

General Specifications

InfraSpec™ NR801EL Fourier Transform Near-Infrared Analyzer, Desktop type

GS 12Y03C00-01E

■ Overview

The NR801EL 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.



NR801EL

Note: NR801EL is designed for industrial use and cannot be used non-industrial purpose.

■ Features

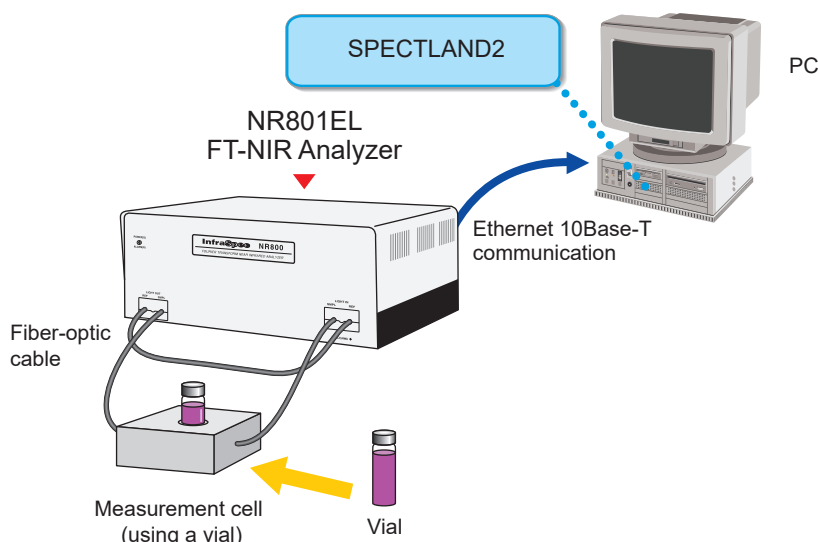
● Newly developed high-performance interferometer and detector

- 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

*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 12Y03A03-01E)

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1. Specifications

The following specifications are based on the standard test procedure 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
 Classification of laser product:
 Class 1 Laser Product
 (IEC 60825-1:2007/2014)
 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

This instrument is a Class A product, and is designed for use in an industrial environment. Please use this instrument in an industrial environment only.

(1) Safety

CSA: C22.2 No.61010-1
 Installation category (Overvoltage category) II *
 Pollution Degree 2 **

*: Describes a number which defines a transient overvoltage condition. It implies the regulation for impulse withstand voltage. "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 indoor atmosphere. Normally, only non-conductive pollution occurs.

(2) EMC directive

Korea Electromagnetic Conformity Standard
 RCM Mark
 EN 61326-1 Class A (For use in industrial locations)

(2) Fiber-optic Cable for Desktop Measurement

Not only the followings but also other types of NR800 series Fiber-optic cable are available. Refer to GS 12Y03A03-01E.

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) Measurement Cell

Various types of the cell are available. Please contact with sales dept.

(4) Software

a. SPECTLAND™ 2 (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.

b. 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 (non-explosive atmosphere), indoors, where the analyzer shall not be exposed to weather, sunlight, or radiant heat.
Ambient temperature	0 to 35 °C
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

Computer	IBM PC/AT compatible desktop
Operating system (OS)	Microsoft Windows 10 Professional 64bit
CPU	Intel Core i5 or higher
RAM	8 GB or more
Hard disk space	10 GB (for program) and 25 GB (for data storage) or more
Ethernet adapter	10 Base-T
Display	SVGA mode (1024 x 768 pixels or more)
Other	CD-R drive is recommended

• 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

5. Model and Suffix Codes

5.1 NR801EL Desktop Analyzer

[Style: S2]

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

[Style: S1]

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

(2) Fluoride Fiber-optic Cable

[Style: S1]

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

5.3 Software

(1) SPECTLAND2

Model	Suffix Code	Option Code	Description
NR831	.....	.....	Measurement and maintenance software
Language	-E	.....	English
-	-N	.....	Always "-N
-	-N	.....	Always "-N
Option		/UP	Version up

Package contents: One CD-ROM
One instruction manual

(2) Chemometrics Software

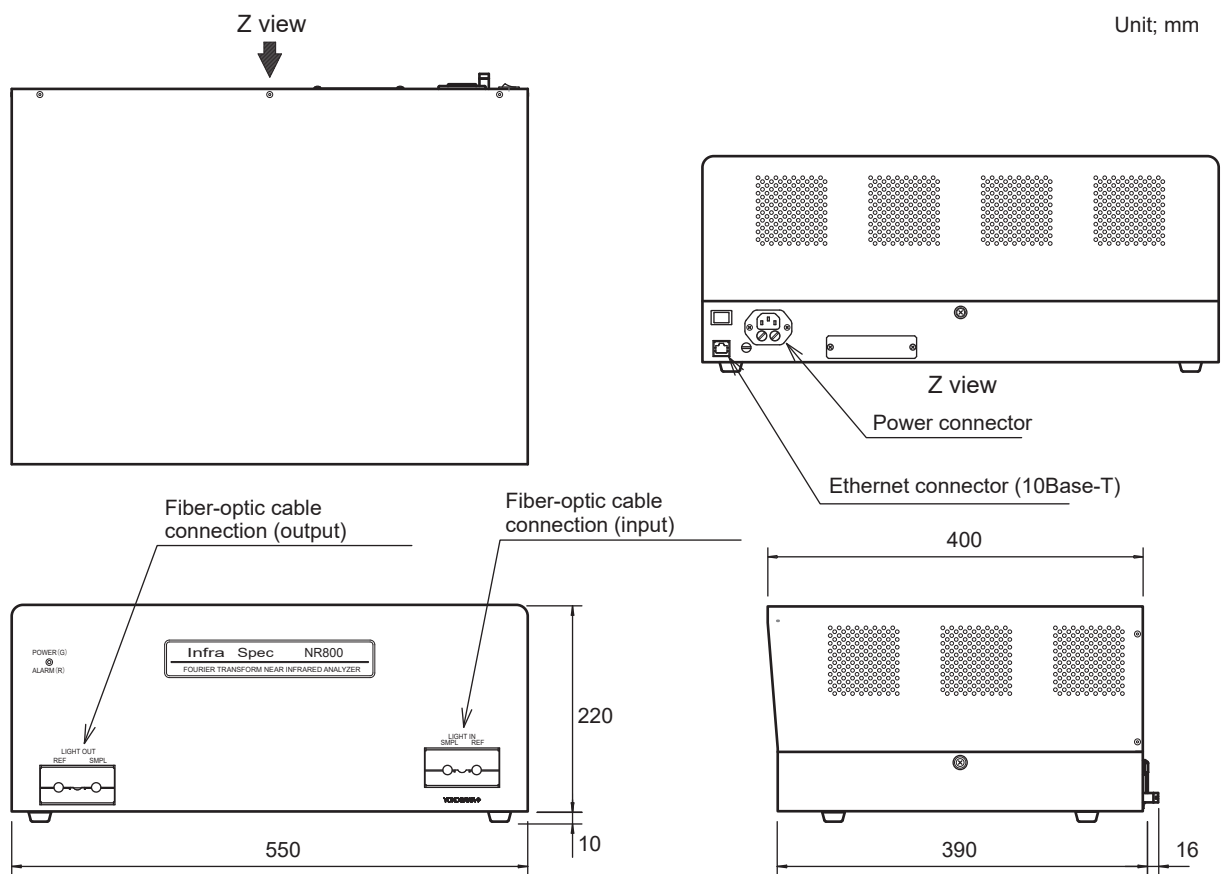
[Style: R1]

Model	Suffix Code	Option Code	Description
NR530	.....	.....	Chemometrics software
Language	-E	.....	English
Type	-V	.....	VEKTOR DIREKTOR
-	-N	.....	Always "-N

Package contents: One CD-ROM (Install disc/User's manual)
One set of user registration document
One set of license key document

6. Outline Drawing

6.1 Analyzer (NR801EL)

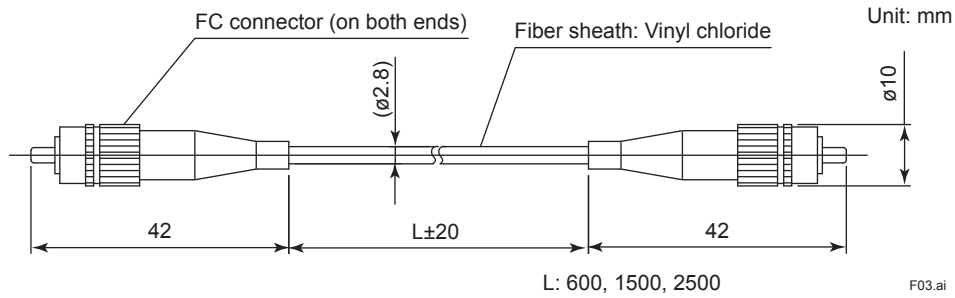


Coating Color

- 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

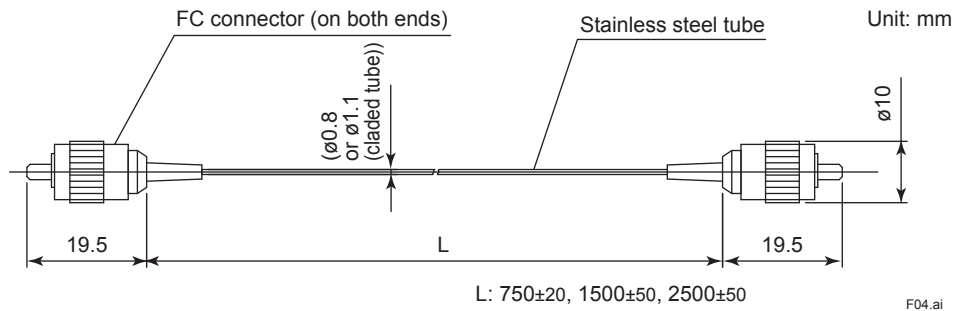
(1) Silica Fiber-optic Cable for At-line Model (NR825)



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)

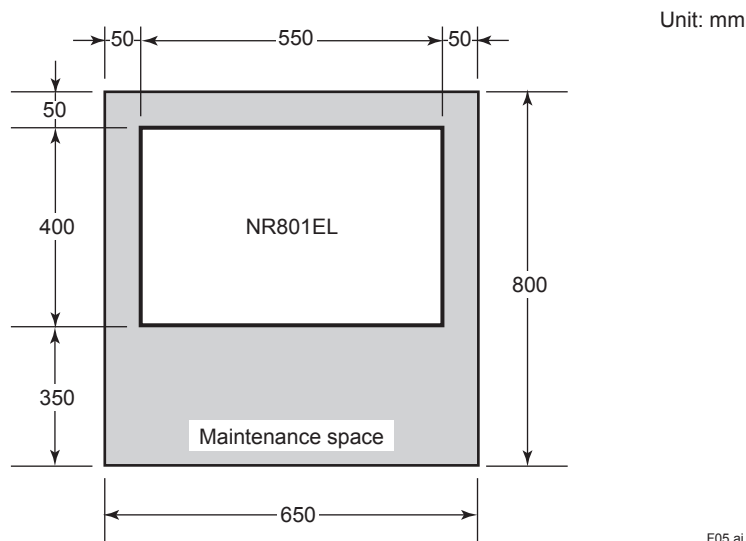


Note 1: When ordering optical fiber as per MS code. 2 measurement cable and 1 reference cable come together. Dimensions and shape of cable are identical for both measurement and reference cable. The above drawing is an example of fiber with FC connectors. The length (L) of each measurement cable must 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 covered 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



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.

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