

Operating Manual for Advanced Force Gauge /Force
&
Torque Indicator (AFG and AFTI)

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Mecmesin

OPERATING MANUAL FOR AFG AND AFTI II

(SOFTWARE 340-O62 VER 1.1)

Thank you for choosing this Mecmesin instrument. With correct use and regular recalibration it will give many years of accurate and reliable service.

The Mecmesin AFG is the latest in a series of highly adaptable display units. By using the latest integrated circuit technology it has been possible to produce a truly universal display which can be used to measure force, torque or weight when combined with suitable transducers.

BEFORE USE

Upon receiving the unit please check that no physical damage has occurred to the packaging material, plastic case or the instrument itself. If any damage is evident please notify Mecmesin immediately.

The batteries in this product have had an initial charge prior to delivery. Please charge for at least 20 hours using the charger supplied, for maximum battery life.

SWIVEL ADAPTOR



Mecmesin have introduced the Swivel Adapter as a standard accessory for the following gauges:

AFG 10N
AFG 25N
AFG 50N
AFG 100N
AFG 250N
AFG 500N
AFG 1000N

It will allow operators to orientate the gripping accessory without the need for a locking nut (as on the extension rod).

We do not recommend its usage for AFG 2.5N or AFG 5N due to its weight, which would need to be tared from the measuring range.

Affix the Swivel Adaptor to the male thread of either the short extension rod (30mm long) or the long extension rod (130mm long). Your chosen grip or accessory may now be connected to the swivel Adaptor and oriented to suit your test.

Note: Ensure that when fitting any gripping fixture (eg. hook, compression plate etc.) either the short or long extension rod must first be screwed into the gauge.

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TO GET YOU GOING QUICKLY

The AFG has high resolution and speed together with many other advanced features, however it may still be used as a straight-forward instrument without dedicated user knowledge.

The most commonly used features such as force or torque display, maximum reading detection and the changing of displayed units, can all be used with just one key press per function on the front panel.

POWERING UP

With the control panel facing you there will be eight key pads visible. The two lower ones are coloured red and green. Pressing the green key will turn the instrument on. A short self test now runs during which the display will show the software version number, revision date and the instrument's range in S.1. units of measurement.

After the self test and providing no load has been applied to the instrument the display will show all zeroes, this is because the unit re-zeroes itself during the self test routine. Please note that an instrument with an integral transducer (AFG) measuring very low forces may not show zero if its attitude was changed during the self test routine, i.e. the unit was horizontal on a table and subsequently picked up during or after the self test routine. This is because on light ranges of instrument the mass of the transducer inside is itself being weighed. This effect is entirely normal, once the unit is properly mounted and zeroed the reading will be totally stable.

DISPLAY MODE

Provided no other keys have been pressed the instrument will be in the display mode. This is the most commonly used mode. The display is showing the actual force that is being applied to the unit. If a force is carefully applied via the sensing probe (hole at bottom of AFG only) the reading on the display will be seen to register this applied force. Take care with lower range instruments not to overload the transducer as this will cause irreparable damage. In this display mode, forces or torques greater than 120% of full scale will produce a constant sound warning coupled with an '-OL-' symbol on the display. The instrument keeps a record of all overloads that are applied, this can only be cleared by trained Mecmesin staff or representatives.

AFG FORCE CONFIGURATION

Tensile forces on the AFG are displayed as positive numbers and compressive forces as negative numbers, the minus sign appearing to the left of the digits when shown. The display also has symbols located at the left which directly relate to this sign (two triangular arrows pointing away from each other for tension and two triangular arrows pointing toward each other for compression).



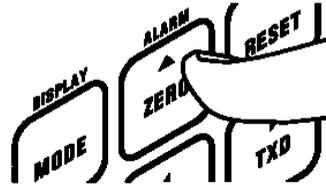
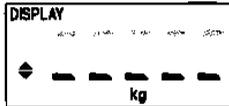
AFG TORQUE CONFIGURATION

The display is equipped with similar rotating arrow symbols which will appear when the unit is configured for torque. In this case, clockwise torques are displayed as positive numbers and anticlockwise torques as negative numbers. The arrows directly relate to the sign just like the tension and compression symbols described above.



ZEROING

During the operation of the instrument it is often necessary to zero the display, for instance if you have added a fixture that you do not want to become part of the measured reading. This is achieved by pressing the "ZERO" key, which is found on the top row of keys in the middle. When the instrument is actually zeroing itself a row of segments on the top and bottom of the display will be seen to alternately blink once, this is to show you that the key press has been successful and the re-zero has been carried out.

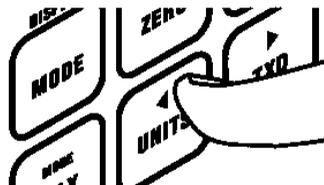
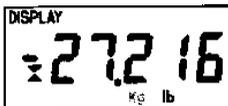


MEASUREMENT UNITS

The instrument is capable of displaying many different units of measurement some of which include kilogrammes, grammes, pounds and Newtons. Torque based instruments can also display many units including kilogramme.centimetres, pound.feet, pound.inches and Newton.metres.

The actual units available will vary depending on the range of the instrument. The most suitable set of units is automatically selected within the instrument's operating programme according to its range and type.

To change the display units press the "UNITS" key, which is found on the bottom row of keys in the middle. The newly selected units will be shown at the bottom of the display. Each successive key press will select the next available units until the instrument returns to the original.



MAX READINGS

The instrument detects and stores an independent maximum (peak) force or torque in both directions. By pressing the "MAX" key, which is found on the bottom row of keys on the left, the highest tensile/clockwise load detected will be displayed along with the tension symbol/clockwise arrow as described above.

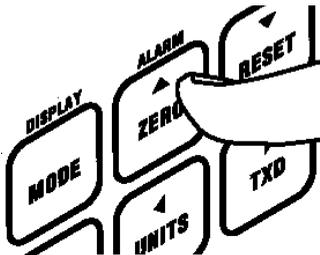


Pressing the "MAX" key a second time will now show the highest compressive/anticlockwise load detected along with the compression symbol/anticlockwise arrow as described above.



After noting the readings you may wish to measure the next maximum in your test series. To do this the instrument must first be re-set so that it is ready to detect the next maximum (peak). Pressing the "RESET" key, which is found on the top row of keys on the right, will clear both maximum registers and prepare for detecting the next maximum readings.

For maximum accuracy it is good practice to re-zero the instrument as well as just resetting before each new test is carried out. As previously mentioned this is done by pressing the "ZERO" key. To make the instrument faster and easier to use we have designed it such that pressing "ZERO" also resets the instrument at the same time. Therefore if you decide to re-zero during tests, only one key press is required.



Note

Apart from the previously mentioned display symbols, the instrument deals with force and torque in exactly the same manner. Consequently, force will be used for all further references in this manual.

USING THE ADVANCED MODES

Overview

The AFG has the following modes of operation other than the main display mode.

ALARM:

In this mode alarm points can be set and other features pertaining to the alarms can be configured.

COM:

COM in this context stands for COMMUNICATIONS. This mode allows the serial RS232 and MITUTOYO outputs to be configured. Also the internal storage of readings and their subsequent transmission are dictated through settings in this mode.

EXTRA:

The EXTRA mode allows all other instrument characteristics not previously covered to be configured.

SETTING AND USE

The other three operating modes are selected in the following manner.

Assuming the instrument is in the display mode, the "MODE" key (found on the top row on the left) is pressed and held for two seconds. This is to alleviate the possibility of false selection or inadvertent tampering. The current mode symbol (in this case 'DISPLAY') will flash. This shows that the key press has been successful and the instrument is waiting for you to press one of the mode selection keys. One of the following mode keys may now be pressed, (their names are printed above or below the keys in red), "ALARM", "COM" or "EXTRA". The selected mode will now be entered. Note that the "MODE" key itself has the word "DISPLAY" above it. This is for selecting the main display mode and can be pressed after the "MODE" key in just the same manner as the other three modes. Also note that the "MODE" key need only be held for two seconds when leaving the display mode, a single press is all that is required when moving between the other three non-display modes.

The following descriptions of the other mode settings assume that the instrument is in its factory default state (see APPENDIX A), i.e. if the modes have already been viewed and/or configured, then the modes may not appear in the same order as they are described below. If this is the case, within each mode the "MORE" key should be pressed until the required display is found to match the one being described. The MODE FLOW CHARTS in APPENDIX B are very helpful when moving around the modes in this way.

Once a mode has been selected the required instrument features may be set-up as follows.

ALARM MODE

Overview

The alarm feature operates by setting a band comprising of two force points, an upper and a lower, which are user selected. The alarm can now be configured so that, depending on the users choice, a buzzer may sound and/or a light may change from green to red to signify whether the test force has gone in or out of the selected band.

The ALARM mode can be entered as described above in the section entitled SETTING AND USE.

The alarm is set to operate by configuring the following parameters.

LOWER AND UPPER ALARM POINTS:

These are the actual force values that you wish to use as the lower and upper alarm band points. The first point is now displayed, shown by a '1' at the top of the display next to the 'ALARM' symbol. The point is set or adjusted by pressing the "UP" and "DOWN" arrow keys.

Single key presses increment or decrement the displayed value by one display count, i.e. 1/5000th of the full scale range in whichever units are currently being displayed. Holding the key down for 0.5 seconds will activate an auto repeat feature whereby the value will increment or decrement slowly at first, and then for as long as the key remains pressed the rate will increase. When the required value is shown the first point is ready and the second alarm point mode may now be entered.

Press the "MORE" key.

The second point (shown by a '2' at the top of the display next to the 'ALARM' symbol) may now be set or adjusted in exactly the same manner as described above for the first point. The points need not necessarily be entered in order as; (point 1 = lower, point 2 upper). Note that in these two point setting modes the displayed units may be changed and the current value converted by pressing the "UNITS" key. These are actually the same units as used by the main display mode so if changed here, the newly selected units will appear upon return to the display mode. Also each alarm point may be transmitted to the current RS-232 or MITUTOYO peripheral by pressing the "TXD" key, this is useful for down-loading tolerance values into data-loggers and other suitable peripherals (the instrument can be used as a MITUTOYO DPI PRE-SETTER). When the required value is shown, the second point is ready and the next mode may be entered.

Press the "MORE" key.

ALARM OUTPUT:

As previously mentioned the alarm can take the form of an audible or visual signal or both.

One of the following options may be set by pressing the “UP” and “DOWN” arrow keys:

- ‘OFF’ There are no alarm outputs of any kind.
- ‘Audio’ The buzzer only.
- ‘LEd’ The visual output of the LED’S only.
- ‘both’ The buzzer and LED outputs both operate simultaneously.

When set press the “MORE” key.

ALARM BAND:

The instrument can now be set such that the alarm is activated when a force value occurs either inside or outside of the selected band defined by the two alarm points.

If in the band is selected, any displayed force now falling inside the selected lower and upper band points (inclusive) will activate the alarm as configured. If the LED output has been selected in the previous mode, then the red LED will illuminate if the displayed force falls inside the band. When the displayed force falls outside the band the green LED will illuminate.

If out of band is selected, any displayed force now falling outside the selected lower and upper band points will activate the alarm as configured. If the LED output has been selected in the previous mode, then the red LED will illuminate if the displayed force falls outside the band. When the displayed force falls inside the band the green LED will illuminate.

One of the following options may be set by pressing the “UP” and “DOWN” arrow keys:

- ‘outbd’ Out of band.
- ‘inbd’ In the band.

When set press the “MORE” key.

AUDIO ONLY OPTIONS:

The buzzer can be configured to output in parallel with either LED so that an audible warning can be produced for pass or fail events. Also a pulse option is available if a constant tone is not desirable.

One of the following options may be set by pressing the “UP” and “DOWN” arrow keys:

- ‘FAIL’ The buzzer will output a constant tone along with the red (FAIL) LED.
- ‘PASS’ The buzzer will output a constant tone along with the green (PASS) LED.
- ‘PULSE’ The buzzer will output a short ‘beep’ whenever an alarm band point is crossed from either direction.

This is the final ALARM setting mode. Pressing the “MORE” key at this point will return the instrument to the first ALARM POINT mode and the cycle repeats.

To return to the main display mode at any time press the “MODE” key twice, once to tell the instrument to change to a different mode and again to select “DISPLAY” as shown in red above the “MODE” key.

Overview

The communications mode allows the setting of options pertaining to the RS-232 and MITUTOYO ports and also the choice of sending displayed readings to either the ports mentioned, or to the internal memory store.

The COM mode can be entered as described above in the section entitled SETTING AND USE.

BAUD RATE,,*

The baud rate only applies to the RS-232 port, and the same rate is used for both transmit and receive lines.

One of the following baud rates may be set by pressing the "UP" and "DOWN" arrow keys:

'1200' '9600' '19200' '57600'

When set press the "MORE" key.

FORMAT:

The transmitted value can be formatted in one of three ways to suit the requirements of the connected peripheral or user software that will be receiving the values from the instrument.

The format only applies to the RS-232 port.

One of the following options may be set by pressing the "UP" and "DOWN" arrow keys:

'PLAIN' The value is transmitted as a numeric string with no units.

'UNITS' The value is transmitted as a numeric string with the current display units appended.

'16bit' The value is transmitted as a 2's complement 16 bit calibrated unscaled binary number, this is a special output for advanced software applications.

When set press the "MORE" key.

TERMINATION CHARACTERS:

Certain printers will need to receive a carriage return (Cr) or line feed (LF) character or both in order to print the required results successfully.

Check the operations manual for your printer or other peripheral in order to ascertain what is required. This setting only applies to the RS-232 port.

One of the following options may be set by pressing the “UP” and “DOWN” arrow keys:

- ‘NULL’ No characters are transmitted at the end of a reading.
- ‘Cr’ A carriage return character is transmitted after each reading.
- ‘LF’ A line feed character is transmitted after each reading.
- ‘CRLF’ A carriage return and line feed character is transmitted after each reading.

When set press the “MORE” key.

BYTE DELAY:

Certain peripherals may need a delay between each byte of the string in order to operate. Some printers that have small or no data buffers may require this feature. The actual delay may in some cases have to be ascertained using trial and error techniques. This delay only applies to the RS-232 port.

LINE DELAY

With certain peripherals it is often necessary to insert a delay between each line or reading. This is especially true of most small MITUTOYO printers. In the main display mode, when readings are transmitted using the “TXD” key, both RS-232 and MITUTOYO readings are sent to their respective ports consecutively. This line delay is executed after the whole transmission sequence. The delay is usually only needed when the instrument is sending multiple readings to a peripheral, e.g. when transmitting all stored memory readings.

One of the following values in seconds may be set by pressing the “UP” and “DOWN” arrow keys:

- ‘0’ -No delay.
- ‘1’ ‘2’ ‘3’ ‘4’ ‘5’

When set press the “MORE” key.

TRANSMIT MODE:

This option allows the user to choose whether displayed readings are transmitted immediately to an external peripheral, or stored in the instrument's internal memory for later transmission. In the display mode, if the transmit mode below is set to ‘port’, single readings are sent immediately to both RS-232 and MITUTOYO ports when the “TXD” key is pressed. Also in the display mode, a single reading can be requested from the instrument regardless of this setting by sending a ‘?’ character to the RS-232 input. This will send a reading to the RS-232 port only. A single MITUTOYO reading can also be requested if the peripheral being used is equipped with the standard MITUTOYO ‘REQ output’.

One of the following options may be set by pressing the “UP” and “DOWN” arrow keys:

- ‘Port’ When the “TXD” key is pressed in the main display mode, the displayed reading is sent to both RS-232 and MITUTOYO ports as described above.
- ‘FILE’ When the “TXD” key is pressed in the main display mode, the displayed reading is sent to the current internal memory location, the display shows how many locations have been used each time a reading is stored.

Note: In the main display mode when the FILE option is selected, the “TXD” and “RESET” keys both have second functions.

Press and hold the "TXD" key for two seconds and all internal memory readings stored so far will be sent to both the RS-232 and MITUTOYO ports as described above, the display shows 't-ALL' during this transmission. Once running, the process can be aborted by pressing any key.

Press and hold the "RESET" key for two seconds and the internal memory will be cleared, the display shows 'St 1 00' indicating that there is 1 00 memory locations now available for storage.

An RS-232 remote control feature is also implemented for computer control of the instrument. This is achieved by sending special key code characters that represent the five main instrument keys to the RS-232 input. For details of these special codes see the Quick reference chart (APPENDIX A) at the end of this manual.

This is the final COM setting mode, pressing the "MORE" key at this point will return the instrument to the BAUD RATE rate setting mode and the cycle repeats.

To return to the main display mode at any time press the "MODE" key twice, once to tell the instrument to change to a different mode and again to select "DISPLAY" as shown in red above the "MODE" key.

EXTRA MODE

Overview

The EXTRA mode allows many of the more general aspects of the instrument's operation to be set, as well as further advanced features such as average reading over time, freeze reading input, first peak detection and test stand control to be configured.

The EXTRA mode can be entered as described above in the section entitled SETTING AND USE.

AUTO OFF:

When powered, the instrument constantly keeps a record of time elapsed since the last key press in order to decide whether or not to power down automatically.

The left side of the display will show 'Ao'; this stands for 'Auto off'. One of the following options may be set by pressing the "UP" and "DOWN" arrow keys:

- 'NO' Provided the 'LOW BATTERY' symbol is not showing, the instrument will not power off automatically.
- 'YES' Provided the 'LOW BATTERY' symbol is not showing, the instrument will power off after ten minutes of no key activity.

If the 'LOW BATTERY' symbol is showing, the instrument will power off unconditionally at intervals of one minute regardless of the above setting and also regardless of any key presses. The instrument may be re-powered but will power off every one minute as long as the 'LOW BATTERY' symbol remains shown. This feature has been designed into the instrument to ensure the integrity of stored readings and other elements of the instrument's set-up as the battery gets near to the end of its cycle before re-charging. When set press the "MORE" key.

FOOT SWITCH 1:

The instrument has two foot switch input pins on the communication connector that allow five of the instruments keys to be remotely actuated via external switches.

Each foot switch can be assigned to one of the 5 main keys, the switch action then remotely presses this assigned key.

The left side of the display will show 'F1'; this stands for 'Foot 1'. One of the following options may be set by pressing the "UP" and "DOWN" arrow keys:

- '1' The "TXD" key.
- '2' The "UNITS" key.
- '3' The "MAX" key.
- '4' The "RESET" key.
- '5' The "ZERO" key.

When set press the "MORE" key.

FOOT SWITCH 2:

The left side of the display will show 'F12'; this stands for 'Foot 2'. One of the following options may be set by pressing the "UP" and "DOWN" arrow keys:

- '1' The "TXD" key.
- '2' The "UNITS" key.
- '3' The "MAX" key.
- '4' The "RESET" key.
- '5' The "ZERO" key.

When set press the "MORE" key.

DISPLAY UPDATE RATE + AVERAGE OVER TIME:

The update rate of the main display can be set to one of three configurations, the third being a special mode allowing AVERAGE OVER TIME to be measured throughout the duration of a test. In the normal display mode, i.e. when 'MAX' is not selected, the reading on the display will reflect and update the average reading over time whenever the displayed force exceeds 2.5% of full scale. We recommend that the expected average value be at least 25% of full scale to ensure consistent and accurate results. The stored average can be cleared ready for the next test by pressing the "RESET" key. The maximum values are also stored along with the average value. These may be accessed in the normal way using the "MAX" key.

The left side of the display will show 'SP'; this stands for 'Speed'. One of the following options may be set by pressing the "UP" and "DOWN" arrow keys:

- 'HI' Normal display updated at a rate of approximately 40 readings per second.
- 'LO' Normal display updated at a rate of approximately 2 readings per second.
- 'At' Special AVERAGE OVER TIME display updated at a rate of approximately 2 readings per second.

When set press the "MORE" key.

EFFECTIVE RESOLUTION:

The effective resolution of the display can be changed from the normal high rate of 1 part in 5000 to 1 part in 300. Under circumstances where the force is fluctuating the lower resolution may prove to be a more convenient option.

The left side of the display will show 'Er'; this stands for 'Effective resolution'. One of the following options may be set by pressing the "UP" and "DOWN" arrow keys:

- 'HI' The display resolution will be 1 part in 5000.
- 'LO' The display resolution will be 1 part in 300.

When set press the "MORE" key.

POLARITY SIGN:

The force polarity sign can be disabled if required. When disabled, the sign will not appear on the display nor will it be transmitted to either the RS-232 or MITUTOYO ports (however, the tension/compression or torque arrows will always be displayed). This feature is particularly useful when the presence of a minus sign in a transmitted reading leads to false statistical analysis of results by an external data-logger.

The left side of the display will show 'Sn'; this stands for 'Sign'. One of the following options may be set by pressing the "UP" and "DOWN" arrow keys:

- 'OFF' No sign will be displayed or transmitted.
- 'ON' A sign will be displayed and transmitted when forces are negative.

When set press the "MORE" key.

FREEZE READING:

This feature allows a displayed reading to be frozen by an external event via a pin on the instrument's communication connector, e.g. a switch contact. Only the normal display mode value is frozen i.e. 'MAX' values are captured and displayed in the normal way. The reading is still frozen even if a 'MAX' value is being displayed when the external event occurs. If this is the case, the frozen reading can be viewed and/or transmitted by returning to the normal display mode using the "MAX" key after the event. The frozen value is cleared ready for the next test by pressing the "RESET" key.

The left side of the display will show 'Fr'; this stands for 'Freeze reading'. One of the following options may be set by pressing the "UP" and "DOWN" arrow keys:

- 'OFF' The freeze reading feature is disabled.
- 'CL' The reading will freeze when a low level appears on the input pin.
- 'OP' The reading will freeze when a high level appears on the input pin.

When set press the "MORE" key.

FIRST PEAK:

A first peak reading is useful in some force or torque applications. It detects the first peak event that occurs during a test, and then goes on to detect the ultimate peak (if it occurs). The results are accessed in the main display mode by pressing the "MAX" key. The first peaks are shown as 'MAX 1' at the bottom of the display, and ultimate peaks are shown as just 'MAX' at the bottom of the display (the same as normal peaks). When this function is enabled, the "MAX" key will now cycle the display through five values as opposed to the normal three values. All four max values can be cleared ready for the next test by pressing the "RESET" key. The thresholds that these peaks are detected and controlled by, are set in a later mode. To capture a first peak, the current force value has to fall back below the latest ultimate peak by a selectable percentage of full scale. The ultimate peak is simply the normal highest peak since the "RESET" key was pressed. A graph showing a typical 'first peak' test is shown in APPENDIX C.

The left side of the display will show 'PI'; this stands for 'Peak 1 st. One of the following options may be set by pressing the "UP" and "DOWN" arrow keys:

- 'OFF' The first peak feature is disabled.
- 'ON' The first peak feature is enabled.

When set press the "MORE" key.

STAND REVERSE:

The instrument is able to send a signal via the correct cable to reverse an attached motorised test stand, and send it back to its start position as set by the stand's limit switches. The stand can be reversed by an alarm point crossing, or by a special sample break detection method that uses the same algorithm as the first peak capture described above. Reversing using the alarm is executed in conjunction with the audio options as described in the ALARM section above. Basically, reversing

is triggered whenever the buzzer would normally emit a tone or 'beep' but in essence the actual audio output need not be enabled for this feature to work. The direction that the stand will be travelling before it is to be reversed must also be set in the next mode. The stand will only reverse once per test. The "RESET" key must be pressed before each test to re-trigger the reversing feature.

The left side of the display will show 'Sr'; this stands for 'Stand reverse'. One of the following options may be set by pressing the "UP" and "DOWN" arrow keys:

- 'OFF' The stand reverse feature is disabled.
- 'AL' The stand will reverse on an alarm point.
- 'br' The stand will reverse on sample break detection.

When set press the "MORE" key.

STAND REVERSE DIRECTION:

As described above, the test direction of the attached test stand must be set for the stand reverse feature so that the instrument can send the correct reverse signal.

The left side of the display will show 'Sd'; this stands for 'Stand direction'. One of the following options may be set by pressing the "UP" and "DOWN" arrow keys:

- 'UP' The stand will be travelling up when it is to be reversed.
- 'dN' The stand will be travelling down when it is to be reversed.

When set press the "MORE" key.

CAPTURE PERCENTAGE:

The capture percentage is the internal value used by the instrument for the threshold detection of 'first peak' and 'sample break'. It is expressed as the percentage of full scale drop, from the current peak. This algorithm causes an added effect that a trigger will not occur until the current peak has reached the set percentage of full scale, see APPENDIX C.

The left side of the display will show 'CP'; this stands for 'Capture percentage'. One of the following percentages may be set by pressing the "UP" and "DOWN" arrow keys:

- '1' '2' '5' '10' '20' '50'

When set press the "MORE" key.

OVERLOAD COUNTER:

When powered and in the display mode, the instrument constantly monitors the loadcell for an overload greater than 120% of full scale in either direction. These overload events are counted as they occur (up to a maximum of 5). This setting shows this counter value but it can not be changed.

The left side of the display will show 'OL'; this stands for 'Overload', the value of the counter will be shown to the right of the display.

When ready press the "MORE" key.

FACTORY DEFAULT:

The instrument can be totally reset to its 'leave the factory state' using this final mode. This can be useful if you get into trouble during instrument operation and wish to quickly return to a known state.

All of the instrument's default settings are highlighted in bold type in the Quick reference chart (APPENDIX A).

The display will show 'F-dEF'; this stands for 'Factory default'.

Pressing either the "UP" or "DOWN" arrow key will activate this function.

The instrument remembers all of its settings when powered off! In addition to all the settings described, the sub-mode position within each of the four main modes (DISPLAY, ALARM, COM and EXTRA) is also stored. This includes the MAX and UNITS settings in the display mode. Because these positions are also reset by this function, when the "UP" or "DOWN" arrow key is pressed, after a small delay the new setting position for EXTRA will have changed. This means that the instrument will now show the AUTO OFF mode display ('Ao YES') as described above. This is quite normal.

Assuming the default function has not been executed, this is the final 'EXTRX setting mode. Pressing the "MORE" key at this point will return the instrument to the AUTO OFF setting mode and the cycle repeats.

To return to the main display mode at any time press the "MODE" key twice, once to tell the instrument to change to a different mode and again to select "DISPLAY" as shown in red above the "MODE" key.

EXTERNAL 'SMART' LOAD CELLS:

The AFG is fitted with a '15 pin socket' for the connection of an external 'Smart' force or torque cell. Such a cell can only be obtained from Mecmesin or authorised distributor and then used with the AFG without the need for additional calibration of either the cell or the AFG itself. When powered on, the AFG automatically recognises any external cell that is connected. During the self test sequence the range of the connected cell will be displayed.

WARNING: The AFG must be OFF when connecting or disconnecting a Smart loadcell.

CABLES:

A full range of cables and accessories is available including:

RS-232 cables terminated by 9- or 25-way female D-TYPE connectors, MITUTOYO printer cables, foot switched, analogue output cables, external freeze reading trigger cables and TEST STAND reverse cables.

A multi-way expansion cable is also available for two or more of the above mentioned cables have to be connected at the same time.

FIXTURES:

A wide range of standard fixtures and accessories are available to cover most applications. In addition Mecmesin specialise in custom made items - please ask for more details.

In the unlikely event of any problems encountered, please contact Mecmesin direct, or your nearest authorised distributor for further help.

Y2K Compliance

The AFG and AFTI are not time-based products, and consequently are not affected by the Millenium.

Quick reference chart

Factory defaults are shown in bold type

RS-232 REMOTE AND FOOT SWITCH ASSIGNMENT CODES:

ALARM:						
Point (1):	0					
Point (2):	0					
Output mode:	OFF	Audio	LEd	both		
Band:	outbd	inbd				
Audio/stand reverse:		FAIL	PASS	PULSE		
COM:						
Baud rate:	1200	9600	19200	57600		
Units:	PLAIN	UNITS	16bit			
Termination:	NULL	Cr	LF	CrLF		
Byte delay:	byt 0	byt 1	byt 5	byt10	byt50	
Line delay:	LIN 0	LIN 1	LIN 2	LIN 3	LIN 4	LIN 5
Text mode select:	port	FILE				
EXTRA:						
Auto off:	Ao NO	AoYES				
Foot switch 1:	Ft1 1	Ft1 2	Ft1 3	Ft1 4	Ft1 5	
Foot switch 2:	Ft2 1	Ft2 2	Ft2 3	Ft2 4	Ft2 5	
Speed/average over time:	SP HI	SP LO	SP At			
Effective resolution:	Er HI	Er LO				
Display and output sign:	SnOFF	Sn ON				
Freeze reading:	FrOFF	Fr CL	Fr OP			
1st peak:	P1OFF	P1 ON				
Stand reverse:	SrOFF	Sr AL	Sr br			
Stand direction:	Sd UP	Sd DN				
Capture percentage:	CP 1	CP 2	CP 5	CP10	CP20	CP 50
Overload count:	OL 0	OL 1	OL 2	OL 3	OL 4	OL 5
Factory default:	F-dEF					

'1' (ascii 001 [01h]): "TXD"

'2' (ascii 002 [02h]): "UNITS"

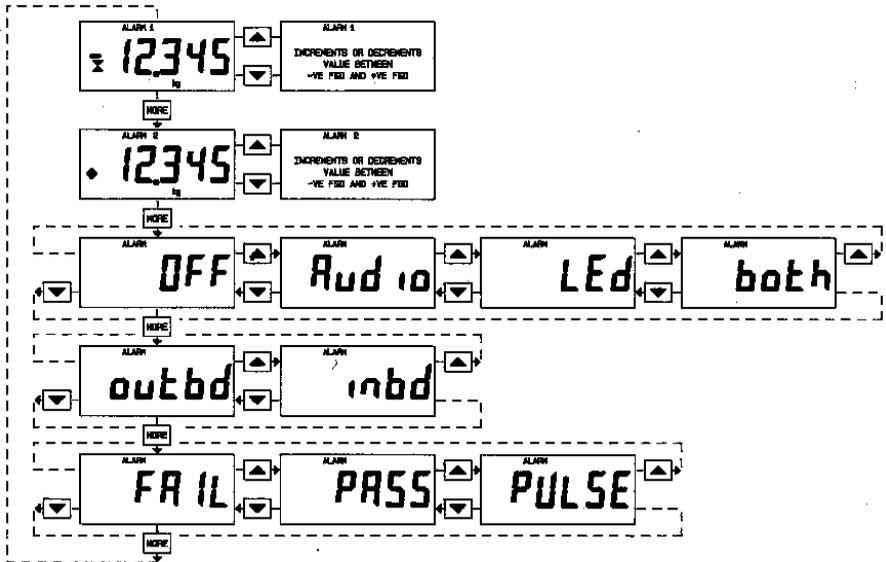
'3' (ascii 003 [03h]): "MAX"

'4' (ascii 004 [04h]): "RESET"

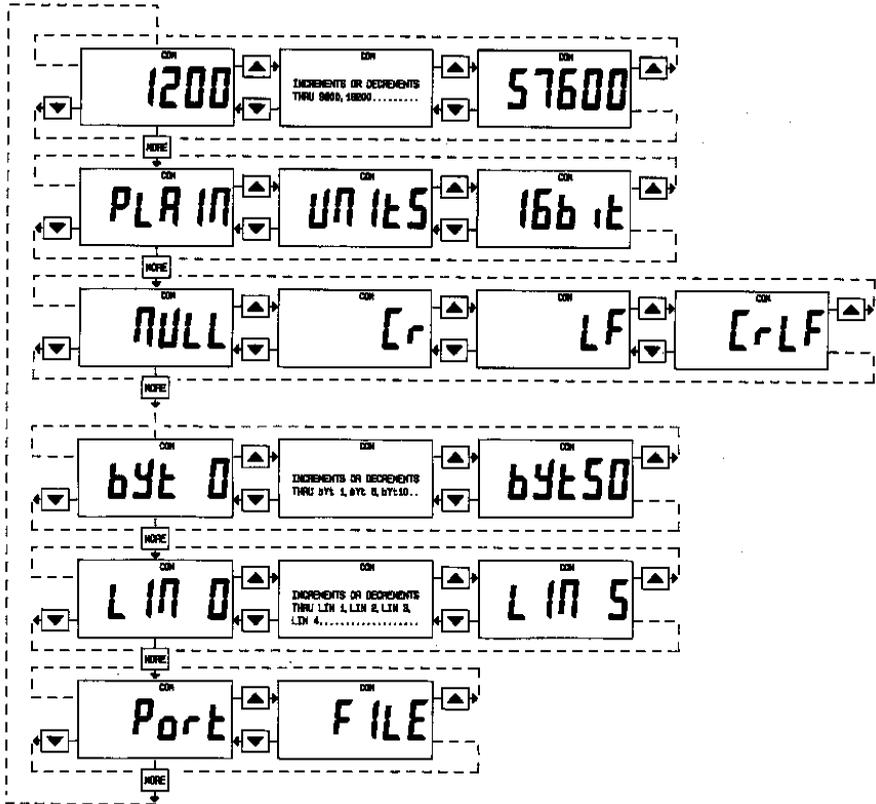
'5' (ascii 005 [05h]): "ZERO"

'?' (ascii 063 [3Fh]): Single reading request.

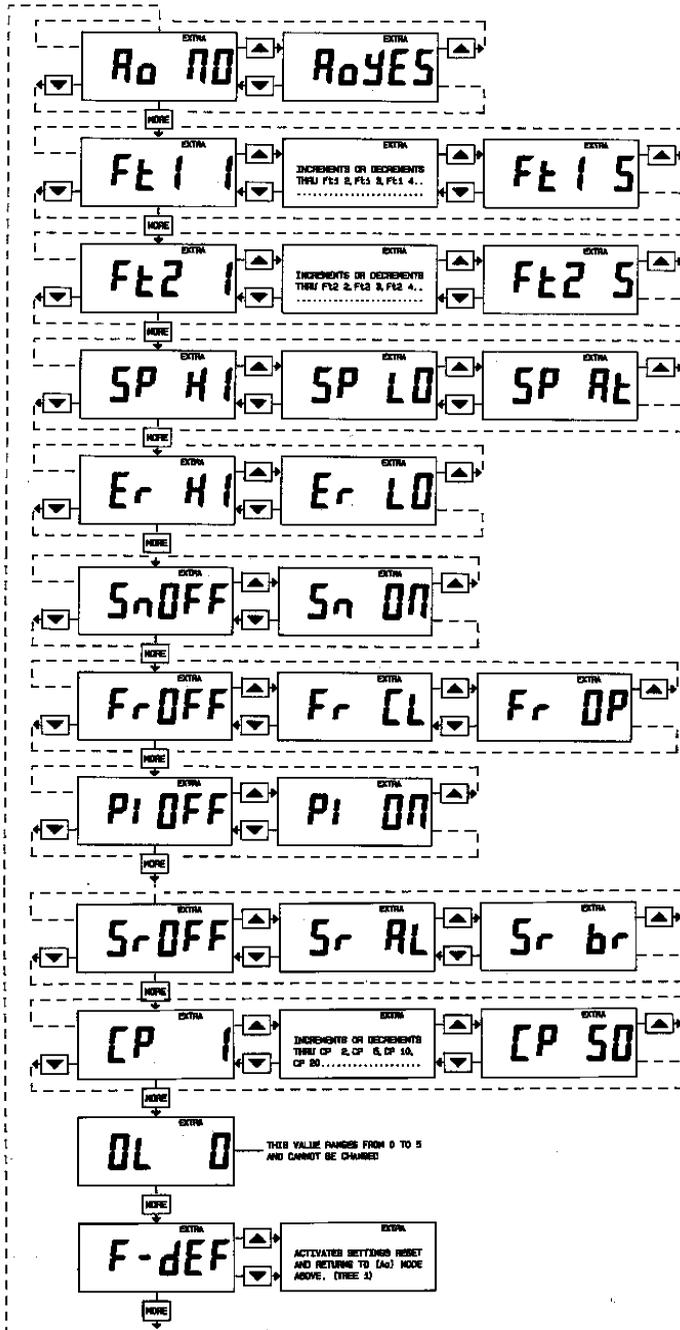
Alarm Mode Flow Chart



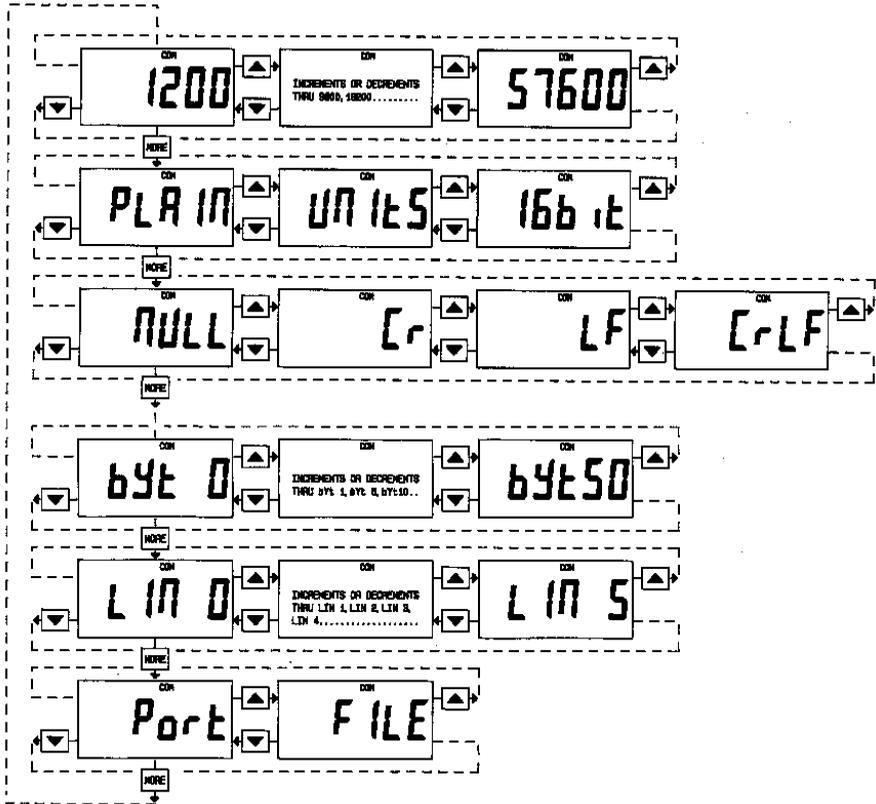
Com Mode Flow Chart



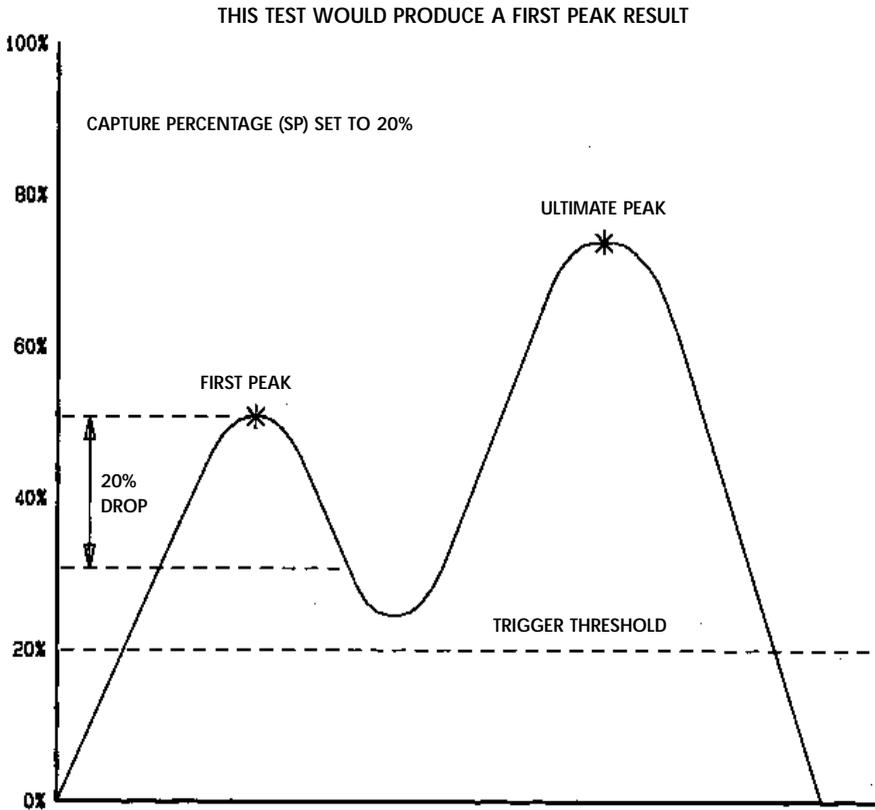
Extra Mode Flow Chart



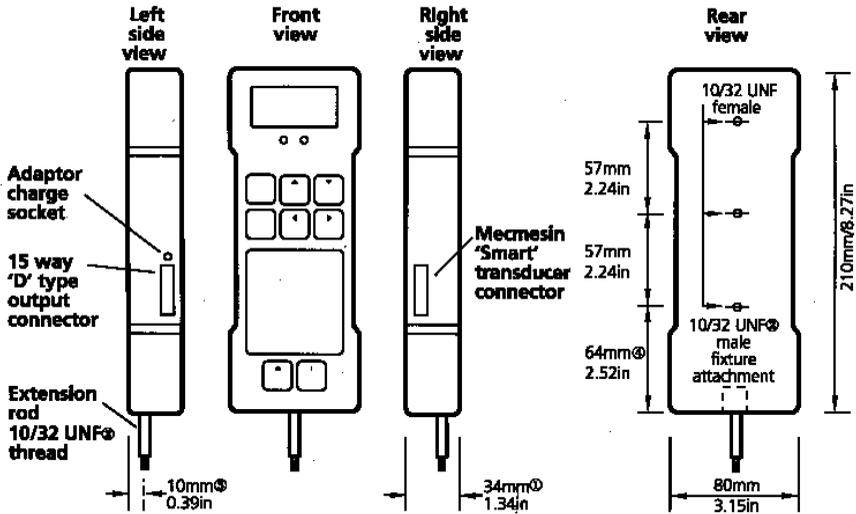
Com Mode Flow Chart



First Peak Example



Dimensions and Miscellaneous Details



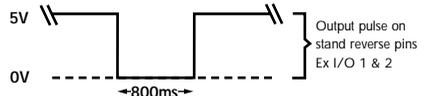
NOTE:
 ⌀ AFG 2500N: 42mm (1.65") ⌀ AFG 2500N: 15.5mm (0.61")
 ⌀ AFG 2500N: 5-T6 UNC thread ⌀ AFG 2500N: 80mm (3.15")

External I/O 1,2

These connections provide an 'ACTIVE LOW' pulse associated with an alarm or sample break event. External I/O 1 (pin 5) is associated with the 'STAND REVERSE' function and is used for the 'UP' signal as set in the 'STAND DIRECTION' mode on the AFG, while External I/O 2 (pin 6) is associated with 'DOWN'. They are CMOS compatible outputs and are normally used to reverse a MECMESIN test stand, however the signals may also be used to interface with other third party equipment such as a 'PCL'. Under normal conditions the signal on pin 5 or 6 is a logic '1' (5V). Upon an event being detected the selected pin is placed in a logic '0' (GND) state for 800ms before returning to a logic '1' state again. The pulse will not occur again until the AFG is 'RESET' and a new event is detected. See page 12 (Stand Reverse) for details. External I/O 1,2 (pins 5,6) are selected as active or inactive as set in the 'STAND DIRECTION' mode as mentioned above. Only one pin is used at one time, the inactive pin always stays in the logic '1' state.

Allocation for the pins on the 15-way 'D Type' Communication & Peripheral Connector

Pin Out:	
1	GND
2	RS232 Transmit
3	RS232 Receive
4	Freeze Reading Input
5	Stand Reverse Up Output
6	Stand Reverse Down Output
7	Mitutoyo Clock Output
8	Mitutoyo Data Output
9	Mitutoyo Ready Output
10	Mitutoyo Request Input
11	Foot Switch 1 Input
12	Foot Switch 2 Input
13	Analogue Output +ve
14	Analogue Output -ve
15	+5V (10mA Max)



Mecmesin Instrument Battery Packs

Appendix E:

The battery packs used with all Mecmesin Instruments are classified as secondary batteries and consist of 6 x 1.2V 600mAh nickel-cadmium, alkaline cells. The construction of the cells are completely sealed, preventing leakage of electrolyte and are maintenance free.

The appropriate life of each battery pack is 500 charge/discharge cycles but this is dependant on the storage and usage environmental conditions (temperature, storage time, humidity etc.).

If the instrument is not being used for more than two calendar months, the battery pack should be stored in a discharged state. Note: the approximate shelf discharge rate is 20% per month. After two months (+) storage, it is essential the instrument undergoes two charge/discharge cycles before use (to attain the correct battery pack discharge capacity).

The instrument can be used by charging the battery pack for approximately 14-16 hours, using the battery charger / mains adaptor provided. A fully charged battery pack will provide approximately 20 hours use between charges. Alternatively, continuous use of the battery charger (providing a constant trickle charge current) during the instrument operation, should not affect the battery pack life.

It is recommended that all instruments should be stored between 15 - 30°C in low humidity conditions, free from corrosive gasses. Failure to comply with these storage guidelines may accelerate the deterioration of the battery pack and could cause corrosion to the cell casing of even leakage of battery chemicals.

Battery pack safety information:

NEVER:

- Short Circuit
- Disassemble or deform cells
- Heat or incinerate
- Immerse in water
- Solder anything to the battery terminals
- Reverse battery pack or individual cell polarity
- Use alternative chargers other than those supplied by Mecmesin
- Use replacement parts other than those supplied by Mecmesin

IMPORTANT:

In the event of rupture, remove the instrument from the surrounding area and ventilate. Strong alkaline electrolyte may damage skin on contact. Seek medical advice if alkaline electrolyte is in contact with the eyes or if ingested.

Never dispose of any product containing nickel-cadmium batteries with 'normal' refuse. Contact your local Environmental Authority to determine the location of your appropriate nickel-cadmium disposal facility.

EC DECLARATION OF CONFORMITY

This is to certify that the:

AFG

associated and derivative products :-

AFT/I, PFI, MYOMETER, SMART CARD

Manufactured by:

**Mecmesin Limited, Newton House, Spring Copse Business Park
Slinfold, West Sussex RH13 7SZ
Tel: 01403 799979**

Conforms with the protection requirements of Council Directive 89/336/EEC, relating to Electromagnetic Compatibility, by the application of Competent Body Technical Report/Certificate No. 5044/10K2/2 dated 19th September 1995.

Tests were carried out to standards EN 55011:1991 and EN 50082-1:1992 by ERA Technology Ltd., Cleeve Road, Leatherhead, Surrey KT22 7SA.

Declaration Issue Date: 9th January 1997

Mecmesin Representative:..... *F.C. MOSE*.....

F.C. MOSE

Position:..... TECHNICAL DIRECTOR.....

Date..... *21 September 2001*..... Issue 02