension .wcf. See Forced Calibration.

Configuration

Configuration

Select **Function | Configuration** to configure the Momentum Weighing Module. The Configuration Window appears.



The Configuration Window allows you to specify the following settings:

??Measurement Setup

??Zero settings

??Stability assessment parameters

??Display Format

??Measurement Sample Rate

??Digital Filtering Coefficient

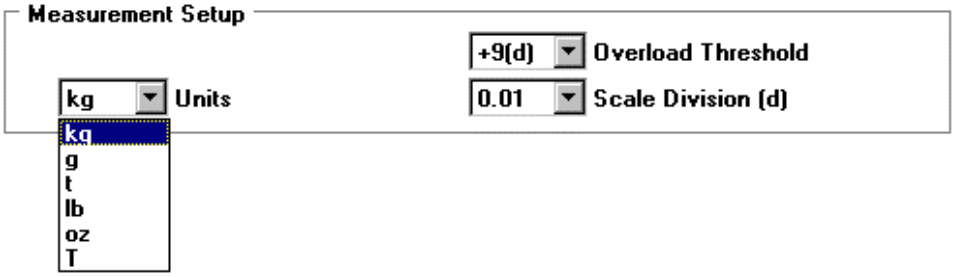
Measurement Setup

Measurement Setup settings are specified using the Configuration Window. Measurement Setup allows you to select the following measurement options:

??Units (of weight measurement)
??Overload Threshold
??Scale Division

Units (of Measurement)

The Units setting is specified using the Configuration Window. To select a unit of weight measurement, click on the down arrow. The drop menu appears.



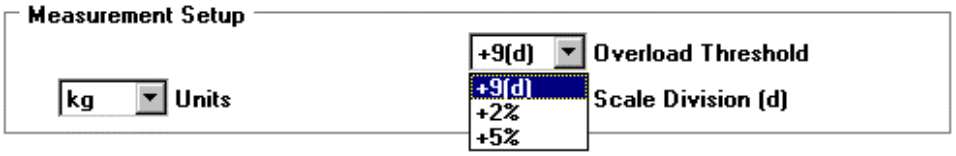
Metric and Imperial units are provided. The Metric units of measurement available are:
??Kilograms (kg)
??Grams (g)
??Tonnes (t)

The Imperial units of measurement provided are:
??Pounds (lb)
??Ounces (oz)
??Tons (T)

Select the desired unit of measurement. Your selection appears in the weight display of the other windows. The weight data is converted automatically by the weighing module into the specified units.

Overload Threshold

The Overload Threshold is specified using the Configuration Window. It represents the maximum value (above the Max Range) that will be shown on the display. Weights that exceed this value are not displayed. The display unit represents an overload state as >>>>. To select an Overload Threshold, click on the down arrow. The drop menu appears:



The available options for the Overload Threshold are:

??+9(d) or nine Scale Divisions (d) above the Max Range

??+2% (two per cent above the Max Range)

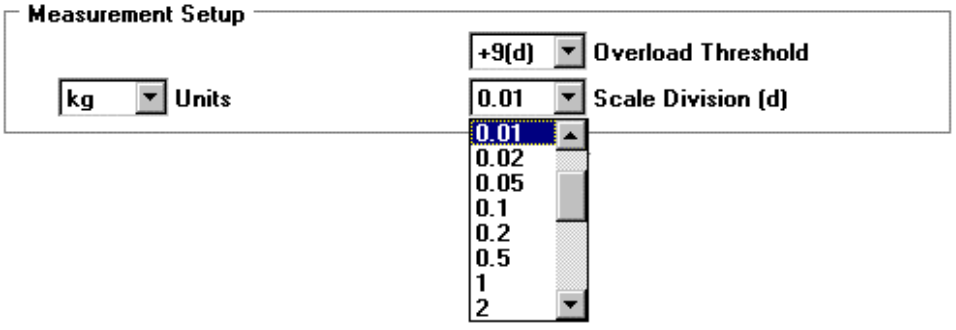
??+5% (five per cent above the Max Range)

Select the desired Overload Threshold.

Scale Division

The Scale Division is specified using the Configuration Window. It determines the increments by which the Units are divided. For example, a setting of 0.01 represents measurement to the 1/100 kg (or Unit selected).

To select the Scale Division, click on the down arrow. The drop menu appears.



Select the desired Scale Division.

Note: The maximum number of allowed scale divisions over the full measurement range is 50,000.

Zero

The Zero setting is specified using the Configuration Window. Zero allows you to define:

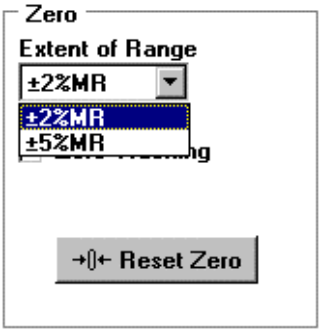
?? Extent of Range (deviation from zero that may be manually nullified)

?? Zero Tracking (enabling or disabling)

?? Manual zero reset

Zero Extent of Range

Extent of Range for manual zero reset is specified using the Configuration Window. It represents the amount of deviation that is allowed from zero. To select a Zero Extent of Range, click on the down arrow. The drop menu appears:



The available options for Zero Extent of Range are:

???2%MR (plus or minus two per cent of the Maximum Range)

???5%MR (plus or minus five per cent of the Maximum Range)

Select the desired Zero Extent of Range.

Zero Tracking

Zero Tracking is specified using the Configuration Window. It allows for the automatic compensation of a slow drift away from Zero. When enabled, Zero Tracking nullifies any offset from zero due to a slow drift.

The default setting is disabled (no Zero Tracking) To enable Zero Tracking, click on the check box.

Any correction made by the function is limited to ±2% of the maximum range of the weighing apparatus. Once this limit is exceeded, automatic correction no longer functions.

Note: Zero Tracking operates on gross weight only.

Slow Drift

A slow drift is distinguished from a genuine weighing operation as follows:

Any weight variation with amplitude of less than one-half of a scale division, where the frequency of repetition is low enough to maintain measurement stability is considered to be a drift.

Reset Zero

The manual zero reset button allows the user to nullify any zero offset in the gross weight, provided that this offset is within the zero range.

The following criteria must be met for a manual zero reset request to work:

?? The module must be unlocked

?? There must be no tare value (gross weight only)

?? The allowed range for zero reset is +/- 2% or +/- 5% of the Maximum Range (configured by the user)

?? The weight must be stable

When a valid manual zero reset command is issued, the weight value is written to the zero offset memory in EEPROM. This value is subtracted from the A/D input. The result is that the displayed gross weight and the gross weight value used in all subsequent calculations is zero.

The zero offset memory is cleared (reset to zero) when the zero/dead weight calibration command is issued.

Stability

Stability is specified using the Configuration Window. The two components of Stability are:

??Extent of Range

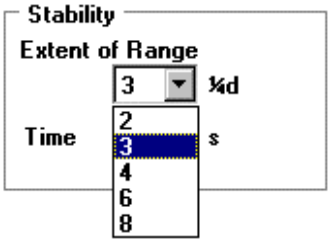
??Time

The measurement is considered to be stable if the magnitude of the difference between the present digital weight sample value and all previous samples over the time window specified ('stability time') is less than the 'stability extent of range'.

For example, if Stability Time = 1.0 second and Stability Extent of Range = 4, the measurement will be considered stable if and only if the present sample and all previous samples within the last 1.0 second differ from one another by less than 4 * ¼ (1) scale division.

Stability Extent of Range

The Stability Extent of Range is the acceptable range of instability or movement in the weight measurement. To select a Stability Extent of Range, click on the down arrow. The drop menu appears.



The available options for Stability Extent of Range are:

??2 ¼ d or two quarter Scale Divisions (d)

??3 ¼ d or three quarter Scale Divisions (d)

??4 ¼ d or four quarter Scale Divisions (d)

??6 ¼ d or six quarter Scale Divisions (d)

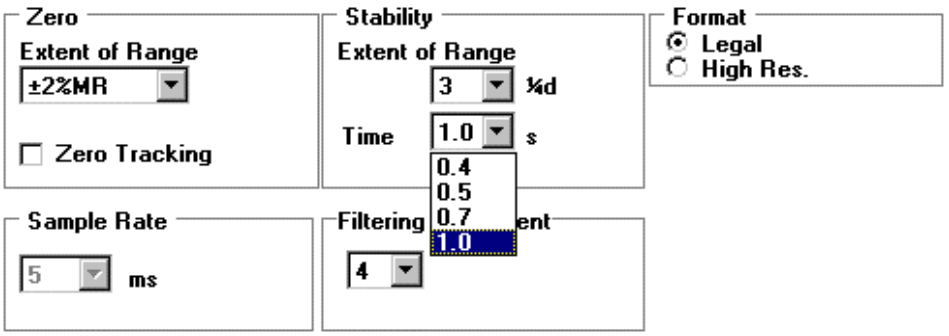
??8 ¼ d or eight quarter Scale Divisions (d)

The default setting is three.

Select the desired Stability Extent of Range.

Stability Time

Stability Time represents a specified time period (in seconds) during which the measurement must remain within the stability range to be considered stable. To select a Stability Extent of Range, click on the down arrow. The drop menu appears.



The available values for Stability Time are:

??0.4 sec

??0.5 sec

??0.7 sec

??1 sec

The default Stability Time is 1 second.

Select a Stability Time.

Format

The display data Format is specified using the Configuration Window. It determines the how the weight value is displayed. The two available options for Format are:

??Legal (to the nearest scale division increment)

??High Resolution (with two additional decimal places to the right of the scale division increment)

Note: High resolution format offers greater precision but is not accepted by the French Metrology Department or the US NIST for point of sale applications.

Regulations

CE Type Approval

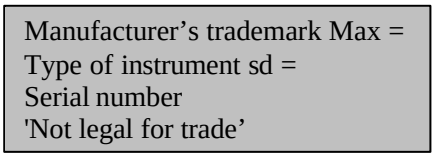
The assembly consisting of the load cells, module, and display unit may be considered to be a non-automatic weighing instrument. To qualify for this description, and to be authorized for use in commercial transactions, it has received CE type approval. If it is only for use in internal processes, the display must have an identification plate showing:

Manufacturer's trademark Max =

Type of instrument sd =

Serial number

'Not legal for trade'



If it is for use in commercial transactions, the display must have a stamped identification plate showing:

Manufacturer's trademark Max =

Type of instrument min =

Serial number sd =

No. and date of CE type approval

Manufacturer's trademark Max =
Type of instrument min =
Serial number sd =
No. and date of CE type approval

In addition, the display must be initially checked when it leaves the factory and regularly checked on site by an approved organization. These checks must be performed every two years, and are the responsibility of the owner of the instrument.

Adjustment Protection Procedure

Sealing (Locking):

All weighing instruments used for commercial transactions must be approved. The parameters associated with measurement must be protected from tampering or falsifying. It must not be possible to introduce, via the interface of an instrument, instructions or data that can be used to:

??Falsify the weighing results displayed

??Change an adjustment factor

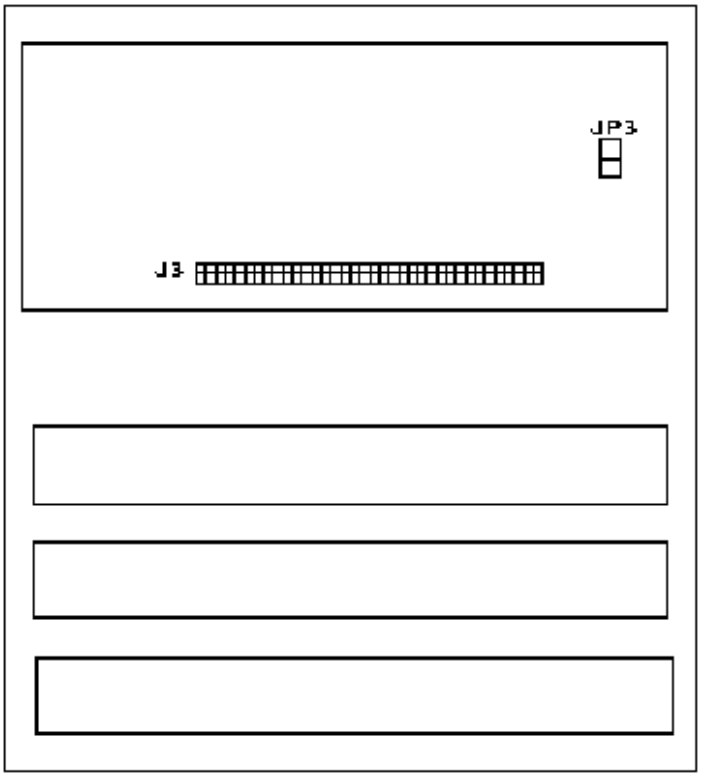
Note: Protection by sealing is intended to guarantee measurement conformity, the accessible parameters therefore only affect module data use by the control system.

Protection (Locking) Procedure

Once calibration and adjustment are complete, the module may be protected. To do this, remove the casing of the module. The Momentum Weighing Module is capable of operation in either the locked or the unlocked mode. The locked mode provides compliance to legal requirements for point of sale applications. In unlocked mode, the user or host processor has access to all of the configuration and calibration settings, and may modify them. In locked mode, the user or host processor may only access and modify data associated with the Runtime window. This includes tare, flow calculation, and threshold settings. Locking the module is accomplished by removing jumper JP3.

The base below is shown with the Tophat and Communication Adapter removed.

Note: Power to the module must be disconnected prior to locking or unlocking the module.



Effect of Protection System on Configuration Parameters

There are two distinct types of data:

??Protected

??Open-access

Data maybe protected (once the module is locked or sealed, this type of data can only be accessed in read-only mode) or open-access data (Read and Write modes).

The table below identifies the characteristics of this data depending on whether the locked mode is operational.

Functions	Unsealed	Sealed
Units	Modifiable	Not modifiable
Maximum Range (MR)	Modifiable	Not modifiable
Scale division	Modifiable	Not modifiable
Overload threshold	Modifiable	Not modifiable
Filtering/ Coefficient	Modifiable	Not modifiable
Flow rate/ Calculation on n measurements	Modifiable	Modifiable
Tare/ Automatic	Modifiable	Modifiable
Tare/ Predefined	Modifiable	Modifiable
Data format	Modifiable	Not modifiable
Stability/ Extent of range	Modifiable	Not modifiable
Stability / Time	Modifiable	Not modifiable
Zero/ Zero tracking	Modifiable	Not modifiable
Zero/ Extent of range	Modifiable	Not modifiable
Zero/ Manual Reset	Modifiable	Not modifiable
Threshold check/ Active	Modifiable	Modifiable
Threshold check / Direction	Modifiable	Modifiable
Threshold check / Active outputs	Modifiable	Modifiable
Threshold check / Cut-off points	Modifiable	Modifiable
Threshold check / TF mask time	Modifiable	Modifiable
Sample Rate	Modifiable	Not modifiable
Print Settings	Modifiable	Not modifiable
Display Settings	Modifiable	Not modifiable
Date/Time	Modifiable	Not modifiable

Bit 15 of Data word 01 indicates whether or not the measurement is protected.

Note: The lock icon  (located in the upper left-hand corner of the Weighing Module windows) graphically depicts the protection state of the module.

Legal Format

Legal Format is a weight value displayed to the nearest scale division increment.

The Legal Format must be selected if the weighing is for Point of Sale applications.

High Resolution Format

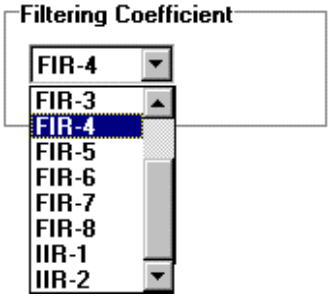
High Resolution Format is a weight value represented with two additional decimal places to the right of the scale division increment

This unit offers greater precision than Legal Format, but is not accepted by the French metrology Department or the United States National Institute of Standards (US NIST) for point of sale applications.

Filtering Coefficient

Filtering allows a fluctuating weight value to be stabilized. Digital Filtering is performed on the measurement data to reduce the effects of electrical or mechanical (i.e. vibration) noise in the system. The user may select from various filters to be applied to the weighing data via the Configuration screen.

To select a Filtering Coefficient, click on the down arrow. The drop menu appears.



The available filters are:

CHOICE	FILTER	
NONE	No Filter	
FIR-1	FIR	2 taps
FIR-2	FIR	4 taps
FIR-3	FIR	8 taps
FIR-4	FIR	16 taps
FIR-5	FIR	32 taps
FIR-6	FIR	64 taps
FIR-7	FIR	128 taps
FIR-8	FIR	256 taps
IIR-1	IIR	0.05 * Fs Hz (Fs = 1/sample rate)
IIR-2	IIR	0.01 * Fs Hz

FIR FILTERS:

The FIR filter is implemented using a rectangular window function. The output of the filter is a sliding average of the last ***n*** samples, where ***n*** is the number of taps for the filter.

IIR FILTERS:

The IIR filter is a 3-pole Butterworth low pass filter with a user-specified cut-off frequency. The options for filter cut-off frequency are:

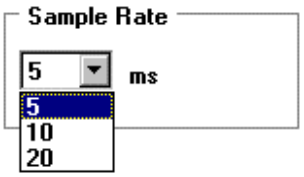
??0.01 * Fs Hz (Fs is the sampling frequency which equals 1/Sample Rate)

??0.05 * Fs Hz

Select a Filtering Coefficient.

Sample Rate

Sample Rate determines the time period between digital samples of weight measurements taken in milliseconds (ms). To select a Sample Rate, click on the down arrow. The drop menu appears.



The available options for Sample Rate are:

??5 ms

??10ms

??20ms

Weighing Module Specifications

Model Number 170 ISP 001 00

The Momentum 170 ISP 001 Weighing Module is an intelligent weighing instrument. The module has one 10V load cell input and two optically coupled discrete outputs (independently configurable). Three serial communication channels (one RS485 and two RS232) are provided. Momentum fieldbus adapters and CPU's are also supported.

General Specifications

	Minimum	Maximum
Operating Temperature	0 ^{o}C	+55 ^{o}C
Storage Temperature	-40 ^{o}C	+70 ^{o}C
Humidity	10%	95%
Power Supply	+18VDC	+30VDC
	---	0.7 Amp

Communication

ATII Interface for Communication adapters and CPU's
RS 232 non-isolated (serial programming and printing)
RS 485 non-isolated (display)

Indicators

Power On LED
System Status LED
System Fault LED
Discrete Output LED's

Firmware Data Storage

Flash EEROM

Module Processor

16-bit, 20MHz, Digital Signal Processor

Module Configuration

User definable metrolological setup data as well as calibration data is retained in permanent EEPROM memory. These parameters are hardware lockable for use in commercial transactions.

Product Specifications

Power Supply to Load Cell:	10VDC
Min Load Impedance:	40 ohm (Eight 350 ohm cells in parallel)
Differential Input signal:	0 – 36 mV
Input impedance:	200 K ohms
Resolution:	1.0 uV @ 5mS update 0.5uV @ 20mS update
Zero Drift:	< 0.2uV/ ^{o}C
Gain Drift:	< 10 ppm/ ^{o}C

Data Sampling Rate Programmable @ 50, 100, or 200 Hz

Discrete Reflexive Outputs

Number of Points:	2, positive logic
Nominal Voltage:	24VDC
Current per point:	500mA
Isolation:	2KV impulse 500V continuous

Weight Indicator Display Output

Physical Interface:	RS 485 non-isolated
Data rate:	9600 BAUD
Max Cable Length:	30m

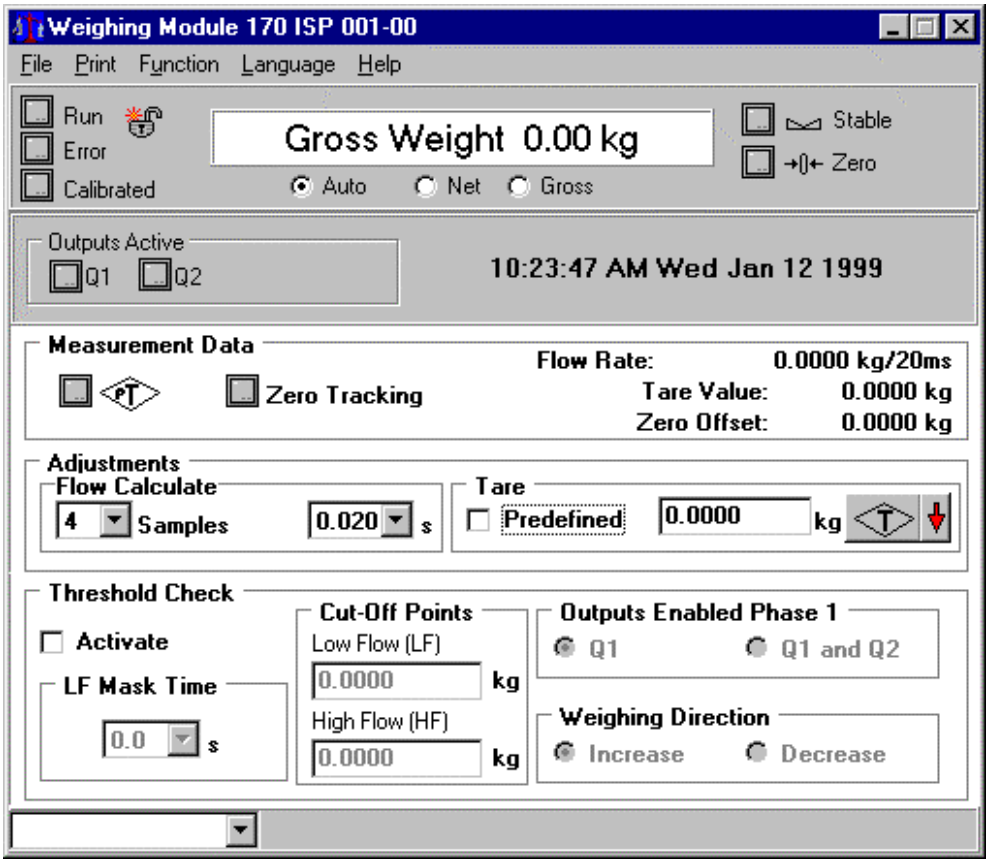
Configuration Data Input

Physical Interface:	RS 232 non-isolated

Runtime

Runtime

Select **Function | Runtime** to view the weighing display and specify weighing options. The Runtime Window appears.



The Runtime window allows the user to view the present gross or net weight measurement, real time Flow Rate calculation result, Tare Value, Zero Offset value, as well as measurement and discrete output status.

The Runtime Window allows the user to specify the following settings:

??Flow calculation Parameters

??Set / Clear Tare, Automatic or Manual

??Threshold Check for Discrete Output Management

Virtual LEDs

Virtual LEDs are provided to notify users of the state of several functions of the Momentum application. The LEDs provided are:

??Run

??Error

??Calibrated

??Stable

??Zero

??Outputs Active (Q1/Q2)

??Predefined Tare

??Zero Tracking

Run LED

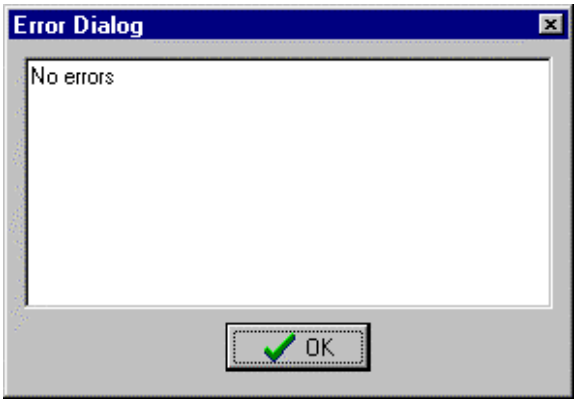
The Run 

virtual LED is green when the module is in run mode.

Error LED

The Error 

virtual LED is lighted red in the event of any errors in the system. A flashing red error virtual LED indicates that the weighing module is uncalibrated or in a state of overload/underload. Clicking on the Error button displays the Error window:



The Error widow displays any active errors. Click on the OK button to close the error window.

Calibrated LED

The Calibrated 

virtual LED is green when the module has been correctly calibrated (refer to Calibration).

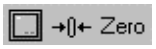
This LED is yellow when the module has been force calibrated.

Stable LED

The Stable 

virtual LED is amber when the weight measurement is stable (within the parameters defined in the stability box in the configuration section).

Zero LED

The Zero 

virtual LED is amber when the weight is within ¼ scale division of zero.

Outputs Active (Q1/Q2) LEDs

The Outputs Active 

virtual LEDs are illuminated green when the respective discrete output is active (on).

Predefined Tare LED

The Predefined Tare 

virtual LED is amber when a Predefined Tare is active.

Zero Tracking LED

The Zero Tracking 

virtual LED is amber when the Zero Tracking function is active.

Tare

Tare settings are specified using the Runtime Window. Tare is the weight of a container or other material that is subtracted from the gross weight to obtain the net weight. The available options for Tare are:

??Predefined Tare

??Automatic Tare

Auto

Selecting the Auto  function displays the present gross weight if the tare weight is zero, and automatically switches to display the net weight if the tare weight is non zero.

Net

Selecting the Net  function displays the present net weight (the gross weight minus the tare weight).

Gross

Selecting the Gross  function displays the present gross weight (the net weight plus the tare weight).

Measurement Data

Measurement Data provides the following user with the following weighing visual indicators:

??Predefined Tare LED

??Zero Tracking LED

??Flow Rate Calculation Result

??Tare Value

??Zero Offset Value

Automatic Tare

Automatic Tare allows the user to assign the weight on the scale as the tare weight. The weight must be stable, positive or zero, and less than the Max Range for the automatic tare command to be accepted by the module.

To specify Automatic Tare, the user places the container or other tare item(s) contributing to the gross weight on the scale, waits for the measurement to become stable, and clicks the Automatic Tare Button  .

The tare value is automatically stored in non-volatile memory.

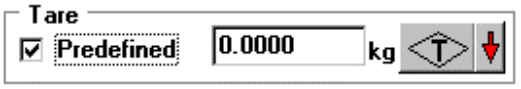
Resetting (Zeroing) Automatic Tare

The Automatic Tare is reset to zero by clicking on the red down arrow  next to the Automatic Tare Button.

Predefined Tare

Predefined Tare allows the user to manually enter a specific tare weight value. The Predefined Tare (PT) virtual LED is illuminated yellow when a Predefined Tare is activated.

Clicking on the Predefined Tare check box shown below allows the user to specify the tare:



The weight of the tare must be entered into the entry field. The user must press the Enter key after entering the weight of the tare to activate the new configuration.

To reset the tare, specify zero for the tare and select Enter.

Flow Calculate

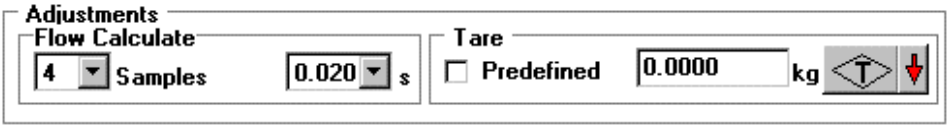
Flow rate is the rate of change in net weight per unit of time. Graphically, flow rate is the slope of the line drawn through the weight measurement samples when plotted with respect to time.

Flow Rate = (Wn – W0) / T where n is the number of samples, Wn is the weight at sample time n, and T is the delta of time between time 0 and time n. The value of n is directly set by the 'Samples' parameter. The value of T is equal to n * Sample Rate in milliseconds.

Flow rate calculation is set by selecting:

- Sample times (the number of digital weight samples over which the calculation is performed)
- A time frame (the per unit basis for conveying the flow rate data)

  By selecting a time of 1.0 second the user can normalize the flow rate to a weight unit per second format (for example, kg/s).



The module displays the calculated flow rate.

Threshold Check

Activating threshold check enables the management of the discrete outputs of the module. These discrete outputs may be used in a batching application to control the flow rate of material in either a filling or emptying mode. There are two phases of the batching process. During phase 1, material is filling (or emptying) at a high flow rate, in order to rapidly approach the target weight. Phase 1 ends when the High Flow (HF) cutoff weight is reached. During phase 2, material is filling (or emptying) at a slow rate so as to approach the target weight in a well controlled, accurate manner. Phase 2 ends when the Low Flow (LF) cutoff weight is reached. The Low Flow cutoff weight is also the target weight for the batching process. The High Flow cut-off point is associated with output Q1. The Low Flow cut-off point is associated with output Q2.

?

The available options are:

??Increase (weighing/filling)

??Decrease (downweighing/emptying)

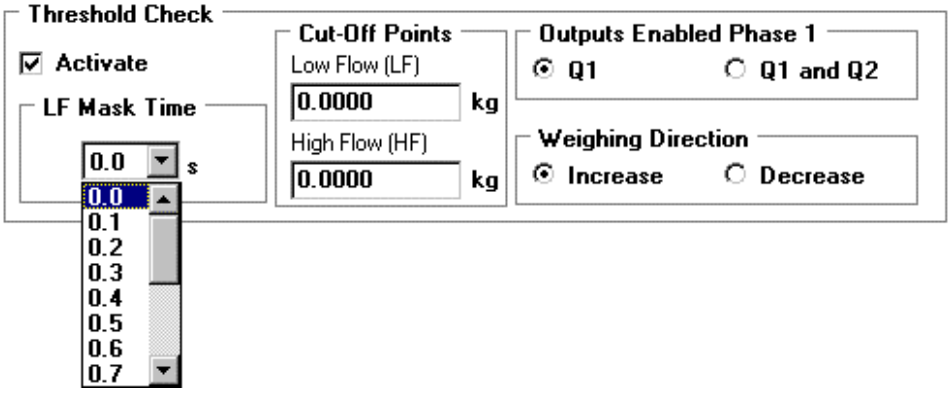
Increase measures (filling) to a target weight. Decrease measures (emptying) to a lesser target weight or zero.

By default, threshold check is not enabled (checked).

See: Active Outputs Phase 1 for Q1 and Q2 outputs

LF Mask Time

LF Mask Time allows the user to specify a delay time after the High Flow cutoff point is reached before the Low Flow cutoff checking is enabled. The purpose of the LF mask time is to ignore overshoot or undershoot (such as due to scale bounce) when filling or emptying. To select an LF Mask Time, click on the down arrow. The drop menu appears.



The range for LF Mask is 0.0 – 1.5 seconds. Select an LF Mask from the drop menu.

Cut-Off Points

Cut-Off Points are the specific weight thresholds for use in a batching process. Measurement may be associated with the following two thresholds:

??High Flow cut-off point

??Low Flow cut-off point

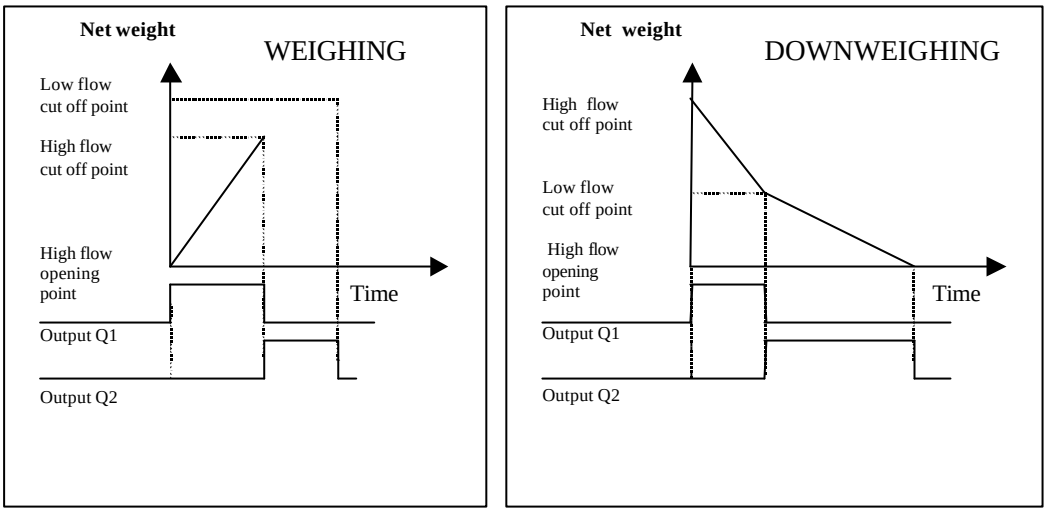
The state of the discrete outputs Q1 and Q2 change when a cut-off point is reached. The logic state of Q1 and Q2 are defined in Outputs Enabled Phase 1.

The permitted threshold values are between zero and the maximum range. When filling, the Low Flow cut-off point must be greater than or equal to the High Flow cut-off point. When emptying, the Low Flow cut-off point must less than or equal to the High Flow cut-off point. These values are expressed in high-resolution format.

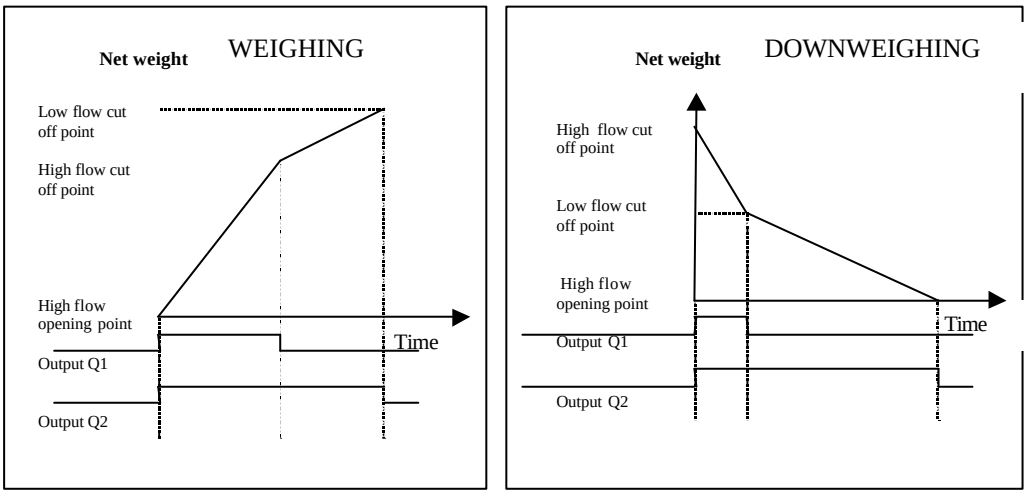
Active Outputs Phase 1

Active Outputs Phase 1 allows the user to configure the logic state of the discrete outputs during phase 1 of a filling or emptying process. During phase 1, the user has the option to choose between Q1 active high only or Q1 and Q2 both active high. By default, the module activates Q1 alone in the first phase. During phase 2, Q1 is always inactive low, and Q2 is always active high.

Active output phase 1 (Q1)



Active Output phase 1 (Q1 and Q2)



Weighing Direction

The Weighing Direction is specified using the Runtime Window.

Weighing direction allows the user to select the direction by which thresholds are taken into account.?

The available options are:

??Increase (weighing/filling)

??Decrease (downweighing/emptying)

Increase measures (filling) to a target weight. Decrease measures (emptying) to a lesser target weight or zero.

Display

Display Type

Display Type allows the user to select how weighing data is shown on a monitor or remote display unit. The available options for Display Type are:

??XBTH 100 ISP PLUS

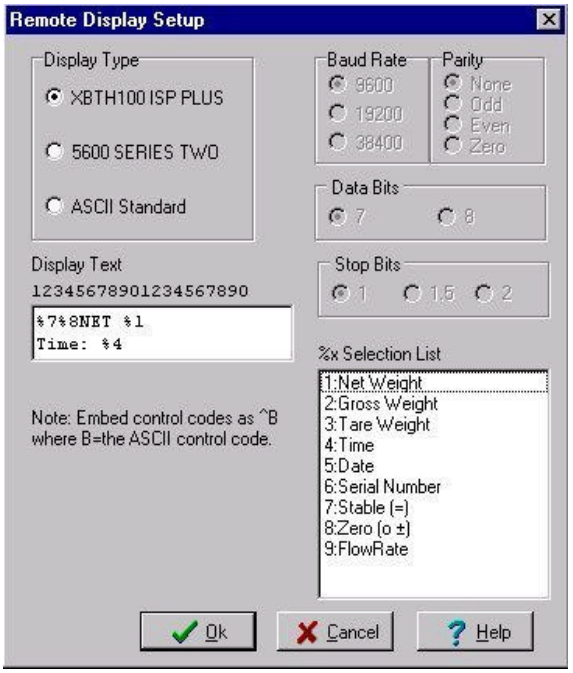
??5600 SERIES TWO (not currently available)

??ASCII Standard (not currently available)

Select a Display Type by clicking on one of the radio buttons.

Display Text

Display Text allows the user to specify text items that are displayed on the remote unit. The parameters displayed are defined in the display set up menu by entering % followed by the number of the message as defined in the selection list. A maximum of 10 characters is allowed for each of the two lines.



The available options for Display Text are:

1. Net weight
2. Gross weight
3. Tare weight
4. Time
5. Date
6. Serial number
7. Stable (displays an = sign)
8. Zero (displays 0±)
9. Flow rate

These parameters can be displayed on the Schneider XBTH100 display, the 5600 SERIES TWO, or any standard ASCII display selection is by appropriate check box.

For the ASCII option, the communications parameters (Speed, Data Bits, and Stop Bits) must also be set up at this stage.

Note: The serial link is tested when the weighing module is powered up. The XBT must be connected to the 170ISP00100 when the module is powered up.

If the channel fault is set, the measurement is replaced by the following:

' -------'

In the event of overload, it displays:

‘>>>>>‘

In the event of underload, it displays:

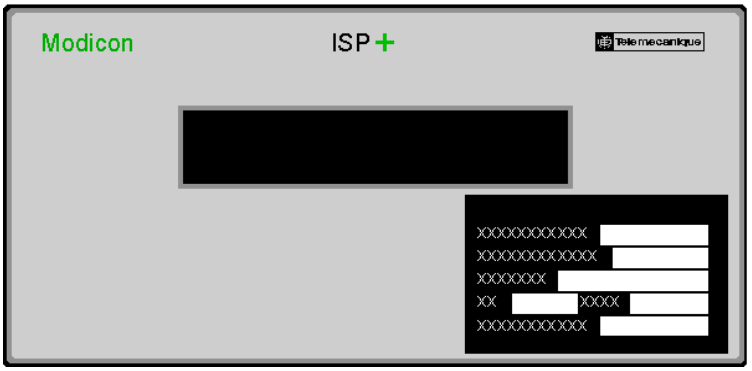
‘<<<<<‘ .

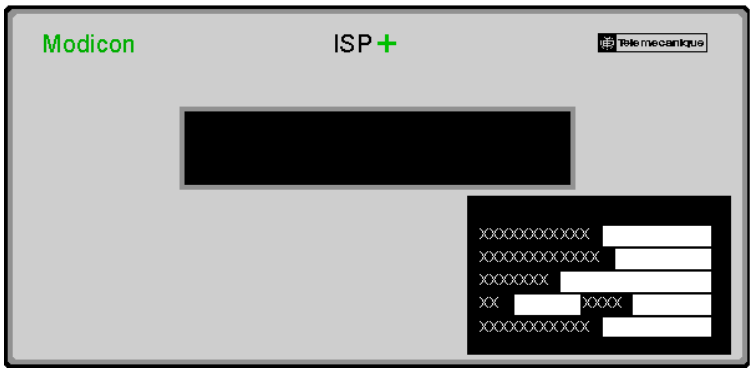
The display unit continuously monitors data reception. If no data is received (because of disconnection, non-transmission by the module, etc) the ‘Time Out’ error is displayed.

When the TSX XBT H100 is powered up it runs a test on its resources. All data received is checked during operation. In the event of problems, the “checksum” error is displayed.

Note: A space is reserved on the stamped identification plate of the TSX XBT H100 to satisfy legal requirements for metrology.

Data sent from the module to the display unit are metrological indicators (see installation documentation for TSX XBT H100).





This display indicates:

??Stable (=)

??Net or Gross weight

??Positive (+), Negative (-), or zero (small 0)

??Signed numerical data for the current weight

??The name or symbol of the measurement unit of weight

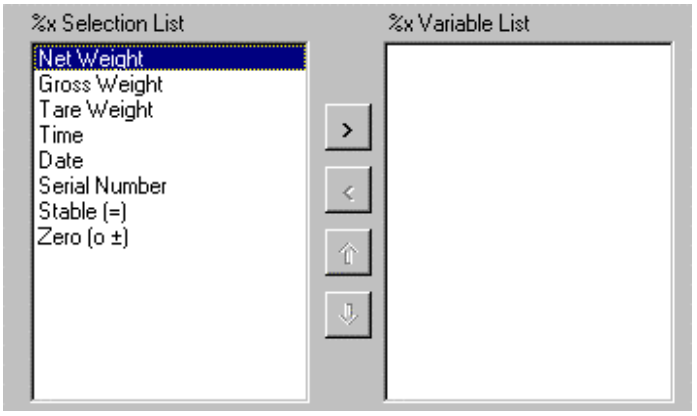
??Gram (g), kilogram (kg), pound (lb), ounce (oz), and tonne (t)

Note: The "Waiting Data" message is displayed when the connection between the weighing module and display unit is lost.

Click on the **Ok** button to return to the Configuration window after selecting Remote Display Setting options.

Selection List

The (Variable) Selection List provides the user with a list of display options from which to choose. To apply display options to the Variable List, the user clicks on the variable (highlighting it). More than one variable can be selected at once by holding the Control Key (Ctrl) down and clicking on multiple variables.



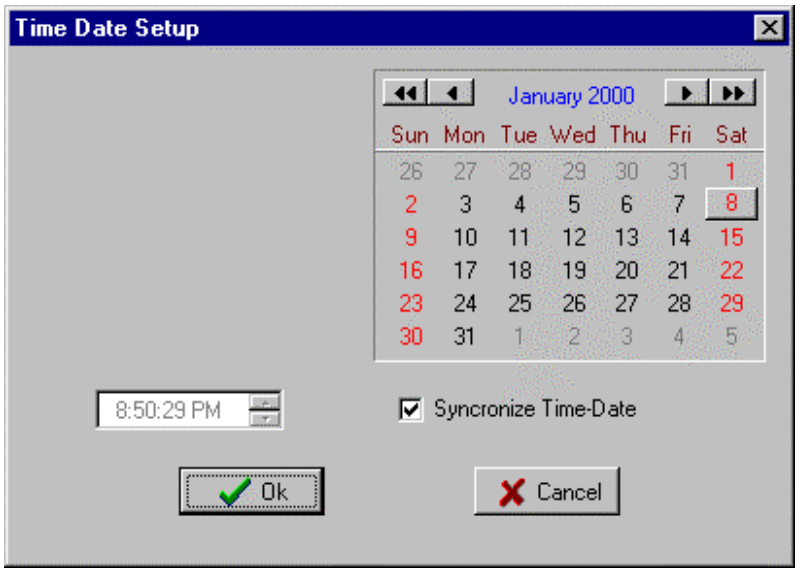
Clicking on the right arrow > button applies the highlighted selections to the Variable List. These display options are shown in the any remote display.

To remove display options from the Variable List, highlight them and click on the left arrow < button.

Time/Date Setup

Time/Date Setup

Select **Function | Time/Date Setup** to access the Time Date Setup window:



In addition to setting the time and date, clicking on the Synchronize Time-Date check box ☑ allows the user to synchronize Momentum with the time and date of the computer running the application.

Note: By default, the weighing module is synchronized to the PC clock.

Print Setup

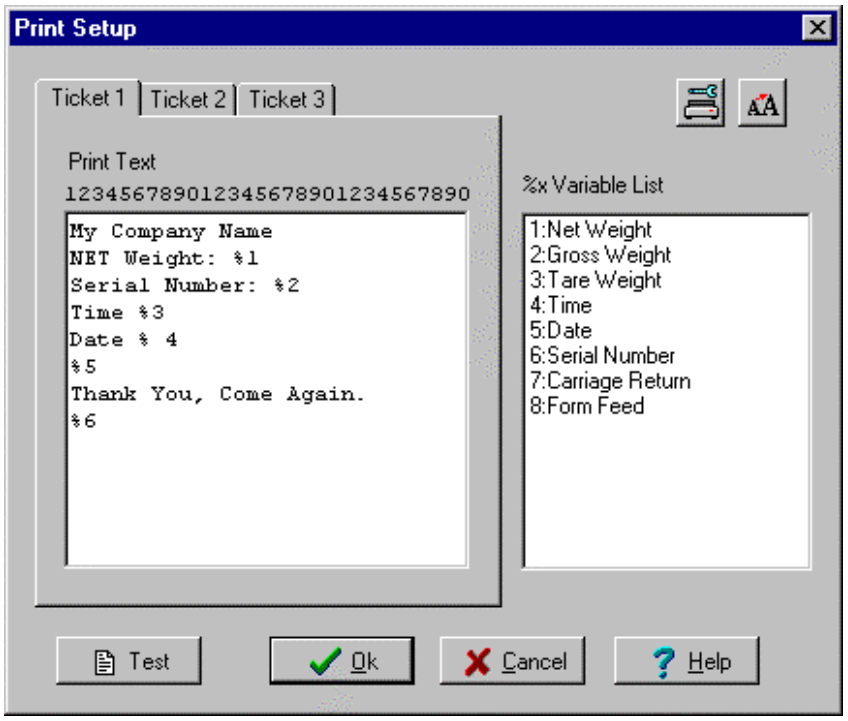
Print

Selecting **Print** from the menu allows the user the option of printing one of three predefined Tickets.

See also Print Setup.

Print Setup

Select **Function | Print Setup** to configure printing option. The Print Setup window appears:



Print Setup allows the user to create three predefined tickets. The Tickets are customized by modifying the text as well as the variables that are displayed.

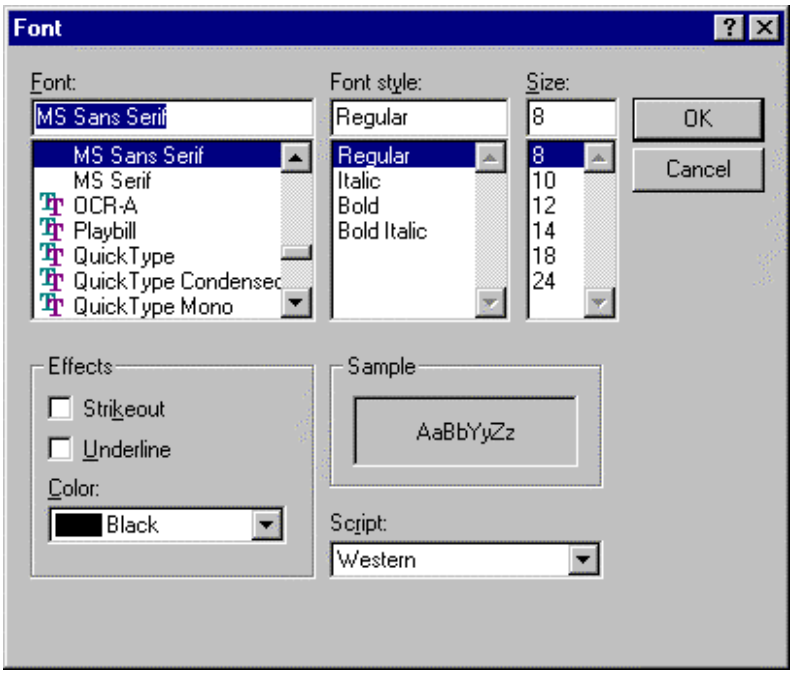
From the Print Setup window, the user also has the option to access the Printer Setup and select Fonts.

Printer Setup

Printing directly from the weighing module is a future feature option.

Font Button

Clicking on the Font button  causes the Font window to appear



Click on the OK button upon making font selections.

Test (Print)

Test print allows the user to print a ticket to a printer from the PC's printer port.

Register Information

Register Information

There are 32 16-bit registers defined for communication with the weighing module. The read only registers contain the real time data as gathered by the module. The read / write registers allow for commands to be sent to the module and for parametric changes to be made. The address is specified as an offset from the base reference (00). Byte ordering is Low-High byte.

Hex	Decimal	Data	Read/Write
01	01	Error/Status	R
02	02	Data on measured value	R
03	03	Gross Weight High	R
04	04	Gross Weight Low	R
05	05	Net Weight High	R
06	06	Net Weight Low	R
07	07	Flow rate High	R
08	08	Flow rate Low	R
09	09	Tare value High	R
0A	10	Tare value Low	R
0B	11	Offset memory (zero offset) High	R
0C	12	Offset memory (zero offset) Low	R
0D	13	Time	R
0E	14	Date	R
0F	15	Language/Units	R
10	16	Checksum	R
11	17	Token/Checksum	R/W
12	18	Command/Status	R/W
13	19	Data 0	R/W
14	20	Data 1	R/W
15	21	Data 2	R/W
16	22	Data 3	R/W
17	23	Data 4	R/W
18	24	Data 5	R/W
19	25	Data 6	R/W
1A	26	Data 7	R/W
1B	27	Data 8	R/W
1C	28	Data 9	R/W
1D	29	Data 10	R/W
1E	30	Data 11	R/W
1F	31	Data 12	R/W
20	32	Data 13	R/W

READ ONLY REGISTER DEFINITIONS:

Bit 15 is defined as the MSB and bit 0 is the LSB.

Register 0x01 Error/Status:

Bit		
0	esRun	Active high = run mode
1	esSysErr	Active high = system error
2	esPredefinedTare	Active high = Predefined Tare in use
3	esZeroTracking	Active high = Zero Tracking is active
4	esCalibrated	Active high = Module is calibrated
5	esHighRes	Active high = Module display is high resolution mode
6	esOverThreshold	Active high = Weight measurement exceeds overload threshold
7	esUnderThreshold	Active high = Weight measurement below underload threshold
8	esReserved	
9	esReserved	
10	esReserved	
11	esReserved	
12	esReserved	
13	esReserved	
14	esReserved	
15	esLocked	Active high = Module is in locked mode

Register 0x02 Data on measured value:

Bit		
0	domQ1Active	Active high = Discrete output Q1 active
1	domQ2Active	Active high = Discrete output Q2 active
2	domReserved	
3	domReserved	
4	domX1	Active high = Discrete input 1 active
5	domX2	Active high = Discrete input 2 active
6	domX3	Active high = Discrete input 3 active
7	domX4	Active high = Discrete input 4 active
8	domReserved	
9	domReserved	
10	domReserved	
11	domReserved	
12	domReserved	
13	domReserved	
14	domZero	Active high = Weight measurement is within ¼ scale division of zero
15	domStable	Active high = Weight measurement is stable

.

Register 0x03 Gross Weight High Word:

Register 0x03 contains the high order word of the gross weight measurement. The format of the weight measurement data is 32-bit floating point IEEE format.

Register 0x04 Gross Weight Low Word:

Register 0x04 contains the low order word of the gross weight measurement. The format of the weight measurement data is 32-bit floating point IEEE format.

Register 0x05 Net Weight High Word:

Register 0x05 contains the high order word of the net weight measurement. The format of the weight measurement data is 32-bit floating point IEEE format. The net weight is equal to the gross weight minus the tare weight.

Register 0x06 Net Weight Low Word:

Register 0x06 contains the low order word of the net weight measurement. The format of the weight measurement data is 32-bit floating point IEEE format.

Register 0x07 Flow Rate High Word:

Register 0x07 contains the high order word of the flow rate measurement. The format of the flow rate measurement data is 32-bit floating point IEEE format.

Register 0x08 Flow Rate Low Word:

Register 0x08 contains the low order word of the flow rate measurement. The format of the flow rate measurement data is 32-bit floating point IEEE format.

Register 0x09 Tare Value High Word:

Register 0x09 contains the high order word of the tare weight measurement. The format of the tare weight measurement data is 32-bit floating point IEEE format.

Register 0x0A Tare Value Low Word:

Register 0x0A contains the low order word of the net weight measurement. The format of the tare weight measurement data is 32-bit floating point IEEE format.

Register 0x0B Zero Offset High Word:

Register 0x0B contains the high order word of the zero offset value. The format of the zero offset value data is 32-bit floating point IEEE format. The zero offset is the present cumulative offset from the original calibrated zero balance condition. This value is updated automatically if zero tracking is enabled, and is updated manually with the Reset Zero command (command #000F). The zero offset is cleared (reset to zero) whenever the calibration procedure is implemented.

Register 0x0C Zero Offset Low Word:

Register 0x0C contains the low order word of the zero offset value. The format of the zero offset value is 32-bit floating point IEEE format.

Register 0x0D Time:

Register 0x0E Date:

Register 0x0F Language/Units:

Register 0x0F contains language and weight measurement units information.
The low byte indicates the units of weight measurement as follows:

00 = invalid data
01 = kg
02 = g
03 = t
04 = lb
05 = oz
06 = T
07 – FF = invalid data

The high byte indicates the language selected.

Register 0x10 Checksum:

Register 0x10 is the checksum for the set of read only registers. It is the signed sum of registers 0x01 through 0x0F. The contents of this register may be used to verify that a valid data set has been sent from the Weighing Module.

READ / WRITE REGISTER DEFINITIONS:

Register 0x11 Token/Checksum:

When writing, register 0x11 is a 16-bit token.This token is scanned by the Weighing Module in order to determine if a new command is ready from the host. The weighing Module will process Registers 0x12 through 0x20 only if the token has changed.

When reading, register 0x11 is a checksum for the read/write register set. The checksum is the signed sum of registers 0x12 through 0x20 minus the token. Thus the checksum may be used to verify both the integrity of the data transfer as well as to verify that the message corresponds to the correct token (and therefore the correct command).

Register 0x12 Command/Status:

When writing a command the data is presented as a 16-bit command number. When reading data it contains status bit information.

Bit		
0	csReserved	
1	csReserved	
2	csError	Active high = Error processing command (error codes?)
3	csReserved4	csReserved5 csReserved6 csReserved
7	csReserved	
8	csReserved	
9	csReserved	
10	csReserved	
11	csReserved	
12	csReserved	
13	csReserved	
14	csReserved	
15	csReserved	

Commands:

Note: In order to write a command and associated data to the weighing module, the token must also be changed and written.

Hex	Decimal	Command Function
0000	00	No Command
0001	01	Force Reset
0002	02	Reserved
0003	03	Set Zero
0004	04	Set Calibrate
0005	05	Reserved
0006	06	Set Machine Constants 1
0007	07	Get Machine Constants 1
0008	08	Set Machine Constants 2
0009	09	Get Machine Constants 2
000A	10	Set Locked Data
000B	11	Get Locked Data
000C	12	Set Non Locked Data
000D	13	Get Non Locked Data
000E	14	Status
000F	15	Reset Zero
0010	16	Write Serial Number
0011	17	Read Serial Number
0012	18	Write Print Text Tape 1
0013	19	Read Print Text Tape 1
0014	20	Write Print Text Tape 2
0015	21	Read Print Text Tape 2
0016	22	Write Print Text Tape 3
0017	23	Read Print Text Tape 3
0018	24	Write Print Variables 1
0019	25	Read Print Variables 1
001A	26	Write Print Variables 2
001B	27	Read Print Variables 2
001C	28	Write Print Variables 3
001D	29	Read Print Variables 3
001E	30	Write Display Text
001F	31	Read Display Text
0020	32	Write Display Variables
0021	33	Read Display Variables
0022	34	Print Tape 1
0023	35	Print Tape 2
0024	36	Print Tape 3
0025	37	Set Time Date
0026	38	Get Time Date
0027	39	Validate Threshold

0028	40	Set Tare Weight
0029	41	Clear Tare Weight
002A	42	Get Firmware Revision

Command #0000, No Command:

Command #0000 is not used.

Command #0001 Force Reset: (not yet functional)

The Force Reset command allows for a soft reboot of the weighing module. It is equivalent to cycling of power to the module. Following a Force Reset command, the Weighing Module will not communicate for approximately 10 seconds, so communication timeout error loops in the host application should be appropriately disabled.

Data words 0 through 13 are not used and should be set to zero.

Command #0001 Force Reset:

Data Word	**Name**	**Data Type**	**Range**
0	Word0	Word	0
1	Word1	Word	0
2	Word2	Word	0
3	Word3	Word	0
4	Word4	Word	0
5	Word5	Word	0
6	Word6	Word	0
7	Word7	Word	0
8	Word8	Word	0
9	Word9	Word	0
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Command #0002 Reserved:

Command #0002 is not used.

Command #0003 Set Zero:

The Set Zero command is used to calibrate the zero balance point for the weighing module. The Set Zero command initiates the calibration procedure. After writing the Set Zero command, the weight data is invalid until the calibration procedure is completed. Command #0004, Set Calibrate, is required in order to complete calibration of the system, and must be performed following command #0003.

Command #0003 Set Zero:

Data Word	Name	Data Type	Range
0	Always3	Word	3
1	Always100	Word	100
2	Word2	Word	0
3	Word3	Word	0
4	Word4	Word	0
5	Word5	Word	0
6	Word6	Word	0
7	Word7	Word	0
8	Word8	Word	0
9	Word9	Word	0
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Command #0004 Set Calibrate:

The Set Calibrate command is used to calibrate the weighing module / load cell system at a known user specified weight. This command also sets the Maximum Range for the application, the units of weight measurement, stability parameters and scale division granularity. A minimum of 6 seconds must be allowed following the calibrate command for the calibration to complete.

Command #0004 Set Calibrate:

Data Word	Name	Data Type	Range
0	Always3	Word	3
1	Always100	Word	100
2	Weight, High word	Float	See Below
3	Weight, Low word		
4	Range, High word	Float	See Below
5	Range, Low word		0
6	Units	TUnitsEnum	See Below
7	SExtent	TSExtentEnum	See Below
8	STime	TSTimeEnum	See Below
9	Scale	TScaleEnum	See Below
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Data word 0 must be 3.

Data word 1 must be 100.

Data words 2 and 3 set the calibration weight in 32-bit IEEE floating point format, high word low word respectively.

Data words 4 and 5 set the Maximum Range for the application, in 32-bit IEEE floating point format, high word low word respectively.

Data word 6 selects the units of weight measurement for the application as follows:

0000 = Kg

0001 = g

0002 = t (metric ton)

0003 = lb

0004 = oz

0005 = T

Data word 7 sets the stability extent of range threshold.

0000 = 2 * ¼ scale division

0001 = 3 * ¼ scale division

0002 = 4 * ¼ scale division

0003 = 6 * ¼ scale division

0004 = 8 * ¼ scale division

Data word 8 sets the stability time criterion.

0000 = 0.4 second

0001 = 0.5 second

0002 = 0.7 second

0003 = 1.0 second

Data word 9 sets the scale division.

0000 = 0.001

0001 = 0.002

0002 = 0.005

0003 = 0.01

0004 = 0.02

0005 = 0.05

0006 = 0.1

0007 = 0.2

0008 = 0.5

0009 = 1

000A = 2

000B = 5

000C = 10

000D = 20

000E = 50

000F = 100

0010 = 200

0011 = 500

0012 = 1000

0013 = 2000

0014 = 5000

Data words 10 through 13 are not used and should be set to zero.

Command #0005 Reserved:

Command #0005 is not used.

Command #0006 Set Machine Constants #1
Command #0007 Get Machine Constants #1

Data Word	Name	Data Type	Range
0	RawZero, High	Float	
1	RawZero, Low		
2	RawWeight, High	Float	
3	RawWeight, Low		
4	RawCalTare, High	Float	
5	RawCalTare, Low		
6	Weight, High	Float	
7	Weight, Low		
8	CalTareWeight, High	Float	
9	CalTareWeight, Low		
10	Max Range, High	Float	
11	Max Range, Low		
12	Units	TUnitsEnum	
13	Word13	Word	0

Command #0008 Set Machine Constants #2
Command #0009 Get Machine Constants #2

Data Word	Name	Data Type	Range
0	ADC_Offset,High	Double Word	-XXXX..XXXX
1	ADC_Offset, Low		
2	Mscale, High	Float	
3	Mscale, Low		
4	CallSExtent	TSExtentEnum	
5	CallSTime	TSTimeEnum	
6	CalScale	TScaleEnum	
7	Word7	Word	0
8	Word8	Word	0
9	Word9	Word	0
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Command #000A Set Locked DataCommand #000B Get Locked Data

Data Word	Name	Data Type	Range
0	Units	TUnitsEnum	
1	Scale	TScaleEnum	
2	OvldThreshold	TOvldThresholdEnum	
3	LockedWord	TLockedWord	
4	FilterCoeffient	TFilterCoeffEnum	
5	StabilityExtent	TSExtentEnum	
6	StabilityTime	TSTimeEnum	
7	ZeroExtent	TZExtentEnum	
8	SampleRate	TSampleRate	
9	Word9	Word	0
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Command #000C Set Non-Locked Data

Command #000D Get Non-Locked Data

Data Word	Name	Data Type	Range
0	CutOffLow, High	Float	
1	CutOffLow, Low		
2	CutOffHigh, High	Float	
3	CutOffHigh, Low		
4	PreDefinedTare, High	Float	
5	PreDefinedTare, Low		
6	FlowCalculation	TflowCalcEnum	
7	FlowTime	TFlowTime	
8	LFMaskTime	TLFMaskTimeEnum	
9	NonLockedWord	TNonLockedWord	
10	Language	Word	-1..32767
11	TareUnits	TUnitsEnum	
12	AutoTare, High	Float	
13	AutoTare, Low	Word	

Command #000E Status

Data Word	Name	Data Type	Range
0	Word0	Word	0
1	Word1	Word	0
2	Word2	Word	0
3	Word3	Word	0
4	Word4	Word	0
5	Word5	Word	0
6	Word6	Word	0
7	Word7	Word	0
8	Word8	Word	0
9	Word9	Word	0
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Command #000F Reset Zero:

The Reset Zero command is used to remove small offsets from the zero balance condition due to such things as drift over time and temperature, mechanical wear, deformation, stiction or residual mass at the load cell. The Reset Zero command will be executed only if the present weight measurement is stable, it is within the zero range as set by data word 7 of the Set Locked Data command (#000A), and there is no tare weight (the tare weight is zero).

Data words 0 through 13 are not used and should be set to zero.

Command #000F Reset Zero:

Data Word	Name	Data Type	Range
0	Word0	Word	0
1	Word1	Word	0
2	Word2	Word	0
3	Word3	Word	0
4	Word4	Word	0
5	Word5	Word	0
6	Word6	Word	0
7	Word7	Word	0
8	Word8	Word	0
9	Word9	Word	0
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Command #0010 Write Serial Number:

Data Word	Name	Data Type	Range
0	Word0	Word	0
1	Word1	Word	0
2	Word2	Word	0
3	Word3	Word	0
4	Word4	Word	0
5	Word5	Word	0
6	Word6	Word	0
7	Word7	Word	0
8	Word8	Word	0
9	Word9	Word	0
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Command #0011 Read Serial Number:

Data Word	Name	Data Type	Range
0	Word0	Word	0
1	Word1	Word	0
2	Word2	Word	0
3	Word3	Word	0
4	Word4	Word	0
5	Word5	Word	0
6	Word6	Word	0
7	Word7	Word	0
8	Word8	Word	0
9	Word9	Word	0
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Command #0012 Write Print Text Tape 1:

Data Word	Name	Data Type	Range
0	Word0	Word	0
1	Word1	Word	0
2	Word2	Word	0
3	Word3	Word	0
4	Word4	Word	0
5	Word5	Word	0
6	Word6	Word	0
7	Word7	Word	0
8	Word8	Word	0
9	Word9	Word	0
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Command #0013 Read Print Text Tape 1:

Data Word	Name	Data Type	Range
0	Word0	Word	0
1	Word1	Word	0
2	Word2	Word	0
3	Word3	Word	0
4	Word4	Word	0
5	Word5	Word	0
6	Word6	Word	0
7	Word7	Word	0
8	Word8	Word	0
9	Word9	Word	0
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Command #0014 Write Print Text Tape 2:

Data Word	Name	Data Type	Range
0	Word0	Word	0
1	Word1	Word	0
2	Word2	Word	0
3	Word3	Word	0
4	Word4	Word	0
5	Word5	Word	0
6	Word6	Word	0
7	Word7	Word	0
8	Word8	Word	0
9	Word9	Word	0
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Command #0015 Read Print Text Tape 2:

Data Word	Name	Data Type	Range
0	Word0	Word	0
1	Word1	Word	0
2	Word2	Word	0
3	Word3	Word	0
4	Word4	Word	0
5	Word5	Word	0
6	Word6	Word	0
7	Word7	Word	0
8	Word8	Word	0
9	Word9	Word	0
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Command #0016 Write Print Text Tape 3:

Data Word	Name	Data Type	Range
0	Word0	Word	0
1	Word1	Word	0
2	Word2	Word	0
3	Word3	Word	0
4	Word4	Word	0
5	Word5	Word	0
6	Word6	Word	0
7	Word7	Word	0
8	Word8	Word	0
9	Word9	Word	0
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Command #0017 Read Print Text Tape 3:

Data Word	Name	Data Type	Range
0	Word0	Word	0
1	Word1	Word	0
2	Word2	Word	0
3	Word3	Word	0
4	Word4	Word	0
5	Word5	Word	0
6	Word6	Word	0
7	Word7	Word	0
8	Word8	Word	0
9	Word9	Word	0
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Command #0018 Write Print Variables 1:

Data Word	Name	Data Type	Range
0	Word0	Word	0
1	Word1	Word	0
2	Word2	Word	0
3	Word3	Word	0
4	Word4	Word	0
5	Word5	Word	0
6	Word6	Word	0
7	Word7	Word	0
8	Word8	Word	0
9	Word9	Word	0
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Command #0019 Read Print Variables 1:

Data Word	Name	Data Type	Range
0	Word0	Word	0
1	Word1	Word	0
2	Word2	Word	0
3	Word3	Word	0
4	Word4	Word	0
5	Word5	Word	0
6	Word6	Word	0
7	Word7	Word	0
8	Word8	Word	0
9	Word9	Word	0
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Command #001A Write Print Variables 2:

Data Word	Name	Data Type	Range
0	Word0	Word	0
1	Word1	Word	0
2	Word2	Word	0
3	Word3	Word	0
4	Word4	Word	0
5	Word5	Word	0
6	Word6	Word	0
7	Word7	Word	0
8	Word8	Word	0
9	Word9	Word	0
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Command #001B Read Print Variables 2:

Data Word	Name	Data Type	Range
0	Word0	Word	0
1	Word1	Word	0
2	Word2	Word	0
3	Word3	Word	0
4	Word4	Word	0
5	Word5	Word	0
6	Word6	Word	0
7	Word7	Word	0
8	Word8	Word	0
9	Word9	Word	0
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Command #001C Write Print Variables 3:

Data Word	Name	Data Type	Range
0	Word0	Word	0
1	Word1	Word	0
2	Word2	Word	0
3	Word3	Word	0
4	Word4	Word	0
5	Word5	Word	0
6	Word6	Word	0
7	Word7	Word	0
8	Word8	Word	0
9	Word9	Word	0
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Command #001D Read Print Variables 3:

Data Word	Name	Data Type	Range
0	Word0	Word	0
1	Word1	Word	0
2	Word2	Word	0
3	Word3	Word	0
4	Word4	Word	0
5	Word5	Word	0
6	Word6	Word	0
7	Word7	Word	0
8	Word8	Word	0
9	Word9	Word	0
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Command #001E Write Display Text:

Data Word	Name	Data Type	Range
0	Word0	Word	0
1	Word1	Word	0
2	Word2	Word	0
3	Word3	Word	0
4	Word4	Word	0
5	Word5	Word	0
6	Word6	Word	0
7	Word7	Word	0
8	Word8	Word	0
9	Word9	Word	0
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Command #001F Read Display Text:

Data Word	Name	Data Type	Range
0	Word0	Word	0
1	Word1	Word	0
2	Word2	Word	0
3	Word3	Word	0
4	Word4	Word	0
5	Word5	Word	0
6	Word6	Word	0
7	Word7	Word	0
8	Word8	Word	0
9	Word9	Word	0
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Command #0020 Write Display Variables:

Data Word	Name	Data Type	Range
0	Word0	Word	0
1	Word1	Word	0
2	Word2	Word	0
3	Word3	Word	0
4	Word4	Word	0
5	Word5	Word	0
6	Word6	Word	0
7	Word7	Word	0
8	Word8	Word	0
9	Word9	Word	0
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Command #0021 Read Display Variables:

Data Word	Name	Data Type	Range
0	Word0	Word	0
1	Word1	Word	0
2	Word2	Word	0
3	Word3	Word	0
4	Word4	Word	0
5	Word5	Word	0
6	Word6	Word	0
7	Word7	Word	0
8	Word8	Word	0
9	Word9	Word	0
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Command #0022 Print Tape 1:

Data Word	Name	Data Type	Range
0	Number	Word	0..2
1	Word1	Word	0
2	Word2	Word	0
3	Word3	Word	0
4	Word4	Word	0
5	Word5	Word	0
6	Word6	Word	0
7	Word7	Word	0
8	Word8	Word	0
9	Word9	Word	0
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Command #0023 Print Tape 2:

Data Word	Name	Data Type	Range
0	Number	Word	0..2
1	Word1	Word	0
2	Word2	Word	0
3	Word3	Word	0
4	Word4	Word	0
5	Word5	Word	0
6	Word6	Word	0
7	Word7	Word	0
8	Word8	Word	0
9	Word9	Word	0
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Command #0024 Print Tape 3:

Data Word	Name	Data Type	Range
0	Number	Word	0..2
1	Word1	Word	0
2	Word2	Word	0
3	Word3	Word	0
4	Word4	Word	0
5	Word5	Word	0
6	Word6	Word	0
7	Word7	Word	0
8	Word8	Word	0
9	Word9	Word	0
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Command #0025 Set Time Date:

Data Word	Name	Data Type	Range
0	Word0	Word	0
1	Word1	Word	0
2	Word2	Word	0
3	Word3	Word	0
4	Word4	Word	0
5	Word5	Word	0
6	Word6	Word	0
7	Word7	Word	0
8	Word8	Word	0
9	Word9	Word	0
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Command #0026 Get Time Date:

Data Word	Name	Data Type	Range
0	Word0	Word	0
1	Word1	Word	0
2	Word2	Word	0
3	Word3	Word	0
4	Word4	Word	0
5	Word5	Word	0
6	Word6	Word	0
7	Word7	Word	0
8	Word8	Word	0
9	Word9	Word	0
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Command #0027 Validate Threshold:

Data Word	Name	Data Type	Range
0	Word0	Word	0
1	Word1	Word	0
2	Word2	Word	0
3	Word3	Word	0
4	Word4	Word	0
5	Word5	Word	0
6	Word6	Word	0
7	Word7	Word	0
8	Word8	Word	0
9	Word9	Word	0
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Command #0028 Set Tare Weight:

Command #0028 is used to set the tare weight. When this command is issued, the current weight measurement (whatever weight is presently on the scale) becomes the tare weight if the weight measurement is stable.

All data words are not used and should be set to zero.

Command #0028 Set Tare Weight:

Data Word	Name	Data Type	Range
0	Word0	Word	0
1	Word1	Word	0
2	Word2	Word	0
3	Word3	Word	0
4	Word4	Word	0
5	Word5	Word	0
6	Word6	Word	0
7	Word7	Word	0
8	Word8	Word	0
9	Word9	Word	0
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Command #0029 Clear Tare Weight:

Command #0029 is used to clear the tare weight. When command #0005 is issued, the tare weight is reset to zero.

All data words are not used and should be set to zero.

Command #0029 Clear Tare Weight:

Data Word	Name	Data Type	Range
0	Word0	Word	0
1	Word1	Word	0
2	Word2	Word	0
3	Word3	Word	0
4	Word4	Word	0
5	Word5	Word	0
6	Word6	Word	0
7	Word7	Word	0
8	Word8	Word	0
9	Word9	Word	0
10	Word10	Word	0
11	Word11	Word	0
12	Word12	Word	0
13	Word13	Word	0

Momentum Hardware

Load Cell Interface

The load cell connector J2 is a 15 pin female D subminiature connector.

The following is a pin-out description. Unmentioned pins are not connected internally to the module.

In general there are three signal pairs:

??Excitation
??Kelvin sense signal
??Measurement signal

The signal pairs are a positive and a negative polarity of each signal. The excitation signals are 10 VDC power supplied by the module to the load cell. The Kelvin sense signal is a feedback to the module of the supply voltage seen at the load cell. This is used to ratiometrically account for line losses in the cable. The measurement signal is the differential input to the module, which varies in proportion to the weight on the load cell.

Pin #	Signal
1	measurement signal (-)
5	measurement signal (+)
2	sense signal (-)
3	sense signal (+)
9	excitation (-)
10	excitation (+)

The shield of the cable must be connected to the back-shell of the connector. This shield is tied to earth ground through the weighing module.

Weighing Module Locking

The Momentum Weighing Module is capable of operation in either the locked or the unlocked mode. The locked mode provides compliance to legal requirements for point of sale applications. In unlocked mode, the user or host processor has access to all of the configuration and calibration settings, and may modify them. In locked mode, the user or host processor may only access and modify data associated with the Runtime window. This includes tare, flow calculation, and threshold settings. Locking the module is accomplished by removing jumper JP3.

The base below is shown with the Tophat and Communication Adapter removed.