



SERIES 710e GAUGE OVERVIEW

EVOLUTION
ENHANCEMENT
ETHERNET



The Measure of Quality™

710e: Evolution

A Forty Year Pedigree

Since the introduction of the Series 710 in 2000, NDC has maintained its global leadership position as supplier of on-line measurement systems to process industries.

The Series 710e evolves and enhances the features of the 710 to meet today's process demands for performance, ease of use and connectivity.

EVOLUTION ENHANCEMENT ETHERNET

With its highspeed DSP digital processing technology and Ethernet infrastructure, the 710e's modular gauging concept represents the leading edge in on-line NIR instrumentation.

The 710e Gauge inherits the hundreds of man-years of experience and expertise that have gone into the development of NDC's Gauging and Applications Engineering capability, since the founding of the company in the late 1960s.

The 710e's pedigree makes it completely dependable for process control

Building on success: evolving the 710 to the 710e represents a winning formula for NDC's customers...

Simplicity with Performance

Designed to generate the fastest Return on Investment, the simplicity of the 710e modular system guarantees minimum hardware, low installation costs and lowest cost of ownership.

The 710e Gauging System comprises five key components: the 710e Gauge and its four devices:

- **HMI** (Human Machine Interface)
- **OWS** (Operator Workstation)
- **User Port** (Analogue/Digital I/O)
- **Hub** (Network Hub)

The 710e communicates both internally and externally via Ethernet, with the option to use other digital communications protocols externally.

Using "Automatic Device Discovery", each component recognises all other 710e Devices to which it is connected, for maximum ease and convenience in the creation, reconfiguration and extension of system networks.

For safety and convenience, all 710e components run on 24V DC supplied either from an on-site supply or an NDC in-line power supply.

THE 710e GAUGE



- **DSP Processor with 107KHz data sampling speed**
- **Multi-wavelength optics**
- **Ethernet infrastructure**
- **Up to 6 measurement channels**
- **HMI Product Manager software with up to 200 measurement stations**
- **Pre-calibrated with NDC "SpeedCal" measurement algorithms**
- **Fieldbus connectivity**
- **Application Engineered for optimal performance**

For maximum convenience, all 710e devices feature Automatic Device Discovery...

710e: Enhancement

Processing power and speed, with economy of hardware: the 710e is designed with best practice in mind for operators, supervisors and managers...

The 710e Gauging System

Each system component performs clearly defined tasks to enable creation of a system with optimal location of 710e measurements, displays and process connectivity. All user interactions with the gauges or devices are permitted on the basis of Best Practice, in order to safeguard system and process integrity.

The **710e Gauge** contains all the processing power and intelligence, not only generating the highly stable and accurate measurement values, but outputting these via Ethernet to the other devices on the NDC network, and generating the displays on the HMI and OWS.

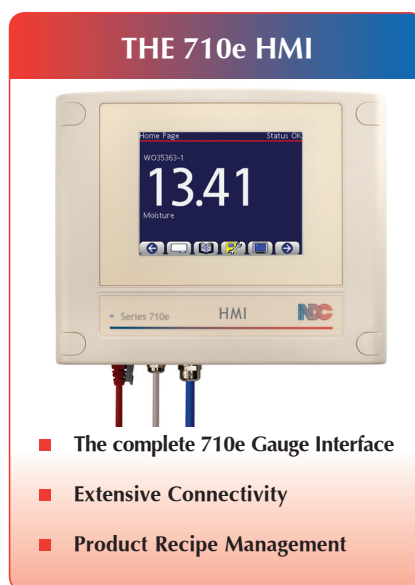
Each gauge is optimized for performance over its measurement range. For more information, consult the NDC **Industry Brochures & Application Notes**.

As standard, all 710e Gauges communicate externally via Ethernet, with the option to include Ethernet IP, Profinet, or Modbus TCP, or, with the addition of an optional NDC Gateway card in the HMI, OWS or User Port, Profibus DP or DeviceNet.

The **Hub** enables networking of more than 2 gauges and facilitates network connectivity. Featuring advanced switching technology, the Hub ensures that only the required information is transmitted between networks, providing best network integrity.

The **Human Machine Interface (HMI)** resides at the top of the device hierarchy, to provide supervisory access to up to 16 Series 710e gauges within the same network. The ¼ VGA colour touch screen provides clear displays of data on up to 16 user-configurable screens.

The HMI's interface allows storage and manipulation of product settings in each gauge and once saved, these can be manually or remotely recalled.

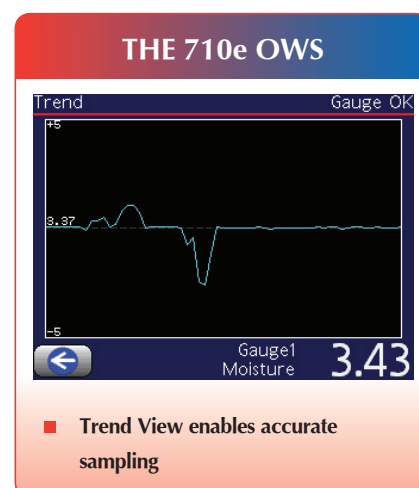


Extensive analogue and digital I/O provision, two onboard Ethernet connectors and an external (RJ45) connector, enable convenient communication with a PC, PLC, DCS or SCADA, and local or factory networks.

The HMI also features all of the functionality of the OWS.

The **Operator Workstation (OWS)** provides operator access to key functions associated with the process, including:

- Measurement displays
- Trend & measurement data
- Product sampling
- Auto Reference standardisation
- Diagnostic checks



Dedicated to one individual gauge, its ¼ VGA colour touchscreen provides an intuitive interface to gauge functions and displays real-time measurements, but cannot be used to change any process-critical gauge settings - this is the function of the HMI. Its Ethernet ports (2x wired, 1x RJ45) enable connection to the gauge and the 710e network and allow a computer running NDC's **GaugeToolsXL** software to be directly connected.

The **User Port**, like the HMI, provides 4 scalable analogue outputs, 8 opto-isolated digital inputs and 8 FET driven digital outputs and can be located where connectivity is needed, anywhere in the network.

710e: Ethernet

No other gauge available today matches the 710e's flexibility of configuration: whether in single or multi-gauge formats...

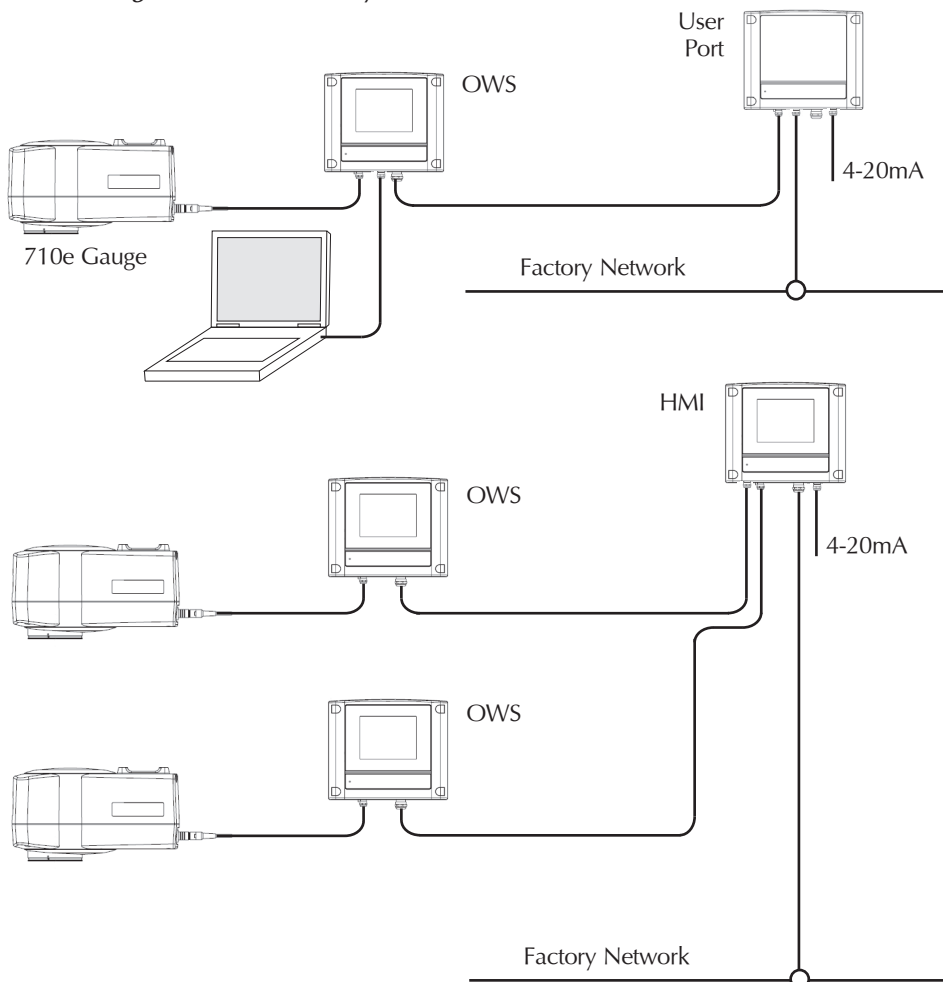
Automatic Device Discovery

means that as soon as a 710e Gauge or Device is connected to the Ethernet network, it binds automatically to it without the need to enter an IP address or change communication settings, and is automatically detected by other 710e Devices present. This makes configuring the 710e more convenient than any other system.

As the gauges perform all processing functions, and generate the displays, there are very few constraints on the location of other components. The HMI screens are quickly and easily configured using the drop down list of connected gauges to create an interface which fully reflects the system configuration.

710e Configuration Examples

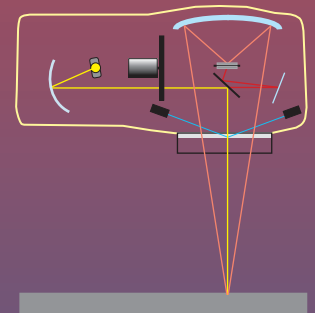
For more information, consult the *710e Configuration & Connectivity Guide*.



How the 710e works

The 710e gauge works on the principal that product constituents such as water absorb Near Infra-red Light at specific wavelengths. When a substance is exposed to this NIR light, it absorbs an amount of it which is related to the amount of constituent present, and reflects the rest.

The 710e generates and emits these specific wavelengths by using rotating optical filters to transform the light from a QH lamp into sequential pulses of light at the desired wavelengths.



It then captures the reflected light using a special multi-segment mirror to focus it onto a light-sensitive detector. Before leaving the gauge, a beam-splitter diverts a portion of the beam to the secondary detector, to form the reference signal against which the reflected light will be compared.

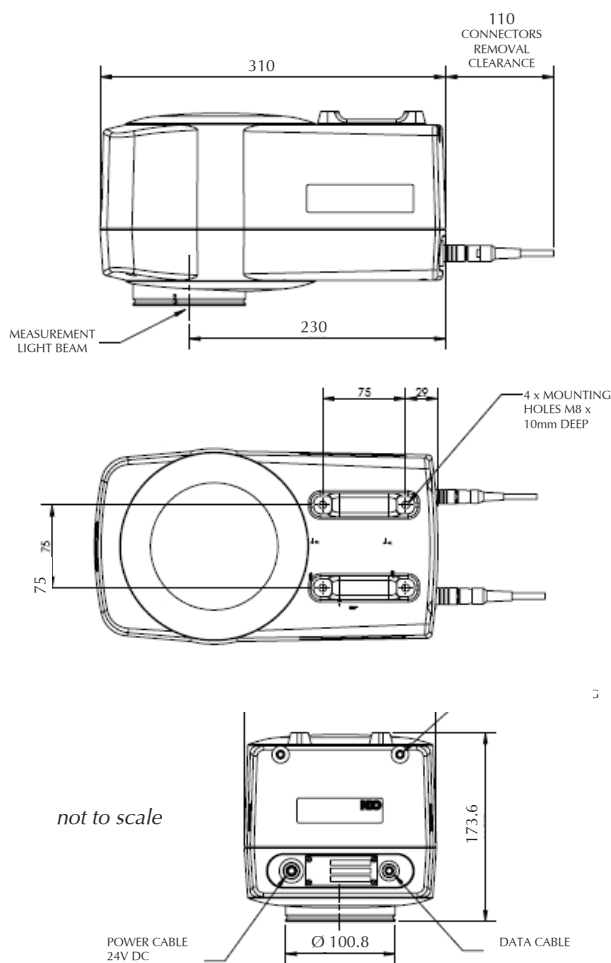
The 710e processes the detector signals to generate a linear output proportional to the detected amount of measured constituent. The 710e's patented optics reject ambient light, RH and temperature influences to provide a highly stable measurement, irrespective of product height fluctuation.

Dimensions

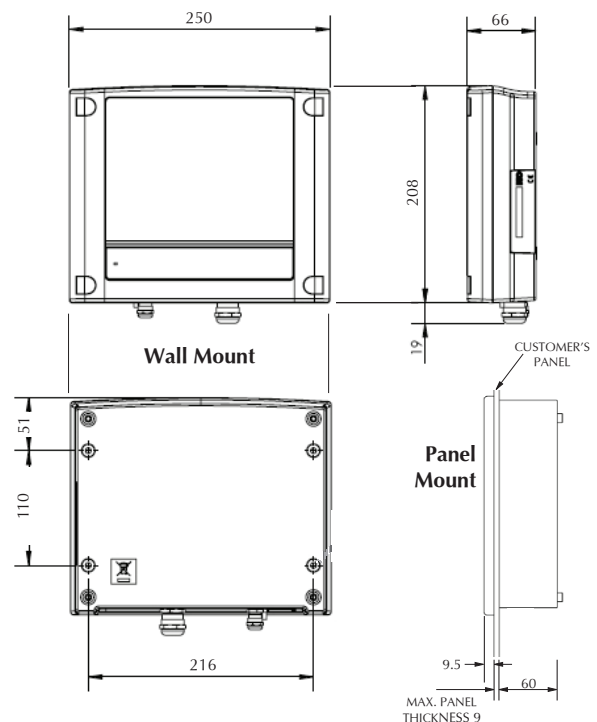
HMI, Operator Workstation, User Port and Hub all use identically sized housings for ease of installation...

710e Component Dimensions

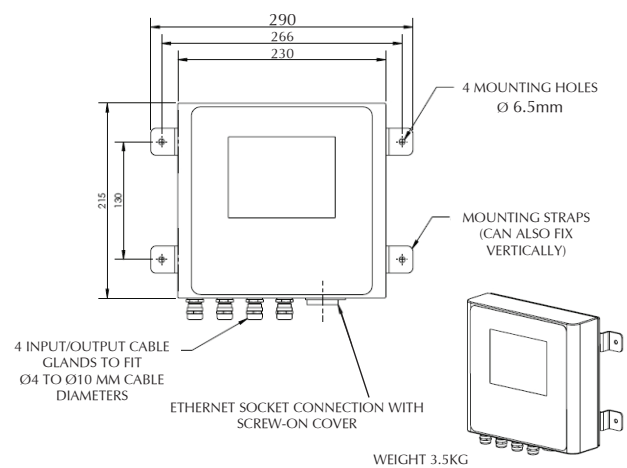
**710e Backscatter Gauge
(MM710e, TM710e, CM710e, IG710e)
Cast Alloy Version**



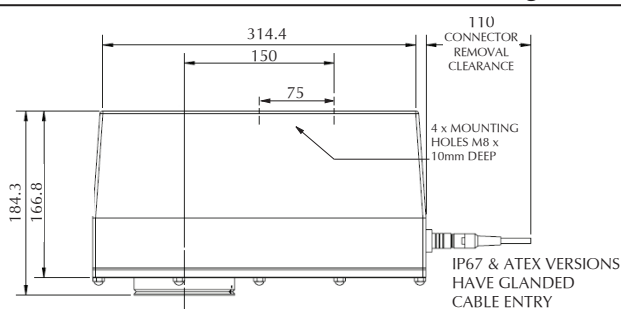
**HMI (Human Machine Interface),
OWS (Operator Workstation),
Hub (Boxed) and User Port**



Stainless Steel IP65/IP67 Housing



Stainless Steel IP65/IP67/ATEX Housing



For more information, see also the: **SERIES 710e CONFIGURATION AND CONNECTIVITY GUIDE**



Technical Specifications

710e Gauge		User Interfaces	
Electronics		HMI	OWS
<p>Processor: Texas Instruments™ Digital Signal Processor. Data Sampling Rate: 107KHz. Product Stations: up to 200 - Measurement Channels: up to 6. Measurement Speed: 1 x every 7.5ms (filterwheel rotation). Integration Period/Response Time: 16-200ms up to 1000s (configurable/ application dependent). Power Consumption: 35 Watts. Direct Outputs: Ethernet or optionally: Ethernet IP, Modbus TCP or Profinet (DeviceNet & Profibus DP via Gateway Card in HMI, User Port or OWS).</p>		Display	
Optics		1/4 VGA Colour Touch Screen	1/4 VGA Colour Touch Screen
<p>Wavelengths: 6, 8, 10, 12 or 16 Wavelengths (up to 6 measurements, application dependent). NIR Source: Quartz Halogen Lamp, 20W. Filterwheel Motor: 24V DC, Brushless. Motor Rotation Speed: 7,500 rpm (50Hz), 8,000 (60Hz). Measurement Area Diameter [and Distance to Product]: 10mm [140±10mm]; 25mm [200±25mm]; 60mm [250mm±100mm] depending on Gauge type and application. High Speed Gating: (Optional) Product Presence/Absence detection Sensors with ultra-fast Response Time. Can also use external inputs.</p>		Displays Gauge Values (up to 4 per screen, on up to 16 user-configurable screens) plus pages from HMI Product Manger software.	Displays up to 4 Gauge Measurement Values, plus pages from OWS interface software.
Environmental		Interface	
<p>Environmental: IP65 (NEMA 4 Equivalent) - Cast Alloy (7.2kg) with Glass Measurement Window or Stainless Steel with Sapphire window (8.5kg). Optional: IP67 - 316 Stainless with glanded cable entry. ATEX Compliance: certified unit available, based on the IP67 316 Stainless Steel housing, to Zones 20, 21, 22. Air Purge Window Shield: (Optional), for dusty or steamy process environments: Cast Alloy or Stainless Steel, requires constant clean air supply. All 710e Devices sealed as standard to IP65 (NEMA 4 Equivalent).</p>		NDC Product Manager Software with pass code protected access to all product and measurement files and set-up and selection parameters of all connected 710e gauges, plus all OWS functions.	
Compliance & Electrical - 710e Gauge & Devices		Connectivity	
<p>CE: all devices comply with EMC: EN61326. Operating Temperature Range: 0 - 50°C (all devices). Electrical: all 710e Gauges and Devices are designed to operate on 24V DC +/-20%, and are internally protected from over-voltage and polarity reversal. Power can be provided from an NDC Power Supply Unit (accepts 80 - 260V AC input) or directly from a local 24V supply. All connections made by screw terminals with glanded cable entry. Cable length restrictions may apply: Please see SERIES 710e CONFIGURATION AND CONNECTIVITY GUIDE for details.</p>		All units feature Automatic Device Discovery when connected to NDC Ethernet local network, with no IP address insertion required.	
		Standard: Ethernet Optional: Ethernet IP or Modbus TCP or Profinet Optional (using NDC Gateway Card): DeviceNet, Profibus DP, Canbus Open 2 x Ethernet Ports (Screw terminals) 1 x Ethernet Port (RJ45 connector) 4 x Analogue Outputs (4-20mA) 8 x Digital Inputs (opto-isolated) 8 x Digital Outputs (FET driven)	Standard: Ethernet Optional: Ethernet IP or Modbus TCP or Profinet Optional (using NDC Gateway Card): DeviceNet, Profibus DP, Canbus Open 2 x Ethernet Ports (Screw terminals) 1 x Ethernet Port (RJ45 connector)
		Mounting/Fixing	
		All Devices are available in wall mounted or panel mounted versions. See opposite for dimensions.	
		Connecting Devices	
		User Port	Hub
		Connectivity	
		Connectivity and Outputs for the User Port are the same as those for the HMI.	Optional Configurations: - Boxed 8-Way (7x wired + 1x RJ45) - Boxed 4-Way (3x wired + 1x RJ45) - DIN-Rail Mounted 4-Way - DIN-Rail Mounted 8-Way

www.ndcinfrared.com

<p>NDC Infrared Engineering is represented in over 60 countries worldwide</p> <p>a spectris company</p> <p>www.ndcinfrared.com</p> <p>ISO9001:2000</p>	<p>NDC Infrared Engineering Ltd Bates Road, Maldon Essex, CM9 5FA United Kingdom</p> <p>Tel: +44 1621 852244 Fax: +44 1621 856180 Email: sales@ndcinfrared.co.uk</p>	<p>NDC Infrared Engineering Inc 5314 North Irwindale Avenue Irwindale, CA 91706 United States of America</p> <p>Tel: +1 626 960 3300 Fax: +1 626 939 3870 Email: info@ndcinfrared.com</p>	<p>NDC China Tel: +86 20 8666 2790 Email: info@ndcinfrared.com.cn</p> <p>NDC Germany Tel: +49 1801 977112 Email: info@ndcinfrared.de</p> <p>NDC India Tel: +91 20 2543 5768 Email: ndcindia@ndc.com</p>	<p>NDC France Tel: N° Azur: 0810 600 400 Email: info@ndcinfrared.fr</p> <p>NDC Japan Tel: +81 3 3255 8157 Email: info@ndcinfrared.jp</p> <p>NDC Brazil Tel: +55-11-5188-8166 Email: info@ndcinfrared.com.br</p>
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