

MPR E-SCAN

HYBRID-DIGITAL REFRACTOMETER



**THE ELECTRON
MACHINE
CORPORATION**

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INTRODUCTION

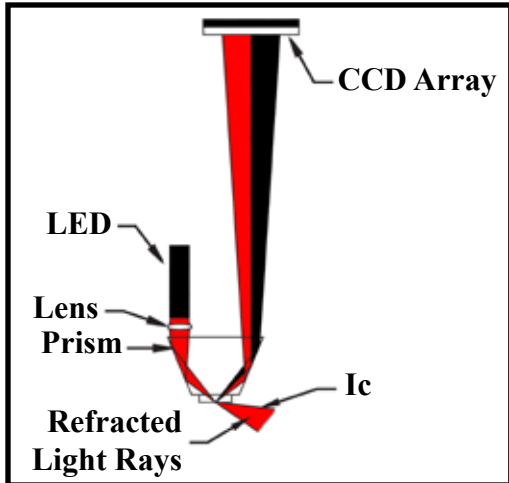
The Electron Machine Corporation has been designing and manufacturing in-line process refractometers since the early 1960s. Our focus is providing simple, rugged, and reliable instruments that provide value over time with accurate measurement, minimal maintenance, and long service life.

The MPR E-Scan is a hybrid-digital critical angle refractometer. It is used to measure the refractive index of process fluids and may be used as an error indicator or an integral part of a complete process control system.

The MPR E-Scan is calibrated and temperature compensated to your process specifications. It is ready for installation and immediate use when received. Calibration procedures are available to change system parameters and allow the refractometer to measure different process fluids.

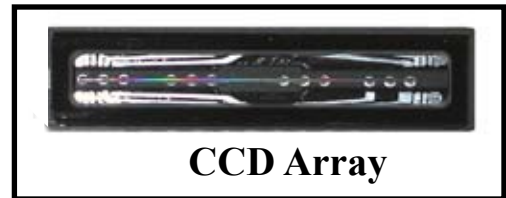


HOW IT WORKS: HYBRID-DIGITAL MEASUREMENT



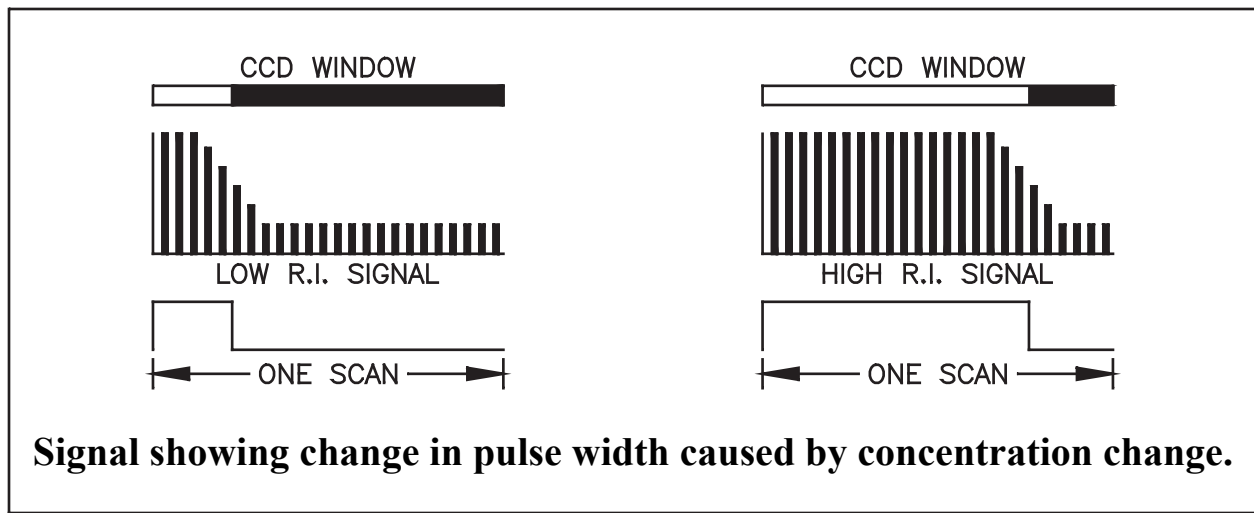
Energy radiated from the LED passes through the prism surface to be reflected off a mirror to the prism-to-process interface. The light reaching this interface intersects the same interface over a series of angles specifically chosen to include the critical angle (I_c) for the process being measured. Light intersecting the interface at an angle greater than critical angle is refracted into the solution. Light intersecting the interface at less than critical angle is reflected up out of the prism to the digital CCD linear array to be scanned.

The resolution of each sensing head is maximized by selecting the angle of the prism for the measurement and temperature range of the process.



CCD Array

The MPR E-Scan refractometer utilizes a hybrid-digital measurement principle. The CCD (charged coupled device) in the sensing head digitally measures the refractive index of the process. Any change in critical angle changes the ratio of light to dark periods. The digital measurement is temperature compensated and converted to a variable voltage by rugged electronic devices in the sensing head. This allows the relatively sensitive micro-processor driven devices to be located in the electronics console where more protection from the process can be provided. The signal is then further enhanced and displayed as a reading in refractive index, Brix, solids, percent, or other measurement unit. This combination of state-of-the-art micro-processors combined with tried-and-true analog components provides a high-level of accuracy along with the rugged dependability required for years of use when installed in harsh industrial environments.



E-SCAN CONSOLE

The console is constructed of molded fiberglass polyester for maximum protection in harsh environments. It is rated NEMA 4X and can be installed outdoors without any additional protection. The front panel consists of a high-resolution, daylight readable, color TFT-LCD display and a 20-button touch pad. This forms the user interface and allows easy navigation through the various menu options. The entire door assembly can be removed and replaced easily to minimize down-time in the event of a failure or to allow upgrading the electronics in the future.

STANDARD E-SCAN FEATURES

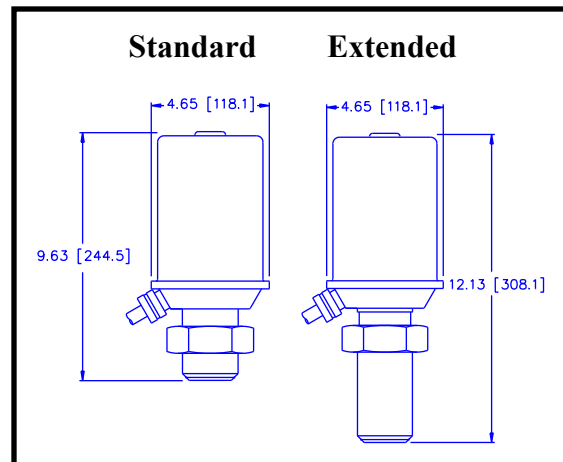
- Color TFT-LCD display with LED backlight and 640x480 pixels
- Menu-driven software with diagnostics
- Factory calibrated and delivered ready for installation
- Sensing head configured and manufactured for your specific application for maximum resolution
- Multi-range capability
- NEMA 4X fiberglass electronics console
- NEMA 4X all stainless steel sensing head with sapphire prism
- (2) Input & (6) Output relays configurable for controlling alarms and cleaning solenoids
- 4-20mA (non-isolated) and RS-232 outputs

OPTIONAL E-SCAN FEATURES

- Flush panel mounting of console
- Vortex cooled electronics console
- Measurement & Temperature PID Control
- Multi-range calibration as requested
- Dual sensing head capability
- Intrinsically safe sensing head
- Air-purging of console and sensing head (Type X and Y/Z)

SENSING HEAD OPTIONS

- Standard or Extended Probes
- Intrinsically Safe
- Severe Duty for installations with extreme vibration
- Various alloys and elastomers for wetted parts (316 & 2205 S/S std.)
- S/S NEMA 4X cable connector



OPTIONAL OUTPUTS

- Printer Output
- Remote Display
- RS-422/485
- HART® Protocol Interface
- Isolated 4-20mA for Measurement
- Isolated 4-20mA for Temperature
- Isolated or non-isolated 4-20mA for control



APPLICATIONS

The use of the MPR E-Scan refractometer on your process guarantees a more consistent quality product. This in turn leads to lower production costs. In today's competitive marketplace quality and cost are the key discriminators to greater profits. Depend on our over 40 years of experience in process refractometers to assist in application details for your process.

PULP & PAPER INDUSTRY

Black Liquor
Green Liquor
Red Liquor

Coatings
Resin
Tall Oil

FOOD INDUSTRY

Sucrose
Fructose
Dextrose

Jams & Jellies
Milk
Fruit Juices

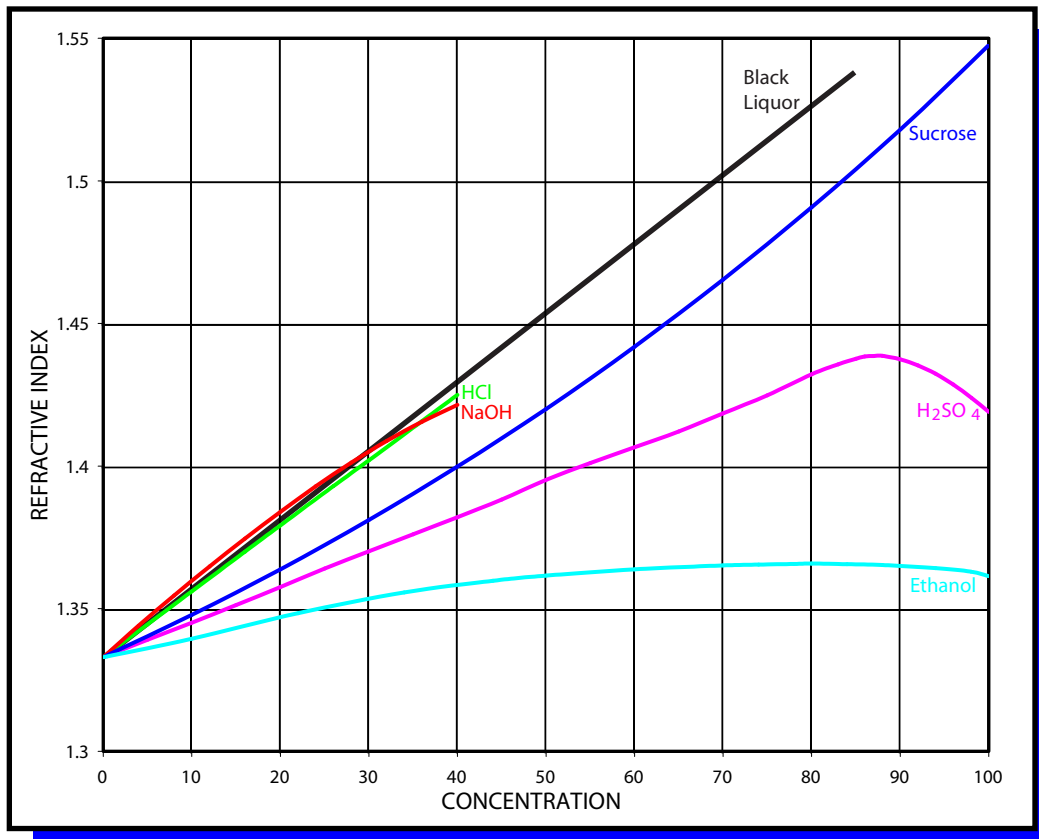
Soft Drinks
Beer
Tomato Paste

CHEMICAL INDUSTRY

Sulphuric Acid
Hydrochloric Acid
Phosphoric Acid
DMAC

Sodium Hydroxide
Sodium Carbonate
Urea
PVOH

Oleum
Glycol
Ethanol
PVA



TYPICAL PROCESS ADAPTERS



Sanitary Spool



Flanged Spool

The Electron Machine Corporation supplies adapters to complete the installations of the refractometer to your process. These adapters are available in standard or custom sizes. Some common types include tubing, standard pipeline and sanitary adapters, vessel mounts, and special isolation valve adapters that allow the refractometer to be removed from an active pipeline without any special tools. Materials and special alloys are available to suit your process requirements.

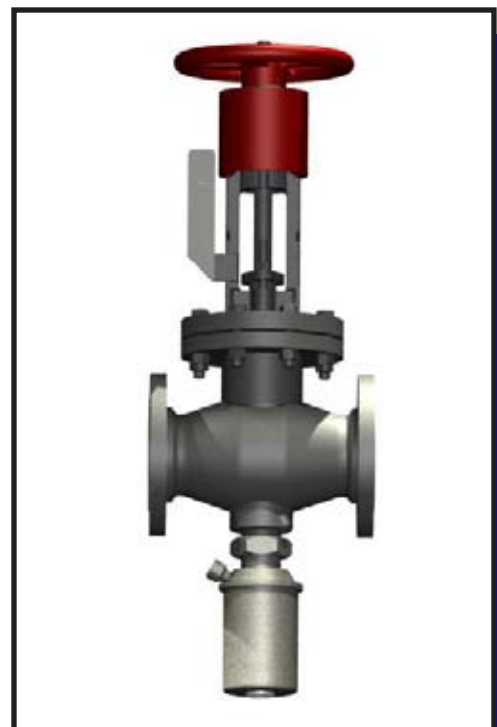
The adapters can also be supplied with a built-in prism wash jet that can be automatically activated by the refractometer program. The prism wash is user variable and the refractometer will supervise the proper operation of this cycle.

For difficult applications EMC has designed special cleaning systems and adapters. Consult the factory or local representative for assistance in your selection.

Vessel or Tank Mount



Isolation Valve



WARRANTY

Electron Machine Corporation warrants that the equipment manufactured by EMC is free of defects in material and workmanship. Should such a fault appear within two years of date of shipment from our factory, the Electron Machine Corporation will repair or replace the defective part upon its prepaid return to Umatilla, Florida, U.S.A. This warranty does not apply to equipment which has been tampered with or abused.

Additionally, a process performance guarantee ensures that the MPR E-Scan will meet or exceed written specifications.

SERVICE

The Electron Machine Corporation strives to maintain the best service possible for our customers. A 24 hour/day, 7 days/week technical support telephone line is monitored by one of our factory trained service personnel for fast help in emergency situations. Additionally, the services of our highly experienced field engineers are also available at standard rates for on-site repairs and training.

ABOUT US

Founded in 1946, Electron Machine Corporation designs and manufactures industrial measuring and control instrumentation in Umatilla, FL, U.S.A. The successful application of our refractometers to many process streams has made it the specified standard in the pulp & paper, food, and chemical processing industries.

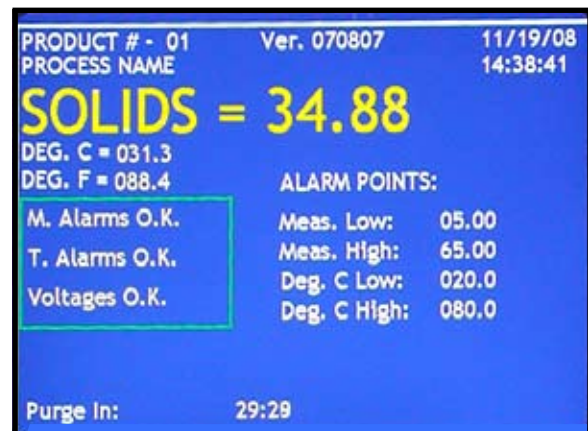
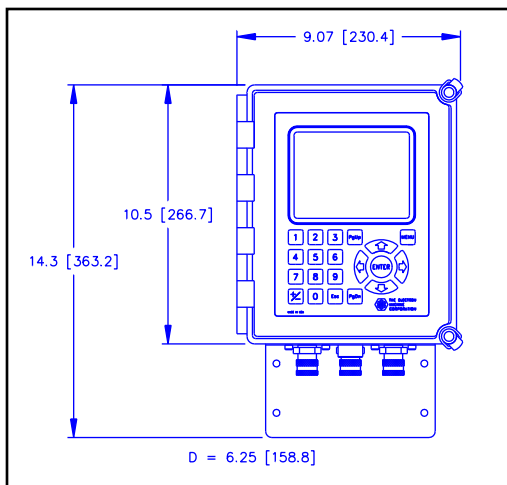
A worldwide network of experienced sales and service personnel assures economical process measurement and control with years of trouble-free service.





E-SCAN HYBRID-DIGITAL REFRACTOMETER SPECIFICATIONS

ACCURACY	±0.05 BRIX (.000075 R.I.) or 0.5% of span
REPEATABILITY/STABILITY	Corresponds to accuracy
SPAN	Configured for specific application for max. resolution
RESPONSE TIME	0.25 seconds to 3 minutes
PROCESS TEMPERATURE	Up to 150°C (300°F) without air purge
AMBIENT TEMPERATURE	Sensing Head: up to 52°C (125°F) without air purge Console: up to 50°C (120°F) without vortex cooled console
DISPLAY	Color TFT-LCD with LED backlighting 640 X 480 Pixel, daylight-readable
INTERCONNECTING CABLE	6M (20FT) standard 300M (1,000FT) maximum
SENSING HEAD WETTED MATERIALS	2205 Duplex S/S, Sapphire, PEEK®, VITON® (other alloys & elastomers available on request)
STANDARD OUTPUTS	4-20mA non-isolated, 0-10 Vdc non-isolated, RS-232 (6) configurable output relays (A/C or D/C) (2) configurable input relays (A/C or D/C)
POWER	85-260Vac, 50/60Hz, 50VA



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