CHECKMATE™ is a trademark of Rohrback Cosasco Systems, Inc.

CORROSOMETER® and CORRDATA® are registered trademarks of Rohrback Cosasco Systems, Inc.

Windows® is a registered trademark of Microsoft Corporation.

No part of this manual may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, for any purpose, without the express written permission of Rohrback Cosasco Systems, Inc.
## Contents

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapter 1</td>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Chapter 2</td>
<td>Specifications</td>
<td>3</td>
</tr>
<tr>
<td>Chapter 3</td>
<td>Installation</td>
<td>5</td>
</tr>
<tr>
<td>Chapter 4</td>
<td>System Configuration</td>
<td>9</td>
</tr>
<tr>
<td>Chapter 5</td>
<td>Reading Probes</td>
<td>13</td>
</tr>
<tr>
<td>Chapter 6</td>
<td>Custom Probe Configuration</td>
<td>24</td>
</tr>
<tr>
<td>Chapter 7</td>
<td>Displaying Data</td>
<td>28</td>
</tr>
<tr>
<td>Chapter 8</td>
<td>Transferring Data to the PC</td>
<td>30</td>
</tr>
<tr>
<td>Chapter 9</td>
<td>Quick Troubleshooting Guide</td>
<td>32</td>
</tr>
<tr>
<td>Appendix A</td>
<td>EC-Type Examination Certificate</td>
<td>33</td>
</tr>
<tr>
<td>Appendix B</td>
<td>Interconnect Control Drawing</td>
<td>38</td>
</tr>
</tbody>
</table>
Figures and Tables

Figure
1.1 CHECKMATE™ Instrument ............................................. 2
3.1 CHECKMATE™ Battery Cover ............................................ 7
4.1 CHECKMATE™ Function Keys ........................................... 9

Table
5.1 Corrosometer© Probe Types and Spans ............................... 23
Chapter 1
Introduction

The CheckMate™ is the next evolution in handheld corrosion monitoring instruments. It is capable of reading all Corrosometer® (electrical resistance) corrosion probes with an enhanced resolution of 0.1 probe divisions (0.01% probe span). The CheckMate™ also features a reduced measurement cycle while still maintaining high accuracy. As with its predecessors, this portable unit has built-in memory that stores readings for later retrieval, however the CheckMate™ can store readings for up to 204 individual probes, with 10 readings per probe. Furthermore, the CheckMate™ makes transferring its stored data to a PC a much simpler process than before, using the included Corrdata® CSV program.
Figure 1.1 CheckMate™ Instrument
Chapter 2
Specifications

CheckMate™ Instrument

Physical

✓ Dimensions: 7.75"H x 4.30"W x 2"D (196.8 mm x 109.2 mm x 50.8 mm)
✓ Weight: 1.5 lb. (0.68 kg)
✓ Temperature range:
  - Operating: 0°F to 122°F (-18°C to 50°C)
  - Storage: 0°F to 150°F (-18°C to 70°C)
✓ Splash-proof enclosure with sealed membrane keyboard

Electrical

✓ Compatible with all Corrosometer© probes
✓ Measurement resolution: 0.1 probe divisions
  (0.01% of probe span)
✓ Measurement repeatability: ± 1 division
  (0.1% of probe span)
✓ Rapid measurement cycle of 30 seconds
✓ Memory for up to 204 probes (with 10 readings per probe)
✓ Reads probes on extension cable of up to 200ft (61m)

✓ Power Supply: 6 AA Alkaline cells
✓ Battery Life: 900 probe readings (typical)
✓ Automatic power shutoff in 2 minutes after reading or non-use
✓ Four Line Liquid Crystal Display (LCD)
✓ Supplied with:
  ▪ Corrosometer© test probe
  ▪ 6 AA batteries
  ▪ CheckMate™ to computer cable (including DB25 to DB9 adapter)
  ▪ CD-ROM with Corrdata© CSV PC software and manual

Hazardous Area Certification
✓ Intrinsically safe
✓ North America: UL/ULc (IEC) AEx and Ex ib IIC T4
✓ Europe: ATEX EEx ib IIC T4
✓ CE compliant (EMC)
Chapter 3
Installation

NOTE: Each CheckMate™ instrument is carefully tested, inspected and packaged prior to shipment. Before unpacking the instrument, please inspect the packaged materials for shipping damage and retain all damaged packaged materials to support any claim against your freight carrier should this become necessary.

Unpacking

Carefully remove the instrument from its package. Included in the package you should find:

CheckMate™ Instrument

✓ Handheld CheckMate™ instrument
✓ Corrosometer© test probe
✓ 6 AA batteries
✓ CheckMate™ to computer cable (including DB25 to DB9 adapter)
✓ CD-ROM with software and manual

Intrinsic Safety

The CheckMate™ instrument is designed for safe use in the harshest of field environments. It has undergone a rigorous design phase to obtain certification for Class I, Zone 1 hazardous locations. The hazardous area certifications for North America are:

UL/ULc (IEC) AEx and Ex ib IIC T4

And for Europe: ATEX EEx ib IIC T4
CE (EMC)

Care must be taken with intrinsically safe systems to maintain their carefully designed integrity. The major features to note:
1. Batteries must be replaced in a safe area even though the unit is intrinsically safe, since standard alkaline batteries are only safe if housed in a suitable enclosure.

2. The instrument is intrinsically safe when used with six 1.5V, size AA alkaline batteries: Duracell MN1500, Energizer E91 or EN91, or Ray-O-Vac 815. Batteries must be changed only in non-hazardous area. Do not mix batteries of different age or part number.

3. Absolutely no substitution of parts or unauthorized repairs may be undertaken or the certifications are rendered invalid.

4. Reference EC-Type examination certificate for conditions of safe use. (See Appendix A)

Battery Installation

The CheckMate™ is supplied with a set of six 1.5 Volt AA alkaline batteries. To install these batteries, remove the access panel on the back of the unit (see Figure 3.1) with the provided Allen Key and install the batteries with the polarities as indicated on the unit.
A secondary, back up battery for stored readings in the CheckMate™ is provided by lithium batteries mounted internally within the unit. These batteries should provide 7-10 years of back up capacity. Replacement of these batteries requires the unit to be returned to Rohrback Cosasco Systems or an authorized dealer.
To check that the unit is operational, press the **ON** button. The screen should appear as shown below:

![Checking BATTERIES
Please Wait](image)

If the batteries are low or in need of replacement, a warning screen will appear as follows:

![WARNING!
LOW BATTERIES
REPLACE NOW!](image)

If batteries are good, the instrument will sequence directly to the **Standby** display as below:

![ROHRBACK COSASCO
SYSTEMS](image)

The battery is tested both at initial switch on, and during probe measurement.
Chapter 4
System Configuration and Setup

CheckMate™ Keypad

The CheckMate™ features a 34-key keypad, with keys for the alphabet A through Z and numerals 0 through 9. The numerals are shared with letters F through P and S. Switch between these letters and the numbers using the “Alpha/Numeric” key. There are also four soft keys, F1 through F4 (as shown below). The soft keys are multi-function keys used to make on-screen selections.

![Figure 4.1 CheckMate™ Function Keys](image)

Setting the Time and Date on the CheckMate™

The CheckMate™ has its own clock so that individual probe readings are automatically time and date stamped.

To set the internal clock for Time and Date:

From the Standby display, press **SetUp (F4)** to go to the **Mate Configuration** display:

![Mate Configuration](image)
Press Set Mate (F3) to go to the Mate Settings display:

```
Mate Settings
Set    Set    Clr
Units  Time   Mem  Exit
```

Press Set Time (F2) to go to the Mate Clock Set To display:

```
Mate Clock Set To
mm dd, yyyy  hh:mm:ss
Read  Set  Exit
```

Press Set (F2) to go to the Set Mate Date & Time display:

```
Set Mate Date & Time
YYMMDDHHMMSS
>   <
Enter  Clr  BkSp  Exit
```

From the keyboard, enter the last two digits of the year followed by the number of the month followed by the date followed by the time in hours followed by the time in minutes followed by 00. When the time is set correctly, press Enter to start the clock. To update the clock on the Mate Clock Set To display, press Read (F1). Press Exit to go to the Mate Settings screen. Press Exit again to return to the Mate Configuration screen. Press Exit again to return to the Standby screen.

**NOTE:** The hour is set on the military 24 hour clock, where 00:00 hours is midnight at the start of the day, and 12:00 is mid-day.
Setting the Engineering Units

To set the Engineering Units:

From the Standby display, press SetUp (F4) to go to the Mate Configuration display:

```
Mate Configuration

Man         Set          _
Conf         Mate         Exit
```

Press Set Mate (F3) to go to the Mate Settings display:

```
Mate Settings

Set      Set       Clr
Units    Time      Mem  Exit
```

Press Set Units (F1) to go to the Set Metal Loss Units display:

```
Set Metal Loss Units

Present Setting
>xxxx<

Mils    mm    um   Exit
```

Select and press Mils (F1) for mils (0.001") and mils/year or press mm (F2) for millimeters and mm/year or um (F3) for micrometers and um/year.

After the selection is made and correctly displayed on the display, press Exit to set the units and return to the Mate Settings display. Press Exit again to return to the Mate Configuration display. Press Exit again to return to the Standby display.
Clearing Memory on CheckMate™

Normally it will not be necessary to clear the memory on the CheckMate™ unless extraneous entries have been made, for example, when initially experimenting with the system. Alternatively, if the equipment is to be transferred to a new location, then it is recommended to clear the memory to avoid confusion with any previously collected data. To clear the memory, proceed as follows.

From the Standby display, press SetUp (F4) to go to the Mate Configuration display:

```
Mate Configuration

Man  Set
Conf  Mate  Exit
```

Press Set Mate (F3) to go to the Mate Settings display:

```
 Mate Settings
Set  Set  Clr
Units  Time  Mem  Exit
```

Press Clr Mem (F3) to go to the clear memory confirmation screen:

```
WARNING!
This will ERASE all Of the Mates Data!
Clear  Abort
```

Press Clear (F1) to clear all memory.
Note: this will clear readings stored in internal memory.
Chapter 5
Reading CORROSOMETER® Probes

CORROSOMETER® probes can be read using three different procedures: Quick, ID and New.

The Quick reading allows the user to read a probe and view the result in approximately 30 seconds. The result of a Quick read can also be saved for future reference, calculation of corrosion rate and/or downloading to a PC.

To do a Quick read-

From the Standby screen, press Read (F1) to go to the What To Read? Display:

```
What To Read?

Probe Rev.   Exit
```

Press Probe (F1) to go to the Read Probe By display:

```
Read Probe By

ID  Quick  New  Exit
```
Press **Quick (F2)** to go to the **Select Probe Type** display:

![Select Probe Type]

Select and press **A (F1)** for Wire Loop type probes or press **B/C (F2)** for Tube Loop/Strip Loop type probes or **D (F3)** for Cylindrical type probes or **G (F4)** for Model 610 Atmospheric Probes only. If you are unsure of the element type, this information can be found on the probe packaging, etched on the probe body adjacent to the connector or in Table 5.1 Probe Type Identification.

Immediately after pressing the key for the probe type selection the instrument will automatically go to the **“Measure”** mode and display:

![Taking Probe Reading]

A series of > symbols will accumulate from left to right across the display to indicate the progression of the measurement function. At the conclusion of the measurement function (approximately 30 seconds) the CheckMate™ will display the probe reading and the check reading in divisions. A typical displayed reading is shown below:

![Div: 214.7 Chk: 803]

The **Div:** reading is the cumulative metal loss (corrosion) of the probe element on a scale of 1,000 divisions. In the example above 214.7/1000 (two-hundred fourteen point seven one-thousandths of the element has been consumed by corrosion. In engineering units this metal loss would be expressed as 214.7/1000 or 0.2147 times the probe span.
The **Chk**: reading is a measure of probe functionality or integrity. The initial value for CORROSOMETER® probes is 800 ±50 divisions. It is recommended that a **CHECK** reading be taken and recorded immediately after unpacking a probe as it will be the value to which all subsequent **CHECK** readings will be compared. The general rule is that the **CHECK** reading should not vary by more than 1% (±10 divisions) from the initial value. If there is more than a 1% change, it is an indication of a loss in probe integrity and replacement is required.

To reread the probe, press the **Read (F1)** key and another reading will be taken and displayed.

If the reading is to be saved in memory for later viewing, for corrosion rate calculation or for downloading to a PC the following procedure should be followed:

Press the **Save** key to go to the **Enter Probe Span** display:

```
Enter Probe Span
> < mils

Enter Clear BkSp Exit
```

From the keypad, enter the span of the probe element in **mils**. The span in mils is shown on the probe packaging or it can be found in Table 5.1. Note: If Type G for the Model 610 Atmospheric Probes is selected, the span is entered in Angs (Angstroms).

Pressing **Clear (F2)** will clear the value previously set so that a new span can be entered. Pressing **BkSp (F3)** backs up one space each time it is pressed so that a change can be made. Pressing **Exit (F4)** returns to the **Read Probe By** display.

Press **Enter** to go to the **Enter Probe ID** display:

```
Enter Probe ID
>***< 51-255

Enter Clr BkSp Exit
```
The instrument will automatically assign the next free ID number. If this is not acceptable you may press \texttt{Clr (F2)} and manually assign an ID from the keypad. Pressing \texttt{BkSp (F3)} backs up one space for each time it is pressed so that a change can be made. Pressing \texttt{Exit (F4)} returns to the \texttt{Read Probe By} display.

Press \texttt{Enter (F1)} to go to the \texttt{Enter Probe Tag} display

Note: If an invalid ID has been selected, the \texttt{Invalid ID} display appears:

\begin{center}
\begin{tabular}{|l|}
\hline
\textit{Invalid ID} \\
ID must be 51-255 \\
Try Again Exit \\
\hline
\end{tabular}
\end{center}

Press \texttt{Try Again (F1)} to return to the \texttt{Enter Probe ID} display. Pressing \texttt{Exit (F4)} returns to the \texttt{Read Probe By} display.

Note: If the ID selected has already been configured, the \texttt{This ID Already Configured} display appears:

\begin{center}
\begin{tabular}{|l|}
\hline
\textit{This ID Already Configured} \\
Try Cont Again Exit \\
\hline
\end{tabular}
\end{center}

Press \texttt{Cont (F1)} to continue to the \texttt{Enter Probe Tag} display if you want to continue to use this ID number.

Press \texttt{Try Again (F1)} to return to the \texttt{Enter Probe ID} display. Pressing \texttt{Exit (F4)} returns to the \texttt{Read Probe By} display.
The **Enter Probe Tag** display allows the user to enter up to twelve (12) alpha or numeric characters to uniquely identify the monitoring location. This can be a Tag No., location or process name.

Pressing **Clr (F2)** clears a previously entered ID. Pressing **BkSp (F3)** backs up one space for each time it is pressed so that a change can be made. Pressing **Exit (F4)** returns to the **Read Probe By** display.

Press **Enter (F1)** to go to the **Enter Probe Alloy** display:

![Enter Probe Alloy Display](image)

The **Enter Probe Alloy** display allows the user to enter up to eight (8) alpha or numeric characters to identify the alloy of the probe element for reference purposes only. It does not affect the calculation of corrosion rates.

Pressing **Clr (F2)** clears a previously entered ID. Pressing **BkSp (F3)** backs up one space for each time it is pressed so that a change can be made. Pressing **Exit (F4)** returns to the **Read Probe By** display.

Press **Enter** to go to the **Probe Reading Saved** display:

![Probe Reading Saved Display](image)

Where XXX is the ID of the location and XXXXXXXXXXX is the Probe Tag.

Press **Exit** to return to the **Read Probe By** display.
To read a probe by ID-

Press ID (F1) to go to the Enter ID> < 51-255 display:

```
Enter ID>  < 51-255
Enter Clr BkSp Exit
```

Enter the ID number of the probe and press Enter (F1)

The CheckMate™ will check the ID number to determine its validity. If the ID is valid, the Connect To Probe display will appear. If the ID is found to be invalid, the ID Not Found message will appear and the Exit key should be pressed to return to the Taking Probe Reading display.

```
Connect To Probe
ID: xxx xxxxxxxxxxxxx
Start Exit
```

After connecting the CheckMate™ to the probe, press the Start key to begin the measurement function and the Taking Probe Reading screen will appear

Pressing the Exit key will return to the Read Probe By screen:

```
Taking Probe Reading
   Please Wait
|>>>  |
```

A series of > symbols will accumulate from left to right across the screen to indicate the CHECKMATE™
progression of the measurement function  At the conclusion of the measurement function (approximately 30 seconds) the CheckMate™ will display the probe reading, the current check reading and the initial check reading in divisions. The initial check reading in divisions will be shown in parenthesis (). A typical display is shown below:

```
Div: 273.4
Check: 812 (813)
Read More Save Exit
```

where 273.4 is the Metal Loss reading in divisions, 812 is the present Check reading in divisions and (813) is the initial Check reading in divisions.

Pressing the Read (F1) key will return to the Taking Probe Reading display and automatically start a new measurement cycle. Press the Save (F3) to go to a display that allows the user to save the readings by pressing the Yes (F1) key which will go directly to the Probe Reading Saved display which is explained below or pressing the No key will discard the reading and return to the Read Probe By display. Press the More (F2) key to go to the MLoss and Rate display:

```
MLoss: units
Rate: units
Read Save Exit
```

The cumulative metal loss, MLoss, in the engineering units originally selected will be displayed and the corrosion rate between the previous probe reading and the present probe reading will be automatically calculated. The corrosion rate, Rate, will be displayed in the engineering units originally selected per year.

**Example:** A T10 CORROSONOMETER® probe (span 5 mils) was installed in a refinery overhead system on March 1, 2004. The initial probe reading of 97.3 divisions and check reading of 813 was made on March 1, 2004. On March 30, 2004, the probe was again read and the results were as shown in the typical display above, i.e. Div: 273.4 and Check: 812. The corrosion rate calculated between these two measurements would be equal to 10.7 mpy (mils per year).

The display for the example above would show:
The present probe reading will be saved with the ID number and Tag Number as displayed. Pressing the Exit key will return to the Read Probe By display for reading of other probes.

To read a New probe

Press New to go to the Select Probe Type display:

The probe type selections are W80 WIRE, W65 WIRE, W45 WIRE, W40 WIRE, TF50, TF5, T50 CYLINDRICAL, T20 CYLINDRICAL, T10 CYLINDRICAL, T8 TUBE LOOP, T4 TUBE LOOP, S50 FLUSH, S40 FLUSH, S20 FLUSH, S10 FLUSH, S8 STRIP LOOP, S8 FLUSH, S4 STRIP LOOP, S4 FLUSH, S4 ATMOSPHERIC, OTHER and TEST PROBE CO. You may scroll up through the list by repeatedly pressing the Up (F2) key or down through the list by repeatedly pressing the Down (F3) key. When the probe element selection is displayed, press the Enter (F1) key to accept the selection. The CheckMate™ will automatically proceed to the next display based on the selection.

If a standard CORROSOMETER® probe (element) is selected, the CheckMate™ will automatically go to the measure mode and the Taking Probe Reading – Please Wait display will appear:
A series of > symbols will accumulate from left to right across the screen to indicate the progression of the measurement function. At the conclusion of the measurement function (approximately 30 seconds) the CheckMate™ will display the probe Metal Loss (MLoss:) in the engineering units originally selected, the in divisions (Div:) and the current check reading (Chk:) in divisions. A typical display is shown below:

MLoss: 1.37 mils
Div: 274.3 Chk: 812

If a TF5 or TF50 high sensitivity atmospheric CORROSOMETER® probe has been selected, the CheckMate™ will go to a special Enter Probe Span display:

Enter Probe Span
> < Angstroms

Using the numeric portion of the keypad, enter the probe span in Angstroms (Å). The packaging for the TF5 and TF50 CORROSOMETER® provides the specific span for the probe. Alternatively, the nominal span can be used without appreciable error. Pressing Enter (F1) will cause the CheckMate™ to automatically go to the measure mode and the Taking Probe Reading – Please Wait display will appear:
A series of > symbols will accumulate from left to right across the screen to indicate the progression of the measurement function. At the conclusion of the measurement function (approximately 30 seconds) the CheckMate™ will display the probe Metal Loss (MLoss:) in angstroms, the reading in divisions (Div:) and the simulated check reading (Chk:) of 800 divisions (TF5 and TF50 high-sensitivity probes do not provide a check reading). A typical display is shown below:

MLoss: 95.0
Div: 40.0
Chk: 800

If OTHER is selected from the probe type selections on the Select Probe Type display the CheckMate™ will go to a second Select Probe Type display that allows the select the specific probe element conversion equation required and enter specific probe spans (in mils) that may be special. The display is shown below:

Select and press A (F1) for Wire Loop type probes or press B/C (F2) for Tube Loop/Strip Loop type probes or D (F3) for Cylindrical type probes. If you are unsure of the element type, this information can be found on the probe packaging, etched on the probe body adjacent to the connector or in Table 5.1 Probe Type Identification.
<table>
<thead>
<tr>
<th>CORROSOMETER or CORROTEMP Probe Element</th>
<th>Type</th>
<th>Span (mils)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strip Loop S4</td>
<td>C</td>
<td>1</td>
</tr>
<tr>
<td>Flush Element S4</td>
<td>B</td>
<td>2</td>
</tr>
<tr>
<td>Atmospheric Element S4</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Strip Loop S8</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Tube Loop T4</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>Flush Element S8</td>
<td>B</td>
<td>4</td>
</tr>
<tr>
<td>Atmospheric Element S8</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Tube Loop T8</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>Flush Element S10</td>
<td>B</td>
<td>5</td>
</tr>
<tr>
<td>Cylindrical Element T10</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Flush Element S20</td>
<td>B</td>
<td>10</td>
</tr>
<tr>
<td>Cylindrical Element T20</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Wire Loop Element W40</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>Wire Loop Element W45</td>
<td>A</td>
<td>11.25</td>
</tr>
<tr>
<td>Flush Element S40</td>
<td>B</td>
<td>20</td>
</tr>
<tr>
<td>Wire Loop Element W80</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>Cylindrical Element T50</td>
<td>D</td>
<td>25</td>
</tr>
</tbody>
</table>

Table 5.1 CORROSOMETER and CORROTEMP Probe Types and Spans

**CAUTION:** CORROSOMETER Model 2500, 3500, or 4500 probes are designated as a "cylindrical" element, not a "tube" element which refers only to "tube loop" elements.
Chapter 6
Custom Probe Setup

Probes may also be configured manually by following the procedure below:

From the **Standby** display, press **SetUp (F4)** to go to the **Mate Configuration** display:

```
Mate Configuration

Man    Set
Conf    Mate   Exit
```

Press **Man Conf (F1)** to go to the **Enter Probe ID** display:

```
Enter Probe ID

>***<  51-255

Enter  Clr  BkSp  Exit
```

Enter a number between 51 and 255 and press **Enter (F1)** to go to the **Enter Probe Tag** display.

Note: If an invalid ID is entered, it is automatically cleared upon pressing **Enter (F1)**.

Note: If the ID selected has already been configured, the **This ID Already Configured** display appears:
Configured

Try
Cont Again Exit

Press Try Again (F2) to return to the Enter Probe ID display or Cont (F1) to continue to the Enter Probe Tag display and reconfigure the ID. Pressing Exit (F4) returns to the Mate Configuration display.

Enter Probe Tag
> <

Enter Clr BkSp Exit

In the Enter Probe Tag display, enter up to twelve (12) alpha or numeric characters to uniquely identify the monitoring location. This can be a Tag No., location or process name. Pressing Clr (F2) clears a previously entered ID. Pressing BkSp (F3) backs up one space for each time it is pressed so that a change can be made. Pressing Exit (F4) returns to the Mate Configuration display.

Press Enter (F1) to go to the Select Probe Type display:

Select Probe Type
> <

SCROLL
Enter Up Down Exit

The probe type selections are W80 WIRE, W65 WIRE, W45 WIRE, W40 WIRE, TF50, TF5, T50 CYLINDRICAL, T20 CYLINDRICAL, T10 CYLINDRICAL, T8 TUBE LOOP, T4 TUBE LOOP, S50 FLUSH, S40 FLUSH, S20 FLUSH, S10 FLUSH, S8 STRIP LOOP, S8 FLUSH, S4 STRIP LOOP, S4 FLUSH, S4 ATMOSPHERIC, OTHER and TEST PROBE CO. You may scroll up through the list by repeatedly pressing the Up (F2) key or down through the list by repeatedly pressing the Down (F3) key. When the probe element selection is displayed, press the Enter (F1) key to accept the selection.
If a CORROSOMETER® probe (element) is selected, the CheckMate™ will automatically proceed to the **Enter Probe Alloy** display:

```
Enter Probe Alloy
> <
Enter Clr BkSp Exit
```

The **Enter Probe Alloy** display allows the user to enter up to eight (8) alpha or numeric characters to identify the alloy of the probe element for reference purposes only. It does not affect the calculation of corrosion rates.

If a TF5 or TF50 high sensitivity atmospheric CORROSOMETER® probe has been selected, the CheckMate™ will go to a special **Enter Probe Span** display:

```
Enter Probe Span
> < Angstroms

Enter Clr BkSp Exit
```

Using the numeric portion of the keypad, enter the probe span in Angstroms (Å). The packaging for the TF5 and TF50 CORROSOMETER® provides the specific span for the probe. Alternatively, the nominal span can be used without appreciable error.

If OTHER is selected from the probe type selections on the **Select Probe Type** display the CheckMate™ will go to a second **Select Probe Type** display that allows the select the specific probe element conversion equation required and enter specific probe spans (in mils) that may be special. The display is shown below:

```
Enter Probe Type > <
(A, B, C,D or G)

Type
Enter Clr List Exit
```

Enter A for Wire Loop type probes or enter B or C for Tube Loop/Strip Loop type probes or enter D for Cylindrical type probes. If you are unsure of the element type, this
information can be found on the probe packaging, etched on the probe body adjacent to the connector or in Table 5.1 Probe Type Identification.

Pressing **Enter (F1)** will go to the **ID Configured** display:

```
Mate Configured for
ID: xxx xxxxxxxxxx

Type
Enter  Clr  List  Exit
```
Chapter 7
Displaying Data on the CheckMate™

Probe reading data can be displayed on the CheckMate™ either by the probe currently attached or by ID. The data includes the Tag ID, Metal Loss, Corrosion Rate, Divisions and Check Readings.

From the Standby screen, press Disp (F2) to go to the Display Data By display:

Press Curr Probe (F1) to go directly to the current probe display or press ID (F2) to select the probe by ID.

Press More (F1) to go to the second screen of information:
Div: xxx.x  
Check: xxx units

More Exit

Press More (F1) one more time to go to the third screen of information:

Alloy: xxxxxxxxx  
Span: xxxx  
xxxxx Readings @ xxint

Exit
Chapter 8
Transferring Data to the PC

Probe reading data is downloaded to the PC using the CheckMate™ to PC program, Corrdata© CSV. It is a simple, Windows compatible program that allows fast download of data stored in the CheckMate™ to a Comma Separated Value (CSV) file. This file can then be opened with Excel or another comparable spreadsheet program.

Installation

The Corrdata CSV program can be found on the CD-ROM included with the instrument. Insert the auto run CD-ROM and follow the on screen instructions to install. The default installation directory is C:\Program Files\RCS\Corrdata CSV.

Configuring Corrdata CSV

When installation is complete, click on the Start Menu to launch the program. Click on the Select menu, then Data Directory to choose the location for where to save the CSV files. Next, from the Select Menu, place a check next to the COM port to be used.

Connect the CheckMate™ to the PC

Connect the CheckMate™ instrument to the 9 pin COM port on the back of the PC using the provided cable. Make sure this is the same COM port as selected previously (in most cases this will be COM 1, however verify this in device manager).

Now click on the large button: “Get CHECKMATE Data and Make Excel (CSV) Files. Click OK on the window that appears next.
CheckMate™ Procedure

From the Standby screen of the CheckMate™, press Dump (F2) to go to the Start Dump display:

Connect Mate To PC
PC Must Be Running
Corrdata CSV

Start          Exit

Press Start (F1) to begin downloading data to the PC.

Dumping Data to PC
Please Wait
ID:  xxx xxxxxxxxxx

The CSV files are saved by tag number and ID in a folder called DataFiles under the directory created previously. They may be opened using Excel or a similar spreadsheet program.

If the CheckMate™ is not connected to the PC properly, or the PC is not running Corrdata CSV, the following screen may be displayed.

WARNING!
No Response From PC
Check Connection
Exit

Make sure that Corrdata CSV software is running, that the correct COM port is checked in the Select menu, and that the CheckMate™ is connected to that COM port using the supplied cable.

If data is still not transferred after checking the connection between the PC and CheckMate™, please see the Troubleshooting section (Chapter 9) for further help.
## Chapter 9
### Troubleshooting Guide

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>CheckMate™ will not turn on.</td>
<td>Batteries not installed.</td>
<td>Install batteries (see Chapter 3)</td>
</tr>
<tr>
<td></td>
<td>Battery voltage low.</td>
<td>Install new batteries.</td>
</tr>
<tr>
<td></td>
<td>Batteries installed incorrectly.</td>
<td>Check the polarities as indicated on the unit.</td>
</tr>
<tr>
<td>CheckMate™ turns off before 2 minutes auto shutdown.</td>
<td>Battery voltage low.</td>
<td>Install new batteries.</td>
</tr>
<tr>
<td>CheckMate™ will not transfer data to the computer.</td>
<td>Corrdata CSV is not running.</td>
<td>Launch Corrdata CSV from the Start Menu. Click the Get Data button and then OK.</td>
</tr>
<tr>
<td></td>
<td>Cable is not connected properly.</td>
<td>Check that the cable is fully plugged into CheckMate™ and that the other end is fully plugged into the 9 pin serial port on the back of the PC.</td>
</tr>
<tr>
<td>CheckMate™ not reading probe.</td>
<td>No probe connected to CheckMate™</td>
<td>Connect probe to CheckMate™</td>
</tr>
</tbody>
</table>
Appendix A
EC-Type Examination Certificate
EC-TYPE EXAMINATION CERTIFICATE

Equipment or Protective System intended for use in Potentially explosive atmospheres
Directive 94/9/EC

EC-Type Examination Certificate Number: DEMKO 05 ATEX 0417899X
Equipment or Protective System: Portable Corrosometer Data Terminal, Models CheckMate,
Part No. 723601 and CheckMate Plus, Part No. 723601-1
Manufacturer: Rohrback Cosasco Systems Inc
Address: 11841 E Smith Ave, Santa Fe Springs CA 90670 USA

This equipment or protective system and any acceptable variation there to is specified in the schedule to this certificate and the documents therein referred to.

UL International Demko A/S, notified body number 0539 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential report no: 0417899

Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

If the sign 'X' is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

This EC-Type examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the Directive 94/9/EC. Further requirements of this Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by the certificate.

The marking of the equipment or protective system shall include the following:
II 2G Ex ib IIC T4

On behalf of UL International Demko A/S

Herlev, 2005-04-19

Karina Christiansen
Certification Manager

UL International Demko A/S
Lyksaker 8, P.O. Box 514
DK-2730, Herlev, Denmark
Telephone: +45 44856585
Fax: +45 44856500

This certificate may only be reproduced in its entirety and without any change, schedule included
Schedule

EC-TYPE EXAMINATION CERTIFICATE No.

DEMKO 05 ATEX 0417899X

Description of Equipment or protective system:
The CheckMate/CheckMate Plus is a handheld corrosometer and data recorder intended for use with Rohrback Cosasco Systems Inc. remote data collectors (RDC's) and corrosion probes in a Hazardous Location, and also with a computer in a Non-Hazardous Location via the PC Isolator Cable. It is intended to provide transfer of stored corrosion data from the RDC's (DEMKO 04 ATEX 0307914X) and also to program the RDC's. It may be connected directly to a corrosion probe for a corrosion measurement or to a test probe of known resistance for system checks and troubleshooting. Software is the only difference between the CheckMate and the CheckMate Plus instruments.

Types comprised by the Certificate
Model CheckMate, Part No. 723601
Model CheckMate Plus, Part No. 723601-1

Electrical Data:
9V supply from six size AA 1.5V alkaline batteries:
Duracell MN1500, Energizer E91, EN91 or Rayovac 815 alkaline type.

RS232 Data Port from Pin 2 and Pin 3 to Pin 5:
Ui = 11.1 V, Io = 22.4 mA, Po = 63 mW, Co = 1.9 uF, Lo = 70 mH
Ui = 11.1 V, Io = 45.9 mA, Pi = 127.4 mW, Ci = 0, Li = 0

Probe Port from Probe A to Probe F:
Ui = 5.88 V, Io = 0.594 A, Po = 0.873 W, Co = 43 uF, Lo = 100 uH
Ui = 5.88 V, Io = 79.4 mA, Pi = 71.7 mW, Ci = 96 pF, Li = 0.32 uH

Probe Port from Probe B, C, D or E to Probe F:
Ui = 5.88 V, Io = 79.4 mA, Po = 116.7 W, Co = 43 uF, Lo = 5.6 mH
Ui = 5.88 V, Io = 4.9 mA, Pi = 7.3 mW, Ci = 96 pF, Li = 0.32 uH

Probe Port from Probe A, B, C, D and E to Probe F:
Ui = 5.88 V, Io = 1.07 A, Po = 1.573 W, Co = 43 uF, Lo = 31 uH
Ui = 5.88 V, Io = 0.667 A, Po = 0.98 W, Co = 96 pF, Li = 0.32 uH

Temperature Data:
-20°C ≤ Ta ≤ 50°C

Routine Tests:
Tests are performed per 11.1.1 of EN 50020:2002 on the PC Isolator Cable P/N 723240.
Schedule DEMKO 05 ATEX 0417899X

[16] Report No.:
Project Report No.: 0417899 (Hazardous Locations Testing)

Drawings:

<table>
<thead>
<tr>
<th>Drawing Number</th>
<th>Sheets</th>
<th>Rev.</th>
<th>Date</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>006436</td>
<td>1</td>
<td>E</td>
<td>08 Apr 05</td>
<td>Marking Label</td>
</tr>
<tr>
<td>723203</td>
<td>8</td>
<td>H</td>
<td>01 Apr 05</td>
<td>Interconnect Control Drawing</td>
</tr>
<tr>
<td>723601</td>
<td>1</td>
<td>C</td>
<td>14 Mar 05</td>
<td>Complete Unit Assembly</td>
</tr>
<tr>
<td>723215</td>
<td>2</td>
<td>-</td>
<td>30 Sep 03</td>
<td>Enclosure Case Top</td>
</tr>
<tr>
<td>723214</td>
<td>2</td>
<td>-</td>
<td>30 Sep 03</td>
<td>Enclosure Case Bottom</td>
</tr>
<tr>
<td>723045</td>
<td>1</td>
<td>A</td>
<td>14 Mar 05</td>
<td>Keyboard Static Guard</td>
</tr>
<tr>
<td>723629</td>
<td>1</td>
<td>-</td>
<td>18 Feb 05</td>
<td>Battery Access Door</td>
</tr>
<tr>
<td>723612</td>
<td>2</td>
<td>G</td>
<td>21 Mar 05</td>
<td>Circuit Board Schematic</td>
</tr>
<tr>
<td>723610</td>
<td>1</td>
<td>M</td>
<td>08 Apr 05</td>
<td>Board Assembly and Parts List</td>
</tr>
<tr>
<td>723611</td>
<td>11</td>
<td>G</td>
<td>07 Mar 05</td>
<td>Circuit Board Trace Layout</td>
</tr>
<tr>
<td>723618</td>
<td>1</td>
<td>C</td>
<td>21 Mar 05</td>
<td>Internal Battery Supply Cable</td>
</tr>
<tr>
<td>723616</td>
<td>1</td>
<td>D</td>
<td>21 Mar 05</td>
<td>Internal RS232 Serial Cable</td>
</tr>
<tr>
<td>723619</td>
<td>1</td>
<td>D</td>
<td>24 Mar 05</td>
<td>External Probe Cable</td>
</tr>
<tr>
<td>723623</td>
<td>1</td>
<td>C</td>
<td>24 Mar 05</td>
<td>External CheckMate/RDC Cable</td>
</tr>
<tr>
<td>723235</td>
<td>1</td>
<td>B</td>
<td>21 Mar 05</td>
<td>CheckMate Test Probe Assembly</td>
</tr>
<tr>
<td>044054</td>
<td>1</td>
<td>S</td>
<td>24 Oct 03</td>
<td>CheckMate Test Probe Material</td>
</tr>
<tr>
<td>006438</td>
<td>1</td>
<td>B</td>
<td>21 Mar 05</td>
<td>CheckMate Test Probe Marking</td>
</tr>
<tr>
<td>723240</td>
<td>1</td>
<td>B</td>
<td>24 Mar 05</td>
<td>PC Isolator Cable Assembly</td>
</tr>
<tr>
<td>723243</td>
<td>1</td>
<td>A</td>
<td>21 Mar 05</td>
<td>PC Isolator Cable Schematic</td>
</tr>
<tr>
<td>723241</td>
<td>1</td>
<td>B</td>
<td>08 Apr 05</td>
<td>PC Isolator PCB Assembly</td>
</tr>
<tr>
<td>723242</td>
<td>1</td>
<td>-</td>
<td>14 Mar 05</td>
<td>PC Isolator PCB Specifications</td>
</tr>
<tr>
<td>723032</td>
<td>5</td>
<td>G</td>
<td>26 May 94</td>
<td>PC Isolator PCB Artwork</td>
</tr>
<tr>
<td>006447</td>
<td>1</td>
<td>A</td>
<td>24 Mar 05</td>
<td>PC Isolator Cable Marking</td>
</tr>
<tr>
<td>CheckMate Instrument</td>
<td>7</td>
<td>-</td>
<td>18 Mar 05</td>
<td>Component Safety Assessment</td>
</tr>
<tr>
<td>CheckMate Instrument</td>
<td>1</td>
<td>-</td>
<td>07 Apr 05</td>
<td>Aggregate Capacitance Table</td>
</tr>
<tr>
<td>PC Isolator Cable PCB</td>
<td>1</td>
<td>-</td>
<td>22 Mar 05</td>
<td>Component Safety Assessment</td>
</tr>
</tbody>
</table>

[17] Special conditions for safe use:
The CheckMate/CheckMate Plus instrument is intrinsically safe when connected in accordance with interconnect control drawing No. 723203 which is supplied with each unit. Downloading of stored data to a computer is performed only in the non-hazardous area and only with PC Isolator Cable Part No. 723240. Alkaline battery replacement is only performed in the non-hazardous area.

[18] Essential Health and Safety Requirements
The manufacturer shall inform the notified body concerning all modifications to the technical documentation as described in ANNEX III to Directive 94/9/EC of the European Parliament and the Council of 23 March 1994.
Schedule DEMKO 05 ATEX 0417899X

On behalf of UL International Demko A/S

Herlev, 2005-04-19

Karina Christiansen
Certification Manager

Certificate: 05 ATEX 0417899X
Report: 0417899

This certificate may only be reproduced in its entirety and without any change; schedule included.
Appendix B
Interconnect Control Drawing