An Introduction to RCS Instruments & Probe Range

- Microcor®
- Corrosometer®
- Corrater®
- Quicksand®

RCS Corrosion Management Solutions
Corrosometer® Instruments
(Electrical Resistance)

- Checkmate™ CORROSOMETER® Portable Instrument
- Checkmate™ Plus CORRDATA® Portable Instrument
- CK-4 CORROSOMETER® Instrument
- 4020LT CORROSOMETER® Transmitter
- CORRDATA® Remote Data Collection System
- CHECKMATE™ DL Instrument
- CORRDATA® MATE II Instrument

RCS Corrosion Management Solutions
Checkmate™ CORROSOMETER®
Portable Instrument

FEATURES:

- Reads all CORROSOMETER® (Electrical Resistance) Corrosion Probes
- Measurement Resolution – 0.1 Probe Divisions (0.01% of Probe Span)
- Repeatability - ± 1 Division (0.1% of Probe Span)
- Rapid Measurement Cycle – 30 Sec.
- Downloads Stored Readings Directly to PC
- Certified for use in Hazardous Locations. Intrinsically Safe – (ATEX/UL/ULc (IEC) Certified)
Checkmate™ Plus CORRDATA® Portable Instrument

FEATURES:
- Reads all CORROSOMETER® (Electrical Resistance) Corrosion Probes
- Downloads Stored Corrosion Data from Corrdata® Remote Data Collectors
- Measurement Resolution – 0.1 Probe Divisions (0.01% of Probe Span)
- Repeatability - ± 1 Division (0.1% of Probe Span)
- Rapid Measurement Cycle – 30 Sec.
- Downloads Stored Readings Directly to PC
- Certified for use in Hazardous Locations. Intrinsically Safe – (ATEX/UL/ULc (IEC) Certified)

RCS Corrosion Management Solutions
CK-4 CORROSOmeter® Instrument

FEATURES –

- Portable
- Intrinsically Safe
- CORROSOmeter® and CORRTEMP®
- CORROSOmeter® Probe Compatibility
- Temperature Readout -40 ºC to +260 ºC (-40 ºF to +500 ºF)
- Data Storage for 26 Probe Locations
- Calculates Corrosion Rate From Last Probe Reading

RCS Corrosion Management Solutions
4020LT CORROSOMETER®
Transmitter

FEATURES:

- 2-Wire Transmitter
- Intrinsically Safe
- Compatible with all CORROSOMETER® Probes
- CE Compliant
- ATEX Compliant

RCS Corrosion Management Solutions
CORRDATA® Remote Data Collection System

FEATURES:

- Maximum Versatility
- Automatic Corrosion Data Collection
- Multiple Power and Communication Options
- Intrinsically Safe
- Simple Operation With Graphical Displays
- Integrates Multiple Parameters
- Wide Environmental Operating Range
- Compliant
- ATEX Compliant

RCS Corrosion Management Solutions
CHECKMATE™ DL

FEATURES:

- Reads CORROSOMETER® and CORRATER® RDCs and all MICROCOR® Data loggers
- Downloads Stored Readings Directly to PC
- Certified for use in Hazardous Locations
- Intrinsically Safe
CORRDATA® MATE II Instrument

FEATURES:

• Reads all RDC’s, CORROSOmeter, CORROtemp CORROSOmeter, & CORRATER Probes
• Reads Microcor Data loggers once configured as Micromate
• Downloads Stored Readings Directly to PC
• Certified for use in Hazardous Locations
Corrosometer® & Corrotemp® Probe Selection

- Corrosometer® probes & instruments determine metal loss from corrosion or erosion by the electrical resistance method.
- ER technology virtually works for any environment except liquid metals or some conductive molten salts.
- RCS provides a wide variety of Corrosometer® probes to match various applications.

RCS Corrosion Management Solutions
# Corrosometer® & Corrotemp®
## Probe Selection

### Probe Monitoring Type

- **External / Structural Monitoring:**
  - Atmospheric or Underground Probes
    - [Series 600](#)

- **Internal Monitoring:**
  - Non Removeable - Fixed Process Probe
    - [Series 2000](#)
  - Removable - Retractable Process Probe
    - [Series 3000](#)
    - (Up to 1500psi)
  - Removable - High Pressure Retrievable Probe
    - [Series 4000](#)
    - (Up to 3600psi or 6000psi)

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![RCS Corrosion Management Solutions](image.png)
Corrosometer® & Corrotemp®
Probe Selection

- **Element Style for Process Probes**
  - Loop Element
  - Cylindrical Element
  - Flush Element

- **Element Sensitivity**
  - General Corrosion (see CORROSOMETER® Probe Selection Guide)
  - Thin elements for low corrosion rates
  - Thick elements for high corrosion rates
  - Thin elements for faster response to corrosion rate upsets (see CORROSOMETER® Probe Selection Guide)

RCS Corrosion Management Solutions
Corrosion Measurement Elements

- Several CORROSOMETER® element forms are available.

- Selection of the most suitable element form & specially the correct probe sensitivity is important for obtaining good quality corrosion data.
Atmospheric or Underground Probes – Series 600

- **600 CORROSOMETER® Probe**
  - The Model 600 Atmospheric Probes are designed to monitor corrosion of a gaseous environment.

- **610 High Sensitivity Atmospheric Corrosion Sensor**
  - The Model 610 Atmospheric Corrosion Sensor monitors the corrosivity of the air in plant control rooms, in motor control centers, near exhaust stacks, and in other environmental monitoring applications.

- **620HD/650 CORROSOMETER® Probe**
  - The 620HD and 650 CORROSOMETER® probes are designed for underground and structural monitoring of pipelines, vessels, above and below ground storage tanks and structures, whether cathodically protected or not.

RCS Corrosion Management Solutions
Fixed Process Probe – Series 2000

- **2500/2500HT CORROSOMETER® Probe**
  - They may be used in aggressive organic or inorganic fluids over the entire pH range.

- **2520/2520HT CORROSOMETER® Probe**
  - Model 2520 fixed process probes are designed for particularly severe or toxic duty service, where retractable or fixed thread probes are not permitted by plant or other regulations.
Fixed Process Probe – Series 2000

- **2600/2600G CORROSOMETER® Probe**
  - These probes are designed for organic or inorganic fluids of all types in the pH range from 0 to 9.

- **2610/2610G CORROSOMETER® Probe**
  - The Model 2610/2610G probes are designed with adjustable insertion length fixed bodies. These probes are designed for organic or inorganic fluids of all types in pH ranges from 0 to 9.
Fixed Process Probe – Series 2000

- **2620/2620G CORROSOMETER® Probe**
  - The Model 2620/2620G fixed process probes are designed for severe duty service, where retractable or fixed threaded probes are not permitted by plant or other regulations.
Retractable Process Probe – Series 3000

- **3000/3000G CORROSOMETER® Probe** - The 3000/3000G retractable process probes provide flexibility and economic replacement via inserts. These probes may be used up to their design temperatures and pressures in organic or inorganic fluids of all types in the pH range from 0 to 9.
Retractable Process Probe – Series 3000

- **3500/3500HT CORROSOMETER® Probe**
  - The Model 3500/3500HT retractable process probes have a thin walled tubular sensing element made from the alloy of interest welded onto a body of the same material.

- **3600/3600G CORROSOMETER® Probe**
  - Model 3600 retractable process probes employ elements made from wire, strip, or small diameter tubing formed into a small loop. These probes may be used up to their design temperatures and pressures in organic or inorganic fluids of all types, in the pH range of 0 to 9.
Retractable Process Probe – Series 3000

- 3700/3705 CORROSOMETER® Probe
  - Model 3700 and 3705 retractable process probes employ measuring elements that can be positioned flush with the inner surface of the pipe or vessel. Corrosion or erosion can then be measured right at the surface, and the lines may be pigged without moving the probes.
High Pressure Retrievable Probe –
Series 4000

- **4500 CORROSOMETER® Probe**
  - The Model 4500 probe is the most rugged mechanically and the least affected by temperature fluctuations. It is a high pressure cylindrical probe with an optional shield, which is recommended for high velocity situations.

- **4605 CORROSOMETER® Probe**
  - The Model 4605 probe is a rugged, high pressure probe with a loop measuring element. It can be read by any CORROSOMETER® corrosion monitoring instrument.
High Pressure Retrievable Probe – Series 4000

- **4700 / 4700-ADJ CORROSOmeter® Probe**
  - The Model 4700-ADJ probe is the ideal high pressure flush probe for providing flexibility in size, while minimizing inventory of replacement probes.

- **4705 CORROSOmeter® Probe**
  - A new style of the Model 4705 probe is now available with an even more durable construction and incorporating a connector with shrouded pins to prevent accident damage.

RCS Corrosion Management Solutions
CORRATER®
(LPR – Linear Polarization Resistance)

- Instruments
- 9000 Plus Portable CORRATER® Instrument
- AquaMate® Portable CORRATER® Instrument
- SCA-1/SCA-1L Single Channel CORRATER® Instrument
- 9030 Plus® CORRATER® Instrument
- 9020 CORRATER® Transmitter
- CORRDATA® Remote Data Collection System

RCS Corrosion Management Solutions
9000 Plus Portable CORRATER® Instrument

- **Features:**
  - Corrosion Rate Monitoring
  - Imbalance (Pitting) Measurement
  - User Selectable Alloy Multipliers
  - Simple Operation
  - CE Compliant

- **Probe Compatibility:**
  2 or 3 Electrode CORRATER® probe

- **Measurement Cycle Time:**
  3 minutes

- **Power Requirements:**
  9 Volt Alkaline Battery

- **Operating Temperature:**
  +32° to +122 ° F (0 ° to 55 ° C)
AquaMate® Portable CORRATER® Instrument

- **Features:**
  - Portable Corrosion Rate Monitoring
  - Imbalance (Pitting) Measurement
  - Solution Resistance Compensation
  - Temperature Measurement
  - Conductivity Measurement
  - CE Compliant

- **Probe Compatibility:**
  - 2 or 3 Electrode CORRATER® probe
  - 2 electrode CORROTEMP® CORRATER® probe (includes temperature)

- **Cycle Time:**
  - Manual mode: 2 to 21 minutes in 0.5 min. increments
  - Automatic mode: 3 to 20 minutes

- **Power Requirements:**
  - 9 Volt Alkaline Battery

- **Instrument Operating Temperature:**
  - +32º to +122 F (0 º to 55 ºC)
SCA-1/SCA-1L Single Channel CORRATER® Instrument

Features:
- Single Range, 0-2 MPY, 0-20 MPY
  0-50 µMPY or 0-500 µMPY
- Continuous Readout of Corrosion Rate
- Weatherproof NEMA 4X Enclosure
- Selectable Multipliers for Different Alloys
- Isolated 4-20mA Output (SCA-1)
- Internal Data Logger with PC Interface (SCA-1L)
- Cycle Time, 15 minutes
- Operating Temperature Range:
  +32°F to 140°F (0°C to 60°C)
9030 Plus® CORRATER® Instrument

- Corrosion Rate, Imbalance and Temperature Measurements
- Solution Resistance Compensation
- One or Two Channels
- Data Logging with CORRDATA® Plus Software
- Isolated 4-20 mA Outputs
- Weatherproof Enclosure
- CE Compliant
- Corrosion Measurement Cycle:
  Manual program range 3 to 30 minutes
  OR automatic cycle

RCS Corrosion Management Solutions
9020 CORRATER® Transmitter

- **Features:**
  - Two-Wire Loop Powered
  - Continuous Corrosion Rate
  - Second Loop for Imbalance Measurement
  - Extended Operating Range
  - Available as an OEM Module
  - Corrosion Rate Ranges: 0-2, 0-20 and 0-2, 0-200 MPY
  - Imbalance Ranges: 0-2, 0-20 and 0-200 Imbalance Units
  - Cycle Time: 5, 10, 15 and 20 minutes
  - Ambient Temperature Range: -18ºC to +60ºC
  - Supply Voltage Range: 16-32 VDC at 20 mA

RCS Corrosion Management Solutions
CORRDATA® Remote Data Collection System

- **Features:**
  - Maximum Versatility
  - Automatic Corrosion Data Collection
  - Multiple Power and Communication Options
  - Intrinsically Safe
  - Simple Operation With Graphical Displays
  - Integrates Multiple Parameters
  - Wide Environmental Operating Range
  - CE Compliant
  - ATEX Compliant
  - Operating Temperature: -40°F to +158°F (-40°C to +70°C)
  - Data Storage: CORRATER®: Most recent 1024 measurements;
    CORROTEMP® CA: Most recent 512 measurements
  - Battery life: CORRATER®: 91 days @ 1 reading/hr.

RCS Corrosion Management Solutions
CORRATER® Probe Selection

- CORRATER® probes and instruments provide a direct measure of corrosion rate & a qualitative pitting tendency of metals in electrolytes by the technique of LPR.
- Standard (projecting) electrodes are suitable for most applications
- Flush electrodes probes are only necessary where thin aqueous films occur or projected electrodes interfere with “pigging” operations
- Laboratory probes are economical but less durable
- CORRATER® probes interact with the electrochemical corrosion mechanism in order to determine the rate at which metal ions are passing into solution (corroding)

RCS Corrosion Management Solutions
CORRATER® & CORRATER®
CORROTEMP® Probes
(Linear Polarization Resistance)

- 6112 CORRATER® Probe
- 7012/7022 CORRATER® Probe
- 7212/7222 CORRATER® Probe
- 8012/8022 CORRATER® Probe
- 6080 CORRATER® Probe

RCS Corrosion Management Solutions
Benefits of CORRATER® Probes

- CORRATER® probes are used by major companies worldwide to measure corrosion in waterfloods, cooling water loops and other aqueous systems and to provide control of inhibitor addition for optimum economy and corrosion protection.

- Replaceable electrodes double as corrosion coupons providing a significant advantage over other electrochemical & electrochemical noise probe designs.

- Electrodes are quickly & easily replaceable saving you and you’re both time and money.
Microcor® High Resolution Corrosion Monitoring System

RCS Corrosion Management Solutions
Microcor® Systems - Introduction

- Primary benefit is its increased speed of response over conventional monitoring techniques.
- Corrosion rates can be measured in any process environment including conductive or non-conductive liquids, brines, gases, single or multi-phase flows, underground or in concrete.

RCS Corrosion Management Solutions
Microcor® Systems - Introduction

- The highest resolution metal loss method available in corrosion monitoring
- Enables corrosion rate to be determined in minutes or hours (50 to 100 times faster than other metal loss methods)
Microcor® Systems

COMPONENTS

• ON-LINE SYSTEM
  • Probe, Probe Adapter, Transmitter, Communication Cable, and IIU/ICMS3

• OFF-LINE SYSTEM
  • Probe, Probe Adapter, MDL All-In-One Microcor® Data-logger, and Checkmate-DL
Microcor® Systems - Components

- PROBES

- The active element of a Microcor probe is measured to an 18 bit resolution, or 262,144 probe life units. This compares to the 10 bit resolution (1000 divisions) of an ER system.

- For optimum thermal stability the range of probes is limited to cylindrical and flush designs.
Microcor® Systems - Components

- **MICROCOR PROBE:**
  - M2500, M2700 Fixed Probes
  - M3500, M3700 Retractable Probes
  - M4500, M4700 High Pressure (Cosasco) Probes

- **QUICKSAND® PROBE:**
  - S3700 Retractable Probes
  - S4500, S4700 High Pressure (Cosasco) Probes
Microcor® Systems - Components

MICROCOR® Probes Configured for Sand (Erosion) Monitoring

- The angled probe detects erosion
- Elements made of corrosion resistant alloys measure erosion only
- Carbon steel elements detect combined effect of erosion and corrosion
- A separate flush probe of carbon steel sees the corrosion only effects

RCS Corrosion Management Solutions
Microcor® Systems - Components

- **Probe Adapters**
  - **Fixed / Retractable Locations**
    - Part Number 745092
  - **High Pressure Retrievable Locations**
    - Up to 2500psi – Part Number 745093
    - Up to 10,000psi – Part Number 745113

RCS Corrosion Management Solutions
Microcor® Systems - Components

- **Microcor® Transmitter MT-9485A (Use ST-9485A for Quicksand® Probes)**
  - The Microcor System is certified explosion-proof to ATEX, UL, and CSA
  - Microcor has an electronic resolution of 1 in 262,144 (18 Bit)
  - Communicates over an RS 485 Field bus for economical field installation cost
  - Up to 32 transmitters can be connected with a single cable run
Microcor® Systems - Components

- MDL All-In-One Microcor® Data-logger
  - Stand-Alone / All-In-One Device
  - Improved Battery Life
  - Hazardous Area Certified
    - ATEX
    - FM
    - IEC
Microcor® Systems - Components

- Intelligent Interface Unit (IIU)
- Integrated Corrosion Management System (ICMS3)
  - In the On-Line System probe readings are collected here for further data analysis.
  - More information to be provided in subsequent IIU/ICMS3 Presentation.
Microcor® Systems - Components

- **CHECKMATE™ DL**
  - Reads CORROSOmeter® and CORRATER® RDCs and all MICROCOR® Data loggers
  - Downloads Stored Readings Directly to PC
  - Certified for use in Hazardous Locations
  - Intrinsically Safe

RCS Corrosion Management Solutions
The Bottom Line – What Microcor® can do for your Customers

- Microcor® reduces inhibitor evaluation times saving time and money
- Microcor® rapidly detects small corrosion upsets in systems with little or no corrosion allowance – e.g. gas pipelines
- Microcor® allows detection of corrosion upsets in batch processes with short cycle times – e.g. refineries
- Microcor® probes can be used in any environment, even in sour service

RCS Corrosion Management Solutions