YORK
Survey Supply

Nothing else measures up!

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Ref:.. \operat98\instructions 18\515450.qxp 05-01-18

YORK Survey Supply

Micro Covermeter

Operating Instructions

Unpacking

On receipt of your new Micro Covermeter 8020 unpack carefully and examine items for any possible transit damage. Any such damage should be notified to the supplier and carrier immediately.

Equipment

The following items are included in the specially designed carry case:
- Micro Covermeter 8020 instrument with integral re-chargeable battery
- Shoulder harness and wrist strap
- AC/DC adaptor for battery charging, with cable and connector
- K9 probe
- Connection cable
- Download cable and software
- Earphone

On receipt it should be noted that the on-board battery has approximately 20% of a full charge available which will be sufficient to enable the function check described below to be carried out. However, prior to first time use in the field, it is necessary to fully charge the unit.

Operation

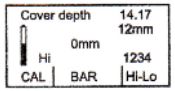
Basic operation and function check.
Connect the K9 probe.
There are sockets fitted either side of the hand grip and it will be noted that the socket configurations are different. It will only be possible to attach the probe to the correct socket. Having pushed the connector home, the outer ring of the connector is rotated to lock the plug to the socket.
Press the red Mode key which has the international ON symbol surrounded by a circular arrow. This key both turns the unit ON and OFF (with a longer key press) and also cycles through the display screens. On pressing this key there will be a high pitched sound and the screen will light up with the first display which will show the instrument name “MC 8020”, together with a software version number and the serial number of the instrument. Verify that the serial number corresponds with the number quoted on the delivery note and advise the supplier in case of any discrepancy.

FIRST SCREEN DISPLAY

MC 8020
Software Version
Serial Number

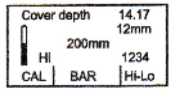
After this display the screen display below will be shown automatically within a few seconds.

PRE-CALIBRATION DISPLAY (TYPICAL)



Hold the K9 probe in air well away from any metallic object, and out of any magnetic field from, say, a fluorescent light or computer screen, and press the left hand yellow ‘Softkey’ button positioned under the word “CAL” on the display screen. The display will change to the sample below. At the time that the key is pressed there will be a high-pitched sound, and after the calibration process has been carried out by the instrument there will be a second, confirming, sound. (Please note that on every key press the instrument will indicate acceptance of the command by sounding and where a calculation or other task is being carried out there will be a second sound to confirm that such task has finished. The following text excludes further mention of these sounds.)

DISPLAY AFTER CALIBRATION (TYPICAL)



Now bring the K9 probe towards a metallic object and note the the display changes from 200* to a smaller number. If the metallic object is suitably large you will note that the display may reach 0. At the same time the smaller numbers, below and to the right of the main depth number, will increase from 0 to possibly, a five figure number such as 16000. This is the signal strength display and it will be discussed later.

This simple test will have enabled you to confirm that the instrument is functioning. You will see a battery outline above the word CAL and there may be some portion not “blacked out”. This denotes that the battery will need charging before the instrument is used in the field. You may now switch the instrument OFF by pressing the Mode key and holding this down for about 2 seconds. A shorter key press will just cycle you to the next available screen. If this happens press again for 2 seconds and the unit will switch OFF. You may switch the instrument OFF when in any screen. The instrument will switch itself OFF if there has been no key press for 10 minutes in

Low Cover Alarm/Quick Scan Mode
Function
This mode allows a cover value to be entered into the memory. When a Quick Scan is made over the area under test an audio alarm will sound when the reinforcement is found closer to the surface than the preset value. The cover at which such reinforcement is found is shown in the display. Approximately one square meter can be scanned in one minute in this mode.

Selection of Low Cover Alarm Mode
The function is selected in the Audio Menu on the Mode line. Pressing the middle softkey will cycle the display between OFF, COVER and LOW COVER. The depth is selected in the Measurement menu under Low Cover. Depths between 10 - 100mm may be entered. If inches are selected then the depths will be shown in increments of 0.05ins. Pressing and holding the middle softkey will cycle the numbers whilst individual key presses will increment the number by one unit.

Data Logging
Method Of Operation
Access the Cover depth screen and locate the bar as described above. Whilst over the bar (or in the orientation desired) press the yellow button on the K9 probe. A symbol of a floppy disc will be shown briefly to confirm that this reading has been added to the memory. To conform this you may now press the Mode key twice to enter the Data log screen. The last measurement logged will be visible on the screen. You may move backwards through the saved Logged measurements by pressing the right hand Softkey and then back up through the sequence by pressing the left hand Softkey.

You will note that the following pieces of information have been stored :

- Cover
- Bar Size
- Date
- Time Log Number

When the memory becomes full you will find that the oldest logged measurement is overwritten if this function has been selected in the Data Log menu. The Logged results can be downloaded to a PC using the Download cable which connects in place of the Probe

Downloading
Install the supplied software and follow the instructions

On-Site Power Supply
This optional extra enables the operator to carry on working with MC 8020 after the on-board power supply has been exhausted. The unit is connected to the MC 8020 via the same socket as the normal mains charger.

Earphone
This enables the operator to utilise the audio function of the MC 8020 when in a noisy working environment. The earphone is connected to the MC 8020 via the charging/accessory socket.

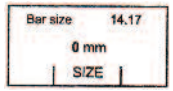
NB The operator should take care to ensure that when using the earphone a safe volume level is maintained.

order to conserve battery life. If this happens during use you must press the Mode key in order to bring the unit back into operation.

Setting Up a New Instrument

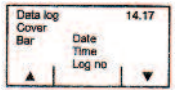
It will now be advisable to set up the instrument with the correct date and time, and also to put into the memory the set of instructions for bar size etc., that most closely suits your local environment and testing requirements.
Turn the instrument ON by pressing the Mode key. After the opening screen and then the basic GAL screen have appeared, press the Mode key again and you will come to the Bar size screen.

BAR SIZE SCREEN



Press the Mode key again and you will come to the Data log screen

DATA LOG SCREEN

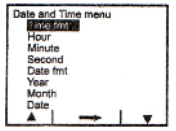


Press the Mode key again and you will arrive at the Main menu screen. The reason for passing through these opening screens before arriving at the Main Menu is that, once set up, you will wish most often to be able to SWITCH ON & GO without requiring to do any further setting up.

MAIN MENU SCREEN

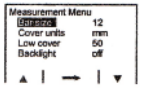
Pressing the right hand yellow 'Softkey' button above which can be seen on the display the icon of an inverted triangle, you will see that the highlight bar moves down the menu. Using the left hand side Softkey above which is the icon of a triangle, the highlighted bar moves up the screen. Use these Softkeys to highlight the Date and Time Menu and press the middle Softkey, marked "SELECT" on the display. This will bring up the Date and Time Menu screen.

DATE AND TIME SCREEN



The left and right hand Softkeys have the same function of moving the highlight to the desired line and the Right Facing Arrow above the middle Softkey will enable each line to be modified to the desired word or number. The time format is either 12 or 24 hour clock. The date format is either day/month/year (d/m/y) or month/day/year (m/d/y).
One further press of the Mode key returns you to the Main Menu where you should now highlight the Measurement Menu. The screen display will now be as below.

MEASUREMENT MENU SCREEN

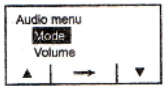


By default the cover units will be in mm. If this is as required then you may change the bar size to the known or an estimated bar size prior to commencing scanning. You may use the automatic routine to determine the bar size when scanning and thus may forego making any change at this time. If the cover units have been selected to be in mm then the bar size and low cover settings will automatically be shown in mm.
If the cover units have been set to inches then the low cover settings change to inches also. When in inch setting the bar size will be shown as a number between 0.2 and 1.6 inches. If you toggle between inches and mm you will see that the nearest mm bar size will be selected to the inch size entered and vice-versa.
The final cover units selection is an 0-1000 scale available for situations where the customer has set up his own table of depths to suit special requirements such as the checking of large diameter pipes or other pre-fabricated items.
The low cover setting is to activate the alarm at a preset depth and is used in conjunction with the audio menu to switch on this function.
The final option on this screen is to turn on and off the backlight function. This is a power hungry feature and should only be used where

the ambient light conditions demand. The backlight may remain on when the unit has switched to power save mode. After the unit has been switched off manually, the backlight feature defaults to 'off'.

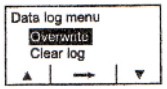
Now select the Audio Menu

AUDIO MENU SCREEN



This mode will allow the option of having the Audio tone turned off, or working whilst performing basic cover surveys, or having the alarm function when in the Lower Cover Alarm mode (see later chapter).
Volume can be modified between a figure of 0 and 20 and the noise level increases as the number cycle through the display when the Select button is held down.
The final option on the Main menu is the Data log menu.

DATA LOG SCREEN



The Overwrite function when ON allows the unit to overwrite earlier logged readings when the memory becomes full. If the Overwrite function is switched OFF then the data logging will cease when the memory is full and these readings will have to be downloaded to PC to enable space to be freed up.
Clear log completely clears the Data log memory and thus if the Clear log line is highlighted and the middle Softkey is pressed, then the Go symbol will change to Sure?. A second press will then delete all logged readings. If you do NOT wish this to happen, then press the Mode key to exit from this screen. When returning to the same screen it will be seen that the Clear log message has reverted to Go.

Switch On and Go

Measuring cover - manual bar selection

Connect the K9 Probe and switch on as described earlier. Perform the calibration process. Note that the basic CAL operation should be repeated before deep cover measurements, and also at regular intervals anyway. If you have already selected the units in which you are likely to be working as recommended earlier in the instructions, then you may commence searching for rebars. Identify the normal working face of the Probe and explore the concrete surface. In correct use the circular keypad with the yellow 'LOG' button will be on top. The yellow baseplate will wear in use to eventually show white. At this stage the stick-on baseplate should be replaced to prevent damage to the probe housing which may reduce the IP65 rating.
The Probe is correctly aligned over the rebar when the depth is reading is nearest to zero, or the tone of the Audio is at its highest pitch if this function is switched on. The smaller numbers referred to earlier as the signal strength may also be noted and can be used to obtain a very precise positioning of the probe. Note that at any time the size of the bar being displayed on the screen can be changed by pressing the middle Softkey above which is the word BAR.
If Data logging is taking place then when a strongest reading is found, using the signal strength, indicating that the probe is above the bar and positioned parallel with the axis of the bar, then the yellow button on the K9 probe is pressed. At this moment a floppy disc symbol will be displayed on the screen above the Hi-Lo indicator to confirm that a reading has been committed to the data log memory test.
When the instrument leaves the factory it is usual that the default setting of Hi will have been set and thus at CAL the depth 200mm will be shown with the probe in air. If this has been changed then the Lo setting will be indicated with a reading of 120mm after CAL and with the probe in air. It must be remembered that the last settings prior to the instrument being switched off will remain in the memory and will be the default settings until changed by the operator. The Hi-Lo setting key can be selected at any time to enable the searching to be refined to your requirements. It is not necessary at this time to perform a further CAL. However it is advisable to CAL whenever an important measurement is to be made. The instrument calibrates both ranges in succession and this can be noted on the display.
The K9 probe has a small red LED in the keypad. It will be seen that this activates after the top dead centre of a bar has been passed and the probe is moving away from the bar. It can be used to aid the identification of the exact position of the bar, though bars at the greater depths will not act upon this feature as well as bars closer to the surface. This LED feature taken together with the signal strength readings and the depth display will be the best combined method of locating a bar.

Automatic Bar Sizing

During normal operation one press of the mode key will bring up the bar size screen. Having used the previously discussed searching techniques to locate the direction and centre line of the bar you may now press the middle softkey under the word Size and the instrument will perform an automatic routine to estimate the size of the target bar. An indication that the instrument is performing the calculation is given and, providing always that an error message is not shown, then a revised bar size will be displayed on this screen accurate to one decimal point. Moving back to the cover depth screen you will note that the bar size has been up-dated to a whole number.
Errors that might be indicated will be that the bar size being targeted is either too near or too far for an accurate bar size determination to take place.

Probe Searching Methods
The K9 probe is placed on the surface to be examined with the circular keypad on the opposite face to that applied to the surface, and thus visible. It is most convenient to have the lead coming out of the probe towards the operator so that it lies under the wrist. The K9 probe can then be moved about on the surface until a reading is obtained. It is recommended that the Hi setting be selected in order that any bars within the range of the K9 probe may be detected. When performing automatic bar sizing it may be found desirable to change to the Lo setting to obtain a satisfactory result. Then the Probe is rotated at this point until the reading in the display is at the lowest number possible (nearest to zero) which will indicate that the Probe is now aligned with its longest face over the bar and with the bar centrally positioned. During the searching procedure additional help can be obtained from either the pitch of the audio if this feature has been selected, or by noting the signal strength numbers arriving at the largest number when directly over the bar and falling off towards zero when the bar is passed. The red LED on the probe will also signal when the top dead centre of the bar has been passed by giving a brief indication as the probe moves away. On sweeping back over the bar the LED again gives an indication as the probe moves away, this time in opposite direction. Mark the point at which the indicators suggest the top dead centre of the bar and now move the probe along this axis to confirm the position of the bar. Deflections may be found at points where bars at, say, 90 degrees are found. Mark these points for a later examination. Now look for bars running parallel to the first bar and gradually a grid can be drawn of the reinforcement.

Specification of K9 Probe

Range	6mm bar	5-108mm
	40mm bar	22-185mm
	Measurement is to the bar surface, ignoring ribs	
Accuracy	± 1mm up to 60mm ± 2mm up to 120mm ± 3mm up to 160mm ± 4mm above 160mm	
Display	Metric display is in whole millimetres. Imperial display is in inches with 10ths displayed	
Cover range for bar size calculation	8mm to 22mm minimum dependant on bar diameter, although this can be overcome by the introduction of any spacer if the bar is to close to the surface of the concrete. Bar size resolution is to ±0.1mm 6mm bar - 60mm maximum 40mm bar - 80mm maximum	
Bar resolution	Bar spacing resolution is dependent on bar size and cover. Some examples of resolution performance	

Bar Diameter	Cover	Minimum Bar Spacing
16mm	60mm	70mm
16mm	100mm	110mm
25mm	130mm	150mm

Bar sizing accuracy	±0.5mm to ±1.5m dependent on bar size and cover depth under ideal circumstances. Error codes indicate to the user if there is too much or to little cover for a bar size to be estimated. Otherwise the bar size is indicated and the current bar size used by the unit to estimate cover is updated automatically.
Ferrous aggregates	Ferrous concrete effects are fully compensated for and cause no significant errors
Search methods	By reference to the screen display, the LED indicator on the K9 probe or by use of the Audio function

Battery
The instrument contains a rechargeable battery which is not user serviceable or user interchangeable. When correctly charged the unit will give in excess of 20 hours operating life in normal temperatures.

Battery Indication
A symbol is visible in the standard Cover depth display shows the approximate state of the battery, and the AC/DC adaptor supplied should be used to keep the battery as fully charged as possible to reduce the likelihood of finding that whilst on site the unit fails because of a low battery. This unit works from 100-240 AC Volts and can therefore be plugged into a 110 volts supply, for example from an on-site generator.

Performance characteristics
The instrument is fully stabilised against battery voltage reduction unitl close to the point of exhaustion. A warning light on the front face of the instrument and showing through a small red outlined circle, will indicate when the unit should be switched off in order to conserve any readings which has been commited to the Data log memory.

Charging
The AC/DC adaptor supplied has a connector which it will be seen attaches to the opposite socket to the one to which the Probe is fitted. Push home and connect to the mains supply. The MC 8020 should preferably by switched off during the charging process as shortly after charging commences the symbol of the battery will become "full" and you may remove the charger too soon. If this happens you will see the battery symbol quickly show that a full charge has not yet been achieved.