



# FOODS

- Moisture
- Fat or Oil
- Protein



MM710e

The Measure of Quality™

# The Need for Process Automation

## NDC & the Foods Industry

NDC Infrared Engineering has over 40 years of experience in the design and manufacture of on-line instruments developed specifically to meet the exacting requirements of the Foods Industry.

Our development team has in-depth knowledge of the physical and chemical attributes of food products, the measurement and control requirements in the process, and the many analytical methods used in quality assurance systems. Their objective is to develop accurate, stable, robust measurements that can be trusted for process control.

We have forged successful relationships with key players in the industry - both producers and equipment manufacturers - and it is this combined technical and commercial knowledge that has enabled us to develop the MM710e - our 8th generation instrument, dedicated to on-line measurement in food processing.

Maintaining consumer loyalty through consistently high product quality...

**The Foods Industry** faces many challenges, as it endeavors to retain customer loyalty, while optimizing yield and meeting quality objectives, and today, more than ever, maximizing production output for the energy consumed.

**Real-time On-line Measurement** and direct automatic control of critical process parameters, such as moisture, present a significant opportunity for manufacturers to achieve these goals, but the complexity and diversity of products and production methods mean a generic approach to on-line measurement cannot work.

**Specifically Engineered Solutions** are needed at various stages of the process, from ingredient preparation to mixing, forming, baking or frying and then to flavouring, sorting, weighing and packing.

At each stage, the product appears in different forms, such as a powder, dough, flake, granule or final product. At the point of measurement, the product may be

### INDUSTRY DRIVERS



- Compliance with food legislation
- Labelling issues
- Reducing energy consumption
- Introduction of GMP
- Implementation of automated closed-loop control systems
- Improving yield & efficiency
- Optimizing product quality
- Maintaining consumer loyalty

transported on an open conveyor belt or in an enclosed duct, and the product flow may be continuous or discontinuous. Furthermore, the product itself may vary due to seasonal changes, crop year differences and raw material supply variations, and ambient process conditions such as lighting, temperature and relative humidity can also change.

### NDC understands these factors

and we engineer the robustness into our measurement solutions that ensures that changes in the measurement output are due solely to varying levels of the measured parameter, without influence from other product or process variables. The result?

**...the MM710e**



MM710e with IP65 Stainless Enclosure, Air Purge Window Shield and Vortex Cooler

# The MM710e Food Gauge

Product quality, yield, waste reduction, energy consumption - whatever the objective, MM710e delivers measurements which are trusted for control...

The **MM710e** uses precision NIR (near infrared) measurement technology to make a continuous single or multi-component non-contacting measurement of parameters such as:

- **Moisture**
- **Fat**
- **Protein**
- **Temperature**

With a measurement speed of 7.5 milliseconds, the patented “light engine” uses optical components manufactured by NDC’s Optics division, to deliver the highest resolution on-line measurements available today.

The MM710e can be incorporated conveniently into closed-loop control systems. Its connectivity options include:

- **Digital**
- **Analogue**
- **Industrial Ethernet**
- **Fieldbus**

Using industry-standard Ethernet communication hardware such as hubs, cables, repeaters and routers, installation and integration of the modular MM710e gauging system is straightforward.



For network integration, the Gauge can be configured for the following industrial Ethernet protocols:

- **EtherNet IP**
- **PROFINET**
- **Modbus/TCP**

If Fieldbus connectivity is required, the OWS, HMI and User Port can be supplied with Network Gateways for:

- **PROFIBUS DP**
- **DeviceNet**
- **CANbus Open**

## Series 710e Peripheral Devices

are available to connect to the gauges via standard Cat5E cable, including:

- **OWS: Operator Workstation**
- **HMI: Human Machine Interface**
- **User Port**
- **Switched 7-Way Switched Hub**

The OWS provides operator-level interaction with an individual gauge; the HMI provides supervisory access to up to 16 networked MM710e gauges. Both units feature high definition multi-lingual colour touch screen displays. The User Port provides additional analogue outputs and digital I/O for any connected gauge. The Hub enables convenient networked configurations.

For simplicity and convenience, all MM710e system components run on **24V DC**, either from an on-site supply or from an NDC in-line 24V universal power supply.

Long term stability, industry-best performance, low installation costs and no routine maintenance requirements guarantee the **lowest cost of ownership** over the MM710e’s many years of service.



# Engineered for Process Measurements

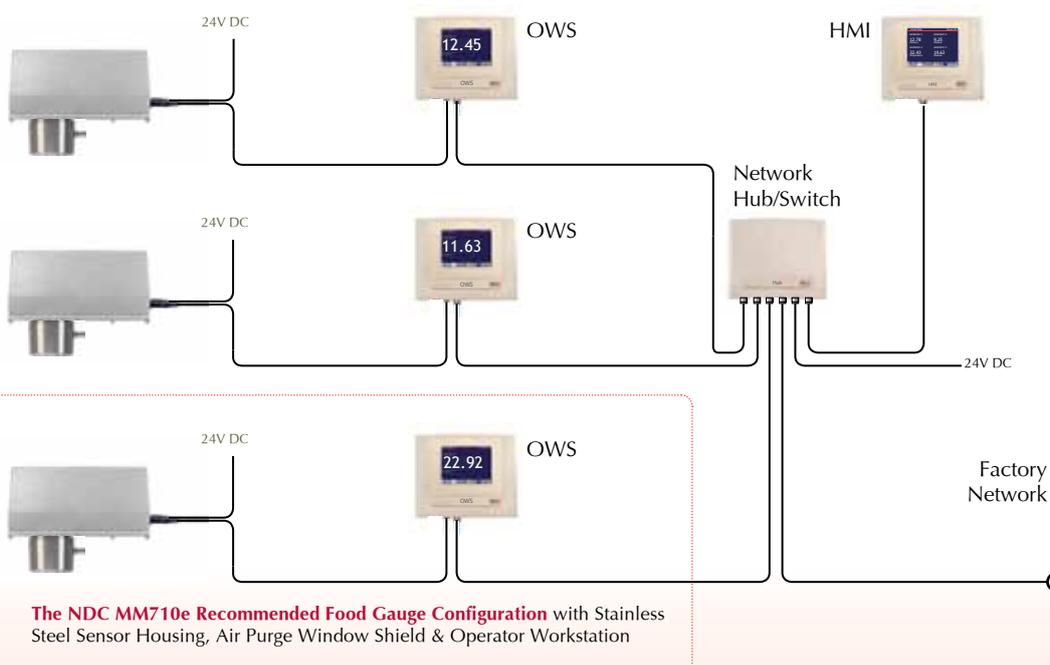
Easy to install, integrate and operate, the MM710e is the most flexible food process gauging system available...

## WITH A WIDE RANGE OF CONFIGURATION OPTIONS...

### A single MM710e Food Gauge with OWS and/or HMI



### A multi-gauge MM710e Food Gauging System: up to 16 gauges can be networked to a single HMI



**The InfraLab e-Series At-Line Analyzer**, complementing the MM710e On-Line Gauge, is designed to replace loss-on-drying and wet chemical laboratory methods for moisture analysis in samples taken from the process. The InfraLab, like the MM710e, can also be configured for multi-component measurements including fat and protein. InfraLab takes less than ten seconds to analyze a sample, is robust, accurate and easy to use and suitable for use in a processing environment.



# Food Industry Applications

NDC Applications Engineering combines in-depth process understanding with robust NIR technology for a precision on-line measurement...

## MM710e FOOD APPLICATIONS: MOISTURE, FAT AND PROTEIN

PRODUCT GROUP	M	F	P	APPLICATION AREAS
Biscuits, Cookies & Crackers	■			Biscuits, Cookies, Crackers
Cereals, Flour and Grains	■	■	■	Bran Flakes, Breakfast Cereals, Flour, Semolina, Wholemeal Flour, Soya Flour, Sunflower Meal, Rape seed, Maize Products
Chocolate	■	■		Cocoa Beans, Cocoa Liquor, Cocoa Powder, Drinking Chocolate, Molten Chocolate, Crumb
Confectionery	■	■		Sugar Coatings, Moulding Starch
Coffee & Tea	■		■*	Green Beans, Ground Roast Coffee, Instant Coffee/Tea, Finished Leaf Tea (* Caffeine )
Cheese	■	■	■	Cottage Cheese, Cream Cheese, Mozzarella, Cheddar, Monterey Jack, Hard Cheese
Dairy Products	■	■	■	Casein, Lactose Powder, Milk Powders, Baby Formulae
Dried Fruits, Nuts & Seeds	■	■		Nuts, Peanuts, Olive Pulp, Wine Pomace, Dried Fruit
Ingredients	■			Flavourings, Herbs and Spices, Yeast
Snacks	■	■		Corn & Potato Based Baked or Fried Snacks, Extruded Snacks, Potato Crisps/Chips, Corn Chip
Sugar	■			Granulated Sugar, Sugar Cubes

## GaugeToolsXL™ SOFTWARE

The MM710e is delivered with NDC's "SpeedCal" pre-calibration(s) ready for use for the specified measurement(s) and range(s). On installation it is simply adjusted to agree with the local reference method. The **GaugeToolsXL** software provided simplifies this process by enabling comparison of MM710e values (collected on-line using the SAMPLE function) with laboratory reference values. In addition, GaugeToolsXL features these user Tools:

- Gauge Set-up and Calibration
- Product Management (Product Settings)
- Displays of Measurement and other Key Parameters
- Data Logging and Data Trending & Export
- Diagnostic Functions
- Device Set-up
- OPC Server (optional)



Sample of User-configurable Screen Layout

The Measure of Quality™

# MM710e Installation Guidelines

## Installation

The MM710e measures over a 60mm diameter area (optionally 25mm) and should be attached to a sturdy support and suspended over the conveyor or process line at a distance from the mean product height to the MM710e measurement window of 250mm. The gauge tolerates product height fluctuations of  $\pm 100\text{mm}$ , without affecting the measurement. The Operator Workstation should be installed near the gauge in a position where the display is clearly visible.

## Discontinuous Product Flows

The optional "High Speed Gating" system detects the product's presence or absence in discontinuous flows and avoids recording of data when nothing is passing across the measurement area. For biscuits, crackers and cookies a 10mm square measurement patch can be specified (distance from window to product surface is  $140\text{mm} \pm 10\text{mm}$ ), which enables a precision measurement of moisture across the surface of the biscuits.

## Measuring Powders in Gravity-fed or Pneumatic Ducts

Sometimes powders are transported in enclosed systems. For these, an NDC PowderVision Powder Sampler is available. The device comprises a tube fitting with window and sample collection cup. The cup fills with product and after the sample has been measured, a jet of air ejects it and the cycle recommences. See the separate Product Information Sheet for details.

## Ambient Conditions

The MM710e's alloy or stainless steel housings are sealed to IP65 standard and can operate in ambient temperatures between 0 and  $50^\circ\text{C}$  without cooling. The stainless steel housing is also available in IP67 and ATEX certified versions. A vortex cooler attachment or insulated air-cooled housing are available for ambient temperatures exceeding  $50^\circ\text{C}$ . An optional Air Purge Window Shield connects to a clean air supply to create a positive air pressure in front of the measurement window to prevent contamination. Ambient lighting or relative humidity changes do not affect the MM710e measurement.

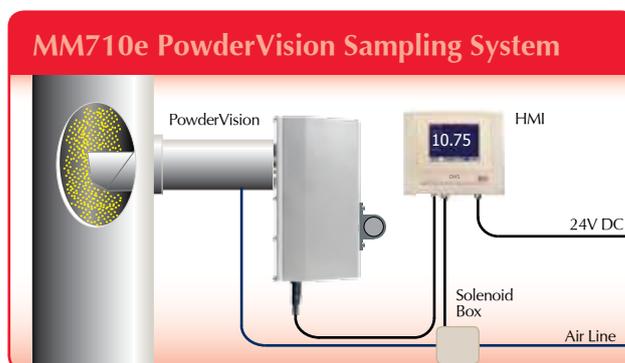
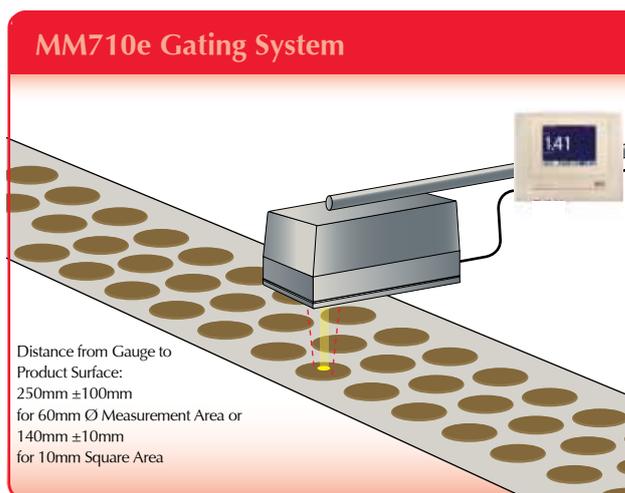
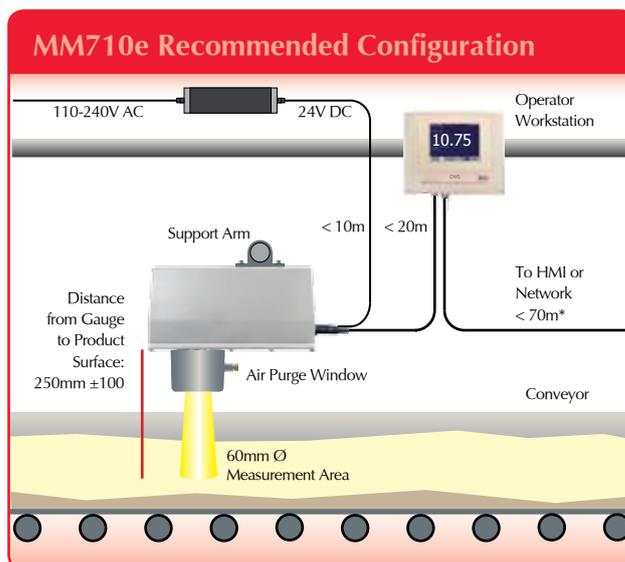
The OWS, HMI and all other Devices feature rugged ABS housings, are sealed to IP65 and are suitable for use in ambient temperatures between 0 and  $50^\circ\text{C}$ . The OWS and HMI are also available in stainless steel.

## Additional Technical Information Sources

As standard, NDC provides a 10m power cable and 10m network cable to the nearest Device. For additional technical information about alternative cable lengths, and the MM710e generally, please also consult: "MM710e Technical Specifications", "Series 710e Configuration Examples" and also: "Series 710e Configuration and Connectivity Guide" and "Series 710e Gauge Overview".

## Support

Please consult your local representative (see website for details) or consult NDC's Customer Care and Applications Technical Support Teams at the numbers and email addresses below.



NDC Infrared Engineering is represented in over 60 countries worldwide

a **spectris** company  
[www.ndcinfared.com](http://www.ndcinfared.com)  
 ISO9001:2008

**NDC Infrared Engineering Ltd**  
 Bates Road, Maldon  
 Essex, CM9 5FA  
 United Kingdom

Tel: +44 1621 852244  
 Fax: +44 1621 856180

Email: [sales@ndcinfared.co.uk](mailto:sales@ndcinfared.co.uk)

**NDC Infrared Engineering Inc**  
 5314 North Irwindale Avenue  
 Irwindale, CA 91706  
 United States of America

Tel: +1 626 960 3300  
 Fax: +1 626 939 3870

Email: [info@ndcinfared.com](mailto:info@ndcinfared.com)

**NDC China**  
 Tel: +86 20 8666 2790  
 Fax: +86 20 8666 5963  
 Email: [info@ndcinfared.com.cn](mailto:info@ndcinfared.com.cn)  
[www.ndcinfared.com/cn](http://www.ndcinfared.com/cn)

**NDC Germany**  
 Tel: +49 1801 977112  
 Email: [info@ndcinfared.de](mailto:info@ndcinfared.de)

**NDC France**  
 Tel: N° Azur: 0810 600 400  
 Email: [info@ndcinfared.fr](mailto:info@ndcinfared.fr)

**NDC Japan**  
 Tel: +81 3 3255 8157  
 Email: [info@ndcinfared.jp](mailto:info@ndcinfared.jp)

**NDC Brazil**  
 Tel: +55 11 5188 8172  
[www.ndcinfared.com.br](http://www.ndcinfared.com.br)