General Specifications

GS 12Y03C00-01E

InfraSpec NR801EL
Fourier Transform Near-Infrared Analyzers, At-line model

InfraSpec

CE

■ Overview

The InfraSpec NR801 EL is the at-line model of NR800 series FT-NIR analyzer. It employs exactly the same hardware in the heart of the system (interferometer and detector) as NR800 process model and thus realizing high S/N (signal-to-noise) ratio, high wave number resolution and wide wavenumber scanning range those done in the NR800 process model. Direct model transfer to/from the NR800 series including process model is another key feature. This model transfer capability will drastically cut down model implementation time and cost at project stage while it provides more flexible and efficient model upgrade during routine operation.

Software specially developed for at-line model, Spectland 2 At-line, will make operation simple and user-friendly and will improve the work efficiency for at-line and Lab. measurement application.

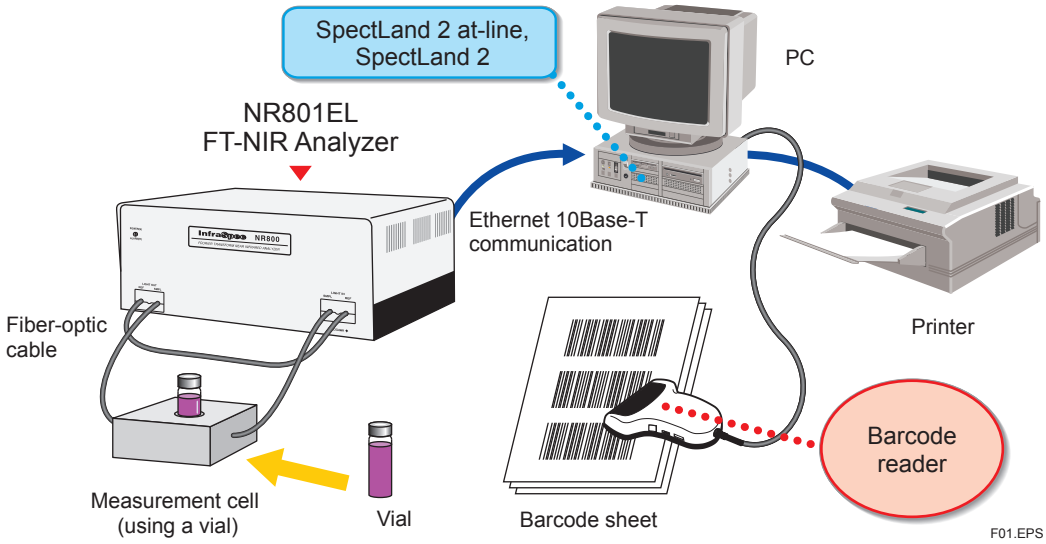
NR801EL

■ Features

- **Newly developed high-performance interferometer and detector**
  - High resolution: Up to 4 cm^{-1}, user-selectable setting
  - High S/N ratio: 2250:1 (RMS, 4 cm^{-1} resolution, 4100 to 4200 cm^{-1}, 1 sec.)
  - Wide wavelength scanning range: 900 to 2500 nm (11,000 to 4000 cm^{-1})
  - Wavelength reproducibility: 0.007 cm^{-1}
  - Wavelength accuracy: 0.04 cm^{-1}
  - Calibration model transfer and share between NR800 series *1
  - Various types of measurement cells (cuvette, vial, probe, and flow-through, etc.,)
  - High-speed Ethernet communication between PC and the analyzer
  - At-line analysis software (SPECTLAND2 at-line) for simple operation.

*1: This feature is available for analyzers employing identical optical system.

■ System Configuration Example (for Vial Cell Measurement)



■ Related Equipment

InfraSpec NR800 Fourier Transform Near-Infrared Analyzer (GS 12Y03A03-1E)

YOKOGAWA

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GS 12Y03C00-01E

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1. Specifications

The following specifications are based on the standard test prcedeure of Yokogawa Electric Corporation.

Also refer to section 5, “Model and Suffix Codes”.

(1) NR801EL Analyzer

a. Hardware Specifications

Principle: Fourier-transform Spectroscope
Enclosure: Desktop type
Measurement method: Transmission
Sample to be measured: Liquid
Light source: Halogen lamp (recommended replacement interval for continuous operation: 5000 hours)
Detector: InGaAs photodiode
Connecting to measurement cell: Fiber-optic cable
Fiber-optic cable connector at analyzer: FC type
Output: Ethernet (10Base-T): 1
Length of Ethernet communication cable: 3 to 40 m
Installation location requirements: Refer to section 3, “Installation Location Requirements”
Utilities: Refer to section 2, “Power Supply”
Weight: Approx. 30 kg
Wavelength scanning range: 900 to 2500 nm (11000 to 4000 cm^{-1})
Wavelength resolution: 4, 8, 16, 32, and 64 cm^{-1} (user-selectable)
Wavelength reproducibility: 0.007 cm^{-1}
Wavelength accuracy: 0.04 cm^{-1}
S/N ratio: 2250:1 (RMS, 4 cm^{-1} resolution, 4100 to 4200 cm^{-1}, 1 sec.)

b. Other Functions

Baseline compensation: Up to 10 points
Measurement spectrum saving

c. Compliant Standard

(1) Safety
ISA: ISA82.02.01 compliant
CSA: C22.2 No.61010-1-04 compliant
EN: EN61010-1:2001 compliant
Installation category (Overvoltage categoly) II *
Pollution Degree 2 **

*: Describes a number which defines a transient overvoltage condition. It implies the resulation for implusee withstand coltage. “II” applies to electrical equipment which is supplied from fixed installations like distribution boards.

**:Describes the degree to a solid, liquid, or gas which deteriorates dielectric strength or surface resistivity is adhering. “2” applies to normal iondoor atmosphere. Normally, only non-conductive pollution occurs.

(2) EMC directive
EN61326-1:2006 compliant: Class A
EN61000-3-2:2006 compliant
EN61000-3-3:1995 +A1:2001 ;A2:2005 compliant

(3) CE-marking

(2) Fiber-optic Cable for Desktop Measurement

a. Silica Fiber-optic Cable (NR825)

Applicable wavelength range: 900 to 2100 nm
Connectors: FC connector on both ends, or FC connector on one end and SMA connector on the other (however, the reference cable must have FC connector on both ends).
Structure: Single core, flexible type
Configuration: 2 cables for measurement and 1 cable for reference
Length: To be specified for measurement cable; fixed at 60 cm for reference cable
Minimum bending radius: 100 mm, Lay the optic-fiber cable with large bending radius to prevent the attenuation of transmitted light.

b. Fluoride Fiber-optic Cable (NR826)

Applicable wavelength range: 900 to 2500 nm
Connectors: FC connector on both ends, or FC connector on one end and SMA connector on the other (however, the reference cable must have FC connector on both ends). Either must be specified.
Structure: Single core, flexible type
Configuration: 2 cables for measurement and 1 cable for reference
Length: To be specified for measurement cable; fixed at 75 cm for reference cable
Minimum bending radius: 120 mm, Lay the optic-fiber cable with large bending radius to prevent the attenuation of transmitted light.

(3) Software

a. SPECTLAND2 at-line (NR832) At-line Routine Analysis Software

(1) Outline
The Spectland 2 at-line is to be installed in PC to be connected to NR801EL and provides man-machine interface of NR801EL model. This software is specially developed for at-line model to suite the needs in operation and maintenance for at-line/Lab. use. It also enables simplified and easy operation/ maintenance of NR801EL.

(2) Major Functions
a. Communication Function
Communication link to NR801EL via Ethernet (10Base-T)
b. Measurement
Provides the following measurement options: sample measurement, blank measurement, and measurement verification (performance test with standard liquid). It allows users to decide measurement result against the criteria and if the results are acceptable, then save the data and print it (in specified print forms). The print items are selected in the Print dialog box.
c. Alarming
Outlier, Hi/Low limit detection for measurement value, and various system diagnostic alarms are provided.
d. Barcode reader interface
Barcode reader interface is provided and all the measurement conditions together with sample name are automatically set by barcode input.

e. Measurement condition/parameter Set
Allows users to set various conditions and parameters for communication, measurement, operator, and printing.

b. SPECTLAND2 (NR831) Measurement and Maintenance Software

(1) Outline
SPECTLAND2 is operation and maintenance software for NR800 series FT-NIR Analyzer.

Basic engineering and maintenance of NR800 is to be done through this software.

SPECTLAND2 is to be installed in the Engineering PC to be connected to the analyzer.

(2) Main Windows

a. Manual Spectrum Window
Enables the analyzer to measure spectra for Chemometrics (calibration model generation software). Spectra data is saved in the file and displayed.

b. Auto Spectrum Window
Allows users to upload spectra data to the PC during continuous measurement (Run/Auto mode) at periodic intervals, upon outlier detection, or measurement value variation failure. This data is saved and displayed.

c. Power Spectrum Window
This window is available for C level users (maintenance personnel) and displays power spectra data.

d. Interferogram Window
This window is available for C level users and displays collected interferogram data.

e. Real-time Trend Windows
Display measurement values of Nos. 1 to 6 and Nos. 7 to 12 components in two separate trend graph windows for each stream. Up to 10 windows can be open at the same time.

f. Historical Trend Windows
Display historical trend data. Trend data of 24 hours for each stream is saved to a file. Up to 4 windows can be open at the same time.

g. Parameter Window
Displays the current parameter settings for the analyzer. User B or C level users can change the settings.

h. Tab-controlled Alarm Status/History Windows
The Alarm Status window displays the active alarms for the analyzer, while the Alarm History window displays all the past alarms. The alarm history can be deleted with commands.

i. Tab-controlled Maintenance Window
Displays the A/D reference value and servo-related data of the analyzer. This window is available for C level users.

j. Tab-controlled Communication Status Window
Display the communication status between the PC and the analyzer. This window is available for C level users.

c. Chemometrics Software (NR530)

(1) Outline
The NR530 is chemometrics software to generate calibration models as well as model evaluation and validation. The software to be installed on the PC.

(2) Specifications
Technique for Generating Calibration Models Partial least square (PLS)

2. Power Supply

Item	Specifications
Power supply voltage	100, 115, 200, or 230 V AC, single phase, 50/60 Hz *
Voltage fluctuation	Rating 10 %, 50/60 ±2 Hz
Power consumption	Approx. 200 VA

*: To be specified for ordering. For details, refer to "Model and Suffix Codes."

3. Installation Location Requirements

Item	Requirements
Location	Non-hazardous location, indoors, where the analyzer shall not be exposed to weather, sunlight, or radiant heat.
Ambient temperature	0 to 35 ºC
Ambient humidity	0% to 80% RH (no condensation)
Vibration	Minimum vibration (vibration acceleration of 2 m/s^2 or less).
Atmosphere	Minimum dust and no corrosive or toxic substances.
Altitude	Up to 2000 m above sea level.

Note; Avoid physical impact as it may result in a malfunction.

4. Recommended Specifications for PC

• PC

Model	IBM PC/AT compatible desktop	
OS	Microsoft Windows Vista Business Edition	Microsoft Windows 2000 SP4/XP SP2
CPU	1 GHz or more	
Memory	1 GB or more	256 MB or more
Hard disk	10 GB (for program) and 15 GB (for data storage) or more	
Ethernet adapter	10 Base-T	
Display	1024 x 768 pixels or greater	
Others	• CD-ROM drive • USB port	

• Color printer

Prepare if necessary.

• Connection Cables and other Devices

Prepare if necessary.

• Electrical Cable for Ethernet

Specifications: 10Base-T, 8 core shielded
Length: 3 to 40 m

• Barcode Reader

Interface: USB
Reading width: At least 65 mm
Resolution: 0.125 mm
Reading code: CODE39

5. Model and Suffix Codes

5.1 NR801EL Desktop Analyzer with CE Marking Suffix Code

Model	Suffix Code	Option Code	Description
NR801EL	••••••••••	••••••••••	FT-NIR Analyzer, At-line model with CE marking
Language	-E	••••••••••	English
Power supply	1	••••••••••	100 V AC ±10%, 50/60 Hz
	3	••••••••••	115 V AC ±10%, 50/60 Hz
	4	••••••••••	200 V AC ±10%, 50/60 Hz
	6	••••••••••	230 V AC ±10%, 50/60 Hz
Power cable	-00	••••••••••	No power cable attached
	-01	••••••••••	For U.S.A. and Japan (UL/CSA)
	-02	••••••••••	For Germany (VDE)
	-03	••••••••••	For Australia (SAA)
	-04	••••••••••	For UK (BS)
	-05	••••••••••	For China (CCC)
Number of measuring channels	-S1	••••••••••	Single channel
Wavelength scanning range	W1	••••••••••	900 to 2100 nm
	W2	••••••••••	900 to 2500 nm
-	-21	••••••••••	Always “-21”
-	-00	••••••••••	Always “-00”
-	0	••••••••••	Always “0”
-	-0000	••••••••••	Always “-0000”

5.2 Fiber-optic Cable for Desktop Measurement

(1) Silica Fiber-optic Cable

Model	Suffix Code	Option Code	Description
NR825	••••••••••	••••••••••	Silica fiber-optic cable for At-line model
Connector	-FF	••••••••••	FC connector at both ends
	-FS	••••••••••	FC at analyzer, SMA at cell/probe
Cable length (cm)	-L060	••••••••••	60
	-L150	••••••••••	150
	-L250	••••••••••	250
-	-000	••••••••••	Always “-000

(2) Fluoride Fiber-optic Cable

Model	Suffix Code	Option Code	Description
NR826	••••••••••	••••••••••	Fluoride fiber-optic cable for At-line model
Connector	-FF	••••••••••	FC connector at both ends
	-FS	••••••••••	FC at analyzer, SMA at cell/probe
Cable length (cm)	-L075	••••••••••	75
	-L150	••••••••••	150
	-L250	••••••••••	250
-	-000	••••••••••	Always “-000

5.3 Software

(1) SPECTLAND2 at-line

Model	Suffix Code	Option Code	Description
NR832	••••••••••	••••••••••	At-line/Routine Analysis Software
Language	-E	••••••••••	English
-	-N	••••••••••	Always "-N
-	-N	••••••••••	Always "-N

Package contents: One CD-ROM
One instruction manual

(2) SPECTLAND2

Model	Suffix Code	Option Code	Description
NR831	••••••••••	••••••••••	Measurement and maintenance software
Language	-E	••••••••••	English
-	-N	••••••••••	Always "-N
-	-N	••••••••••	Always "-N

Package contents: One CD-ROM
One instruction manual

(3) Chemometrics Software

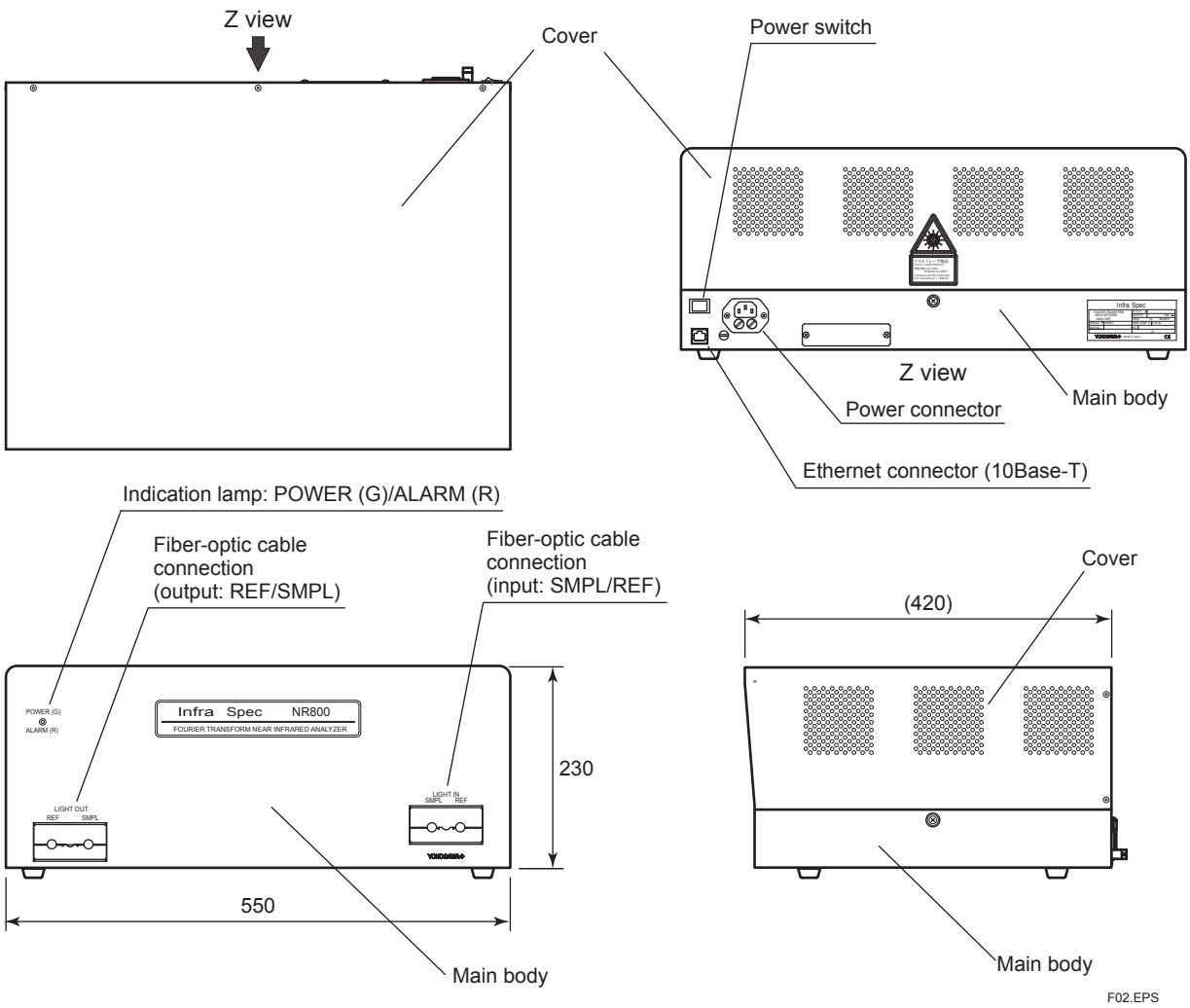
Model	Suffix Code	Option Code	Description
NR530	••••••••••	••••••••••	Unscrambler analysis and calibration model generating software Chemometrics Software
Language	-E	••••••••••	English
-	-N	••••••••••	Always "-N
-	-N	••••••••••	Always "-N

Package contents: One CD-ROM
One instruction manual
One set of user registration document

6. Outline Drawing

6.1 Analyzer (NR801EL)

Unit; mm



F02.EPS

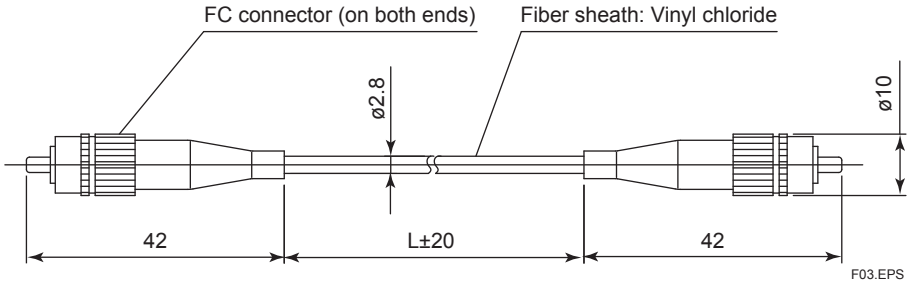
Coating Color

- Cover: Frosty white (Munsell No.: 2.5Y 8.4/1.2)
- Main body: Lamp blank (Munsell No.: 08Y 2.5/0.4)

6.2 Fiber-optic Cable

(1) Silica Fiber-optic Cable for At-line Model (NR825)

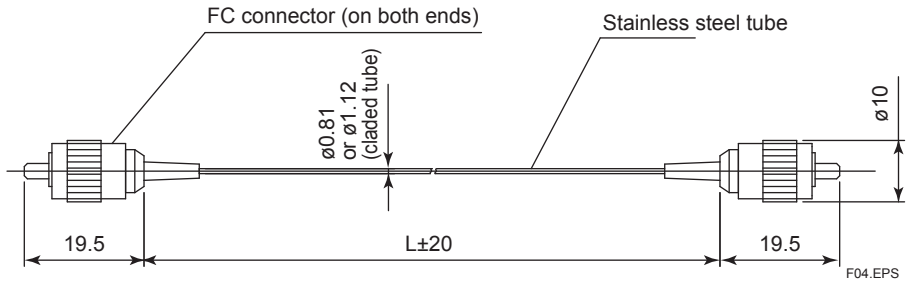
Unit: mm



Note 1: When ordering optical fiber as per MS code. 2 measurement cable and 1 reference cable come together. Dimension and shape of cable are identical for both measurement and reference cable. The above drawing is an example of fiber with FC connectors. The length (L) of each measurement cable must be specified in reference to “Model and Suffix Codes for ordering. ” The length of the reference cable is fixed at 60 cm.
Note 2: The figure above shows an example of a cable with an FC connector on both ends. Shape and dimensions for a cable with FC and SMA connectors differs from the shown above.

(2) Fluoride Fiber-optic Cable for At-line Model (NR826)

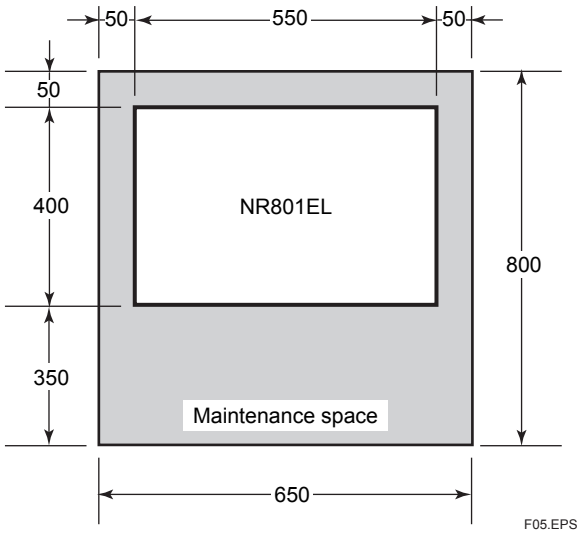
Unit: mm



Note 1: When ordering optical fiber as per MS code. 2 measurement cable and 1 reference cable come together. Dimensions and shape of cable are identical for both measurement and reference cable. The above drawing is an example of fiber with FC connectors. The length (L) of each measurement cable must be specified in reference to “Model and Suffix Codes for ordering. ” The length of the reference cable is fixed at 75 cm.
Note 2: When a cable length is 75 cm, a stainless steel tube is coverd with a polyimide tube.
Note 3: The figure above shows an example of a cable with an FC connector on both ends. Shape and dimensions for a cable with FC and SMA connectors differs from the shown above.

7. Installation Space

Unit: mm



8. Support for Calibration Model Generation

(1) On-site Guidance of Calibration Model Generation

A Yokogawa engineer will train an user's site personnel in the procedure to generate a calibration model for one measured item using a user-provided sample with its laboratory analysis results.

(2) Calibration Model Generation

Yokogawa generates a calibration model using the necessary quantity of user-provided samples with laboratory analysis results. A predefined SEP (standard error of prediction) value of 1σ will be used as the measurement target value. The target value, sample quantity, and other details are determined separately for each application.

(3) Others

Other support options for calibration model generation and maintenance include:

- Sampling test for potential users
- Maintenance contracts
- Sampling/model generation/maintenance consulting service.

Contact a Yokogawa sales representative for further information, and advice on the best solution for your needs.