User's Manual

IR810S
Explosion protected model Infrared Gas Analyzer
Start-up and Safety Precautions

IM 11G06D01-01EN

YOKOGAWA
Yokogawa Electric Corporation

IM 11G06D01-01EN
3rd Edition

PREFACE

We are grateful for your purchase of Yokogawa's Infrared Gas Analyzer, Explosion protected model: IR810S. Read this instruction manual carefully.

The related documents are as follows.

General Specifications:	GS 11G06D01-01EN	
User's Manual:	IM 11G06D01-01EN	IR810S Start-up and Safety Precautions (this manual)
	IM 11G06D01-02EN	IR810S Operation and Installation
	TI 11G06A01-01EN	Communication Functions (MODBUS)
	IM 11M13G01-02EN	ZR802S Explosion-proof Zirconia Oxygen Analyzer, Converter

The "EN" in the document number is the language code, meaning English

An exclusive User's Manual might be attached to the products whose suffix codes or option codes contain the code "Z" (made to customers' specifications). Please read it along with this manual.

For the latest User's Manual, download it from our website or scan the QR code.

Search by product model name (IR810S).

https://www.yokogawa.com/library/

Inspection of product

On receipt of the product, inspect the package and note it has no damage caused by the delivery. Confirm the specification of the product conforms with your order and accessories are all delivered. Check the product code labeled on a model plate is correct. See Model and Suffix Code and chapter 1 of this manual.

Notes on Handling User's Manuals

- Please hand over the user's manuals to your end users so that they can keep the user's manuals on hand for convenient reference.
- Please read the information thoroughly before using the product.
- The purpose of these user's manuals is not to warrant that the product is well suited to any particular purpose but rather to describe the functional details of the product.
- No part of the user's manuals may be transferred or reproduced without prior written consent from YOKOGAWA.
- YOKOGAWA reserves the right to make improvements in the user's manuals and product at any time, without notice or obligation.
- If you have any questions, or you find mistakes or omissions in the user's manuals, please contact our sales representative or your local distributor.
- This manual is an essential part of the product ; keep it in a safe place for future reference.

Drawing Conventions

Some drawings may be partially emphasized, simplified, or omitted, for the convenience of description.

Some screen images depicted in the user's manual may have different display positions or character types (e.g., the upper / lower case). Also note that some of the images contained in this user's manual are display examples.

Trademark policy

- All names of company, brand of product used in this manual are registered trademarks.
- TM or ® to signify brand or trademarks are not used in this manual.

Copyright

Product Disposal

The instrument should be disposed of in accordance with local and national legislation/ regulations.

IR810S Fonts

Adobe-Helvetica

◆ CE marking products

■ Authorized Representative in EEA

The Authorized Representative for this product in EEA is Yokogawa Europe B.V. (Euroweg 2, 3825 HD Amersfoort, The Netherlands).

■ Identification Tag

This manual and the identification tag attached on a packing box are essential parts of the product. Keep them together in a safe place for future reference.

■ Users

This product is designed to be used by a person with specialized knowledge.

■ Information of the WEEE Directive

This product is purposely designed to be used in a large scale fixed installations only and, therefore, is out of scope of the WEEE Directive. The WEEE Directive does not apply. This product should be disposed in accordance with local and national legislation/regulations.

The WEEE Directive is only valid in the EU.

◆ Control of Pollution Caused by the Product

This is an explanation for the product based on “Control of Pollution caused by Electronic Information Products” in the People’s Republic of China.

产品中有害物质的名称及含量

部件名称	有害物质					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr (VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
外壳(金属)	×	×	×	×	○	○
外壳(塑料)	×	×	×	×	○	○
印刷电路板组件	×	×	×	×	○	○

○： 表示该有害物质在该部件中所有均质材料中的含有量都在GB/T26572所规定的限量要求以下。
×： 表示该有害物质至少在该部件的某一均质材料中的含有量超出GB/T26572所规定的限量要求。

环保使用期限：这个标志是基于SJ/T11364，在中国（不包括台湾，香港，澳门）贩售的电子电器产品所适用的环保使用期限。

只要遵守产品上关于安全及使用上的注意事项，从制造之日起计算在该年限内，不会发生制品内的有害物质外泄，突然变异，对环境或人体以及财产产生重大影响的情况。

（注） 该年限是《环境保护使用期限》，不是产品的保质期限。
另外，关于替换部件的推荐替换周期，请阅读使用说明书。

Safety Precautions

Safety, Protection, and Modification of the Product

- This manual is intended for the following personnel :
  - Engineers responsible for installation, wiring, and maintenance of the equipment
  - Personnel responsible for normal daily operation of the equipment.
- In order to protect the system controlled by the product and the product itself and ensure safe operation, observe the safety precautions described in this user's manual. We assume no liability for safety if users fail to observe these instructions when operating the product.
- If this instrument is used in a manner not specified in this user's manual, the protection provided by this instrument may be impaired.
- If any protection or safety circuit is required for the system controlled by the product or for the product itself, prepare it separately.
- Be sure to use the spare parts approved by Yokogawa Electric Corporation (hereafter simply referred to as YOKOGAWA) when replacing parts or consumables.
- Modification of the product is strictly prohibited.
- The following safety symbols are used on the product as well as in this manual.

WARNING

This symbol indicates that an operator must follow the instructions laid out in this manual in order to avoid the risks for the human body and health including risk of injury, electric shock, or fatalities. or the damages to instruments. The manual describes what special care the operator must take to avoid such risks.

CAUTION

This symbol indicates that the operator must refer to the instructions in this manual in order to prevent the instrument (hardware) or software from being damaged, or a system failure from occurring.

The following are signal words to be found only in our instruction manuals.

CAUTION

This symbol gives information essential for understanding the operations and functions.

NOTE

This symbol indicates information that complements the present topic.

This symbol indicates Protective Ground Terminal.

Warning and Disclaimer

The product is provided on an "as is" basis. YOKOGAWA shall have neither liability nor responsibility to any person or entity with respect to any direct or indirect loss or damage arising from using the product or any defect of the product that YOKOGAWA cannot predict in advance.

CAUTION

• Incomplete installation may result in a fall, electric shock, fire, or injury.

• It is a heavy product. Install with care. Injury or accident may result from tipping over or falling.

• During installation work, care should be taken to keep the unit free from cable chips or other foreign objects. Otherwise, it may cause fire, trouble or malfunction of the unit.

WARNING

In piping, the following precautions should be observed. Wrong piping may cause gas leakage. If the leaking gas contains a toxic component, there is a risk of serious accident being induced. Also, if combustible gas is contained, there is a danger of explosion, fire or the like occurring.

- Connect pipes correctly referring to the instruction manual.
- Exhaust should be led outdoors so that it will not remain in the locker and installation room.
- Exhaust from the analyzer should be relieved in the atmospheric air in order that an unnecessary pressure will not be applied to the analyzer. Otherwise, any pipe in the analyzer may be disconnected to cause gas leakage.
- For piping, use a pipe and a pressure reducing valve to which oil and grease are not adhering. If such a material is adhering, a fire or the like accident may be caused.

CAUTION

- Wiring work must be performed with the main power set to OFF to prevent electric shocks.
- Enforce construction of class-D grounding wire by all means. If the specified grounding construction is neglected, a shock hazard or fault may be caused.
- Wires should be the proper one meeting the ratings of this instrument. If using a wire which cannot endure the ratings, a fire may occur.
- Be sure to use a power supply of correct rating. Connection of power supply of incorrect rating may cause fire.

WARNING

- Do not smoke nor use a flame near the gas analyzer. Otherwise, a fire may be caused.
- Do not allow water to go into the gas analyzer. Otherwise, hazard shock or fire in the instrument may be caused.

WARNING

- When performing maintenance, inspection, or other work with the top cover (or front door) of the product open, be sure to safely shut off the measuring gas line and provide sufficient ventilation inside and around the product to prevent poisoning, fire, or explosion due to gas leakage or other causes.

CAUTION

- Do not power on the product with the top cover (or front door) of the product open. Otherwise, dust, foreign matter, etc. may stick on internal walls, thereby causing faults.

CAUTION

Be sure to observe the following for safe operation avoiding the shock hazard and injury.

• Do not touch the equipment with wet hands.

• Dispose of maintenance parts and other replacement parts in accordance with local rules.

Other cautions

Operation of this instrument is performed on a touch panel. Pressing the appropriate part of the display screen will expand the screen, and calibration operations and setting changes can be easily executed, so please be careful not to operate it incorrectly.

◆ Compliant Standards

Safety, EMC, and RoHS conformity standards

Safety:

CE:
EN 61010-1, EN IEC 61010-2-030
GB30439
Installation altitude: 2000 m or less
Category based on IEC 61010: II (Note1)
Pollution degree based on IEC 61010: 2 (Note2)

Note1
Installation category, called over-voltage category, specifies impulse withstand voltage.
Category II is energy-consuming equipment to be supplied from the fixed installation.

Note2
Pollution degree indicates the degree of existence of solid, liquid, gas or other inclusions which may reduce dielectric strength.
Degree 2 is the normal indoor environment.

EMC:

CE:
EN 61326-1 Class A, Table 2 (For use in industrial locations)
EN 61326-2-3
EN 61000-3-2
EN IEC 61000-3-2
EN 61000-3-3
RCM: EN61326-1 Class A, Table2

Note: · This instrument is a Class A product, and it is designed for use in the industrial environment. Please use this instrument in the industrial environment only.
· Influence of immunity environment (Criteria A): Output shift is specified within ±15% of F.S.

Environmental regulation:

RoHS : EN IEC 63000
Waste Electrical and Electronic Equipment (WEEE) Directive:
This product is purposely designed to be used in a large scale fixed installations only and, therefore, is out of scope of the WEEE Directive. The WEEE Directive does not apply.
The WEEE Directive is only valid in the EU.
REACH: Regulation (EC) 1907/2006

Explosion protection approval

EU-TYPE (ATEX):

Applicable Standard:	EN IEC 60079-0, EN 60079-1, EN 60079-2
Type of protection	II 2 G Ex db pxb IIB + H2 T4 Gb
Ambient temperature	0ºC to 45ºC
Enclosure Rating	IP4X

IECEx:

Applicable Standard:	IEC 60079-0, IEC 60079-1, IEC 60079-2
Type of protection:	Ex db pxb IIB + H2 T4 Gb
Ambient temperature	0ºC to 45ºC
Enclosure Rating	IP4X

GB EX (by NEPSI):

Applicable Standard:	GB/T 3836.1, GB/T 3836.2, GB/T 3836.5
Type of protection:	Ex db pxb IIB+H2 T4 Gb
Ambient temperature:	0ºC to 45ºC
Enclosure Rating:	IP4X

TAIWAN EX:

Registration: IECEx registered and approved for use in Taiwan. For explosion protection specifications, please refer to the IECEx section.

INDIA EX:

Approval: IECEx approved for use in India. For explosion protection specifications, please refer to the IECEx section. However, in India, only IECEx certificate of conformity for “d”, “p” is applicable.

After-Sales Warranty

Do not modify the product.

Yokogawa warrants the product for the period stated in the pre-purchase quotation. Yokogawa shall conduct defined warranty service based on its standard. When the customer site is located outside of the service area, a fee for dispatching the maintenance engineer will be changed to the customer.

During the warranty period, for repair under warranty carry or send the product to the local sales representative or service office. Yokogawa will replace or repair any damaged parts and return the product to you.

- Before returning a product for repair under warranty, provide us with the model name and serial number and a description of the problem. Any diagrams or data explaining the problem would also be appreciated.
- If we replace the product with a new one, we won't provide you with a repair report.

In the following cases, customer will be charged repair fee regardless of warranty period.

- Failure of components which are out of scope of warranty stated in instruction manual.
- Failure caused by usage of software, hardware or auxiliary equipment, which Yokogawa did not supply.
- Failure due to improper or insufficient maintenance by user.
- Failure due to misoperation, misuse or modification which Yokogawa does not authorize.
- Failure due to power supply (voltage, frequency) being outside specifications or abnormal.
- Failure caused by any usage out of scope of recommended usage
- Any damage from fire, earthquake, a storm and flood, lightning, disturbance, riot, warfare, radiation and other natural changes.

Yokogawa does not warrant conformance with the specific application at the user site. Yokogawa will not bear direct/indirect responsibility for damage due to a specific application.

Yokogawa will not bear responsibility when the user configures the product into systems or resells the product.

Maintenance service and supplying repair parts will be covered for five years after the production ends. For repair this product, please contact the nearest sales office described in this instruction manual.

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Explosion protected model
Infrared Gas Analyzer
Start-up and Safety Precautions

IM 11G06D01-01EN 3rd Edition

CONTENTS

◆ PREFACE i
◆ CE marking products iii
◆ Control of Pollution Caused by the Product iv
◆ Safety Precautions v
◆ Compliant Standards viii
◆ After-Sales Warranty ix
1. Inspection of product 1
2. INSTALLATION 4
2.1 Where to install equipment 4
2.2 How to install 6
2.3 Piping 8
2.4 Wiring 9
2.4.1 Wiring type and location 10
2.4.2 Recommended Cables 11
2.4.3 Cable port, cable gland mounting 12
3. OPERATION 22
3.1 Checking the pressure in the pressurized enclosure 22
3.2 Power supply 23
4. MAINTENANCE 24
4.1 Daily check and maintenance procedures 24
4.2 How to replace a fuse 25
Appendix Explosion Protected Type Instrument 25
Revision Information i

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1. Inspection of product

On receipt of the product, inspect the package and note it has no damage caused by the delivery. If damage is found, do not discard the product's original packaging (including the outer box) upon arrival, immediately contact our sales department. Confirm the specification of the product conforms with your order and accessories are all delivered. Check the product code labeled on a model plate is correct. Also, please make sure that you have all the accessories.

■ Model and Suffix Code

Model	Suffix code	Option code	Description
IR810S			Explosion-protected model Infrared Gas Analyzer
Type	-AT		ATEX ZONE1
	-EC		IECEx ZONE1 (*1)
	-NE		NEPSI
Measuring Components	-A1		NO
	-A2		SO_2
	-A3		CO
	-A4		CO_2
	-A5		CH_4
	-B1		$NO+SO_2$
	-B2		NO+CO
	-B4		$CO+CO_2$
	-B5		$CO+CH_4$
	-B6		CO_2+CH_4
	-C1		$NO+SO_2+CO$
	-C4		$CO+CO_2+CH_4$
	-D1		$NO+SO_2+CO+CO_2$
O_2 Analyzer	-N		None
	-1		ZR802S+ZR22S (*2)
	-2		External O_2 meter (*2)
	-3		Build-in paramagnetic O_2
	-4		Build-in paramagnetic O_2 (H_2 background) (*3)
NO Measuring Range	- □□		See ■ Measuring gas range
SO_2 Measuring Range	- □□		See ■ Measuring gas range
CO Measuring Range	- □□		See ■ Measuring gas range
CO_2 Measuring Range	- □□		See ■ Measuring gas range
CH_4 Measuring Range	- □□		See ■ Measuring gas range
O_2 Measuring Range	- □□		See ■ Measuring gas range
Digital Communication	-N		None
	-R		RS-485
Automatic Validation	-N		None
	-V		Automatic Validation
Gas Connection	-R		Rc1/4
	-T		1/4 NPT
Protection system Cable Glands	-MN		M25 (No cable glands) (*11)
	-TN		3/4 NPT (No cable glands) (*11)
	-MC		With Cable Glands (M25)
Air purge gas flow rate	-10		100L/min For high flammable gas concentration (*4)
	-05		50L/min For middle flammable gas concentration (*4)
	-02		20L/min For low flammable gas concentration (*4)
Display Language	-E		English
	-C		Chinese
	-J		Japanese
Mount Type	-W		Wall mount
—	-NN		Always "-NN"
—	-NN		Always "-NN"
Option Code		/U	Unit change (mg/m3, g/m3) (*5)
		/CG1	Cable Glands for I/O wiring (ATEX, IECEx, NEPSI)x 6 (*6)
		/CG2	Cable Glands for I/O wiring (ATEX, IECEx, NEPSI) x 10 (*6)

/CG3	Cable Glands for I/O wiring (ATEX, IECEx, NEPSI) x 12 (*6)
/CG4	Cable Glands for I/O wiring (ATEX, IECEx, NEPSI) x 16 (*6)
/A	Peak alarm (*7)
/K	O_2 compensation (*8)
/NX	Display NOx instead of NO (*9)
/PR	Pressure Regulator (For Sample/ Reference gas line, Pair) (*10)

(*1) Select -EC if you want to order Taiwan Ex specification (Taiwan Ex registration based on IECEx) or Indian Ex specification (Indian Ex approval based on IECEx).
(*2) Oxygen analyzer is not included. Please arrange it separately.
(*3) If the sample gas contains more than 100 ppm hydrogen, select the "-4" specification for H2 background.
(*4) The flow rate of air purge gas must be determined according to the type and concentration of combustible gas contained in the sample gas.
(*5) Select this option when one or more of NO, SO_2, or CO is included in the measuring component.
(*6) Prepare one from the following (a) to (c).
(a) Order one from /CG1 to /CG4. Cable glands of the same type as in (b) are packaged with the product. Select the amount you need. The following is for reference only.
/CG1: Wiring only RS-485 and power supply
/CG2: 1-2 Component measurement
/CG3: Three or more component measurements without RS-485 or without external zirconia (ZR802S+ZR22S)/external O_2 analyzer.
/CG4: Other than the above
(b) Prepare Cable glands, U. I. Lapp GmbH article number 53112720 (SKINTOP MS-M20ATEX Thread size: M20 × 1.5, Cable diameter 7-13, Torque 12 N・m)
(c) Prepare Cable glands according to each applicable certification standard. Cable glands with thread size M20 × 1.5, IP66 rating, and heat resistance of 85°C shall comply with Ex d(db) IIC or Ex e(eb) IIC protection standards and be certified according to the applicable regulatory requirement: ATEX (-AT), IECEx (-EC), and GB standard (-NE), and shall be installed to maintain the specified degree of protection of the equipment.
(*7) Available only when CO is included in the measuring component.
(*8) Available when the O_2 analyzer specification is other than "-N" and one or more of NO, SO2, or CO is included in the measuring component.
(*9) NOx converter is not included. Prepare a product that conforms to the standard.
(*10) One pressure regulator valve for the sample gas and one for the reference gas are included. Select this option if input pressure is not stable.
(*11) Cable glands, adapters, and/or blanking elements shall have thread size M20 × 1.5, IP66 rating, and heat resistance of 85°C, and shall be certified to Ex d(db) IIC according to the applicable regulatory requirement: ATEX (-AT), IECEx (-EC), or GB standard (-NE), and shall be installed so as to maintain the specific degree of protection of the equipment.

Accessories

Name	Qty	Code Specification	Description
Fuse (for main body)	2	Pre-installed in equipment	250 V/5 A delay type 5×20 mm IEC 60127-2 sheet3
Ferrite Cores for Power Cable	1	none	A1179MN
Fuse (for pressurized enclosure)	2	Pre-installed in equipment	250 V/1.25 A delay type 5×20 mm IEC 60127-2 sheet3
Cable clip	2	—	—
Screw for fixing cable clip	2	none	M5, 8 mm length
Bolt	4	none	M8, 35 mm length
Washer	8	none	M8
Nut	4	none	M8
Thread conversion connector	4	Gas connection "-T"	Rc 1/4 male to 1/4 NPT female
Key for door opening/closing	2	none	—
Thread conversion connector	2	Protection system Cable Glands"-TN"	M25×1.5 male to 3/4 NPT female
O-ring	2	Protection system Cable Glands"-TN" or "-MC"	—
Cable glands	2	Protection system Cable Glands "-MC"	Applicable cable diameter Ø9.5 to 15.4 mm, Connecting thread M25×1.5
Cable glands	6	"/CG1"Cable Glands for I/O wiring x6	Applicable cable diameter Ø7 to Ø13 mm, Connecting thread M20×1.5
	10	"/CG2"Cable Glands for I/O wiring x10	
	12	"/CG3"Cable Glands for I/O wiring x12	
	16	"/CG4"Cable Glands for I/O wiring x16	
Pressure Regulator	1	"/PR" For Sample/Reference gas line, Pair	Pressure Regulator (Stainless)
	1	"/PR" For Sample/Reference gas line, Pair	Pressure Regulator (Aluminium)

Spare Parts

Name	Part No.	Qty	Name	Part No.	Qty
C-type snap ring	Y9011EV	1 (*1)	Filter	K8020PW	1
Plate	K9213FB	1	Snap ring plier	K9643ZE	1

1: The minimum purchase quantity is 10 per order.

Measuring gas range

Select the range for the sample gas selected under "Measuring Component". Select "None (-NN)" for gases not included in the measurement component. This product is free-range. You can set the range within the selected measurement range. The measurement accuracy varies when the measurement range is set within the optional range. For details, refer to the general specification GS 11G06D01-01EN.

For multi-component meters, the measurement ranges for NO/SO_2/CO/CH_4 measurement cannot be combined with "-E□" and "-"P□" together.

(Example) Measuring component code - B1 (NO+SO_2 meter)
NO measurement range: -E3 (0-200/2000 ppm), SO_2 measurement range: -E6 (0-500/5000 ppm)
=> Both are -E ranges, so they can be combined.
NO measurement range: -E3 (0-200/2000 ppm), SO_2 measurement range: -P1 (0-2/10 vol%)
=> Not possible due to a mix of -E and -P ranges.

/U: See Table 3 in General Specification (GS 11G06D01-01EN) for unit conversion options.

Table 1 NO

Range	Code	Note
None	-NN	—
0–50/500 ppm	-E1	Optional range
0–100/1000 ppm	-E2	Optional range
0–200/2000 ppm	-E3	—
0–250/2500 ppm	-E4	—
0–300/3000 ppm	-E5	—
0–500/5000 ppm	-E6	—

Table 2 SO_2

Range	Code	Note
None	-NN	—
0–50/500 ppm	-E1	Optional range
0–100/1000 ppm	-E2	Optional range
0–200/2000 ppm	-E3	—
0–250/2500 ppm	-E4	—
0–300/3000 ppm	-E5	—
0–500/5000 ppm	-E6	—
0-2/10 vol%	-P1	—

Table 3 CO

Range	Code	Note
None	-NN	—
0–50/500 ppm	-E1	Optional range
0–100/1000 ppm	-E2	Optional range
0–200/2000 ppm	-E3	—
0–250/2500 ppm	-E4	—
0–300/3000 ppm	-E5	—
0–500/5000 ppm	-E6	—
0-2/20 vol%	-P1	—
0-3/30 vol%	-P2	—
0-5/50 vol%	-P3	—
0-10/100 vol%	-P4	Optional range

Table 4 CO_2

Range	Code	Note
None	NN	—
0–1000/5000 ppm (*1)	-C1	Optional range
0–2000/10000 ppm (*1) (*2)	-C2	Optional range
0-0.5/2.5 vol% (*1) (*3)	-C3	—
0-1/5 vol% (*1)	-C4	—
0-5/25 vol%	-C5	—
0-20/100 vol% (*4)	-C6	Optional range

(*1)For multi-component meters, other components can only be selected from "-E□". Always use N_2 for reference gas.
(*2)Measured values exceeding 9999ppm are displayed as ++++.
(*3)Measurements are displayed in vol% only.
(*4For multi-component meters, other components can only be selected from "-P□".

Table 5 CH_4

Range	Code	Note
None	-NN	—
0–2/20% vol%	-P1	—
0–3/30% vol%	-P2	—
0–5/50% vol%	-P3	—
0–10/100% vol%	-P4	Optional range

Table 6 O_2

Range	Code	Note
None	-NN	—
0-5/25 vol% (*1)	-M1	for built-in paramagnetic O_2 analyzer
0-25/100 vol% (*2)	-M2	for built-in paramagnetic O_2 analyzer
0-5/100 vol% (*3)	-R1	For ZR802S and other external O_2 analyzers

(*1) Available when the O_2 Analyzer is "-3".
(*2) Available when the O_2 analyzer is "-3" or "-4".
(*3) Select this option when the O_2 Analyzer is "-1" or "-2".

2. INSTALLATION

CAUTION

- Inappropriate installation may cause a hazardous accident such as a tip-over, electric shock, fire, and injury.
- IR810S is a heavy product. It should be handled carefully to install. Otherwise, it may cause tip-over, fall, injury, and hazardous accidents.
- During installation work, care should be taken to keep the unit free from cable chips or other foreign objects. Otherwise, it may cause fire, trouble, or malfunction of the unit.

2.1 Where to install equipment

Installation Requirements

- The product is for indoor use. Avoid exposure to direct sunlight, weather, and radiant heat from hot substances. If exposure to such conditions are unavoidable, a protective hood or cover should be prepared.
- Vibration-free environment
- A clean atmosphere

<Operating conditions>

Ambient conditions:

Ambient temperature:	0 to 45°C
Protective gas temperature:	5 to 45°C
Ambient humidity:	10 to 90%RH (at 40°C, no condensation)
Storage temperature:	-10 to +50°C
Storage Humidity:	35 to 85% (no condensation)

Supply voltage:

Voltage rating;	100 to 240 V AC
Allowable range;	85 to 264 V AC

Power frequency

Rating;	50/60 Hz
Allowable range;	47 to 63 Hz

Dimensions (W x D x H):
429 x 243 x 947 mm

Weight: approx. 35 kg

Analog output signal:

Isolated output:	4-20 mA DC
Maximum load capacity:	550 Ω
Number of outputs:	4
Output Item:	NAMUR NE43 burnout
Hold function:	available

Analog input (when O_2 analyzer: -1 or -2 is selected)

Number of input points;	1 point (for connection to external oxygen analyzer
Input signal;	4-20 mA DC (Max40 mA)
Functions:	Oxygen concentration display, oxygen concentration conversion

Contact output

Contact type;	1a relay contact, 1c relay contact
Maximum output points	
	1a; 11 points
	1c; 6 points
Contact capacity;	

24 V DC, 1A (resistance load)

Function; Instrument error, calibration error, automatic calibration in progress, Solenoid valve drive CH1 to CH5 for automatic calibration, Range identification CH1 to CH5, blowback, alarms 1 to 6, peak alarm output, sample switching, maintenance in progress, power status

Contact input

Contact type; no-voltage or voltage contact input
Maximum input points; 8 points
On/Off;
No-voltage contact input

Resistance value below 200 Ω; closed
Resistance value of 100 kΩ or more; open

Voltage contact input

Voltage 1 to +1 V DC; closed
Voltage 4.5 to +25 V DC; open

Contact capacity: Leakage current 3 mA or less when OFF

Insulation

Contacts mutual; non-insulating
Internal circuit; transformer isolation

Function; Remote hold, average value reset, automatic calibration start, auto zero calibration start, automatic validation start, remote range changeover, blowback contact for ZR802S, calibration error for ZR802S

Digital Communications:

RS-485 (Modbus RTU): 115200/38400/9600 bps
Cable length: Up to 600 m (115200 bps)
Up to 1200 m (38400/9600 bps)

shield ground

24 VDC for Signal interrupter output

Number of output points; 1 (for signal interrupter K8019KA) (*1)
4 (for signal interrupter K8019KB) (*2)

Functions; Monitors internal pressure inside equipment and provides 24 VDC power to signal circuit interrupters under normal conditions

*1: Used for the following combinations
- When O_2 analyzer 1 or 2 is selected
- When "-R" (digital communication) is specified.
- When both of the above are selected

*2: Prepare K8019KBaccording to the contact output to be used.
If all 17 points are used, four K8019KBs are required.

Annunciator contact output:

Number of contact points; 1

Functions; Outputs the internal pressure status (state 1 or state 2) of the equipment

state1; Outputs status during override, analyzer power off, scavenging, or insufficient internal pressure

state2; Outputs status after completion of sweeping

Contact type; Relay contact output, C contact (NC/CO/COM)

Contact capacity; 30 VDC, 100 mA

Contact operation; OPEN/CLOSE

Contact	Annunciator output	
	NC-COM	NO-COM
state 1	OPEN	CLOSE
state 2	CLOSE	OPEN

<Maintenance space>

Clear the space as below if the analyzer is installed by itself.

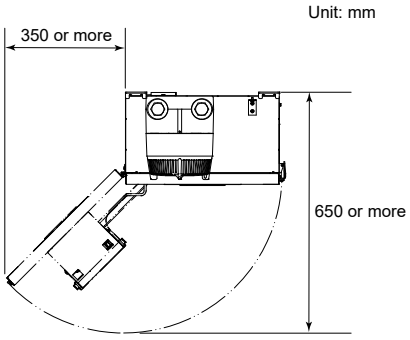


Figure 2.1 Maintenance space

To install the analyzer for optimum performance, select a location that meets the following conditions;

- Install circuit breakers in non hazardous area.
- Install external power switches and circuit breakers in the same room where the product is installed and where they are easily accessible to the operator.
- Attach a label to the external power switch to alert the user.

2.2 How to install

See ■ External Dimensions.

CAUTION

To install the product, take note of the following points.

- Do not place any objects on the case.
- Be sure to turn off the power before installing or removing the unit.
- Install so that the front face is vertical with the front, horizontal, and vertical orientations in the correct position.
- At least 3 persons are required to install the IR810S. (IR810S lifting: 2 or more persons, screw installation: 1 or more persons)
- Mount on wall that can withstand 140kg.

■ Where to install equipment

Follow the next instruction and install equipment properly.

- Mount the four brackets on the enclosure on a sufficiently sturdy wall using the supplied bolts or equivalent.
- Mount the unit at a height where the status/alarm display is easily visible.

■ Mounting orientation

Mount correctly in front, horizontally, and vertically.

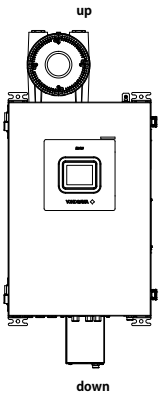


Figure 2.2

External Dimensions

- **IR810S**

Unit：mm

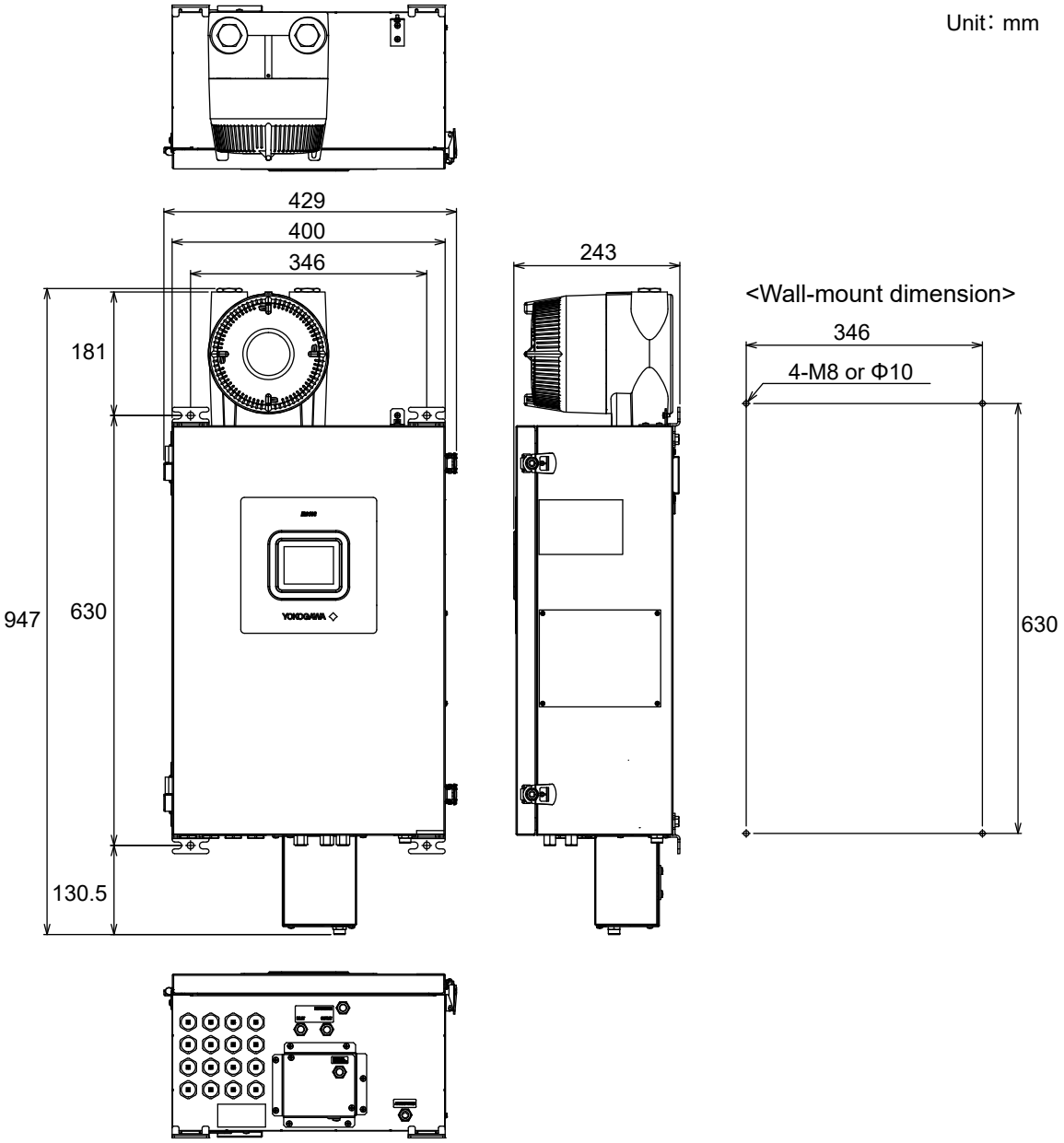


Figure 2.3

2.3 Piping

WARNING

In piping, the following precautions should be observed.

Wrong piping may cause gas leakage.

If the leaking gas contains a toxic component, there is a risk of serious accident being induced.

Also, if combustible gas is contained, there is a danger of explosion, fire or the like occurring.

- Connect pipes correctly referring to the instruction manual.
- Exhaust should be led outdoors so that it will not remain inside the sampling equipment or indoor.
- Exhaust from the analyzer should be relieved in the atmospheric air in order that an unnecessary pressure will not be applied to the analyzer. Otherwise, any pipe in the analyzer may be disconnected to cause gas leakage.
- For piping, use a pipe and a pressure reducing valve to which oil and grease are not adhering. If such a material is adhering, a fire or the like accident may be caused.

CAUTION

Piping connection must be secured. Gas inlets have several types: reference gas inlet, outlet or purge gas inlet. When the connection is insecure or wrong, combustible, toxic, explosive gas may be accumulated inside the analyzer or system.

Observe the following when connecting the gas pipes.

- The pipes should be connected to the gas inlet and outlet on the analyzer, respectively.
- Connect the sampling system to the instrument by using corrosion-resistant tube. The material should be such as Fluoropolymer (PTFE), stainless steel, or polyethylene. In case where there is no danger of corrosion, don't use rubber or soft vinyl tube. Analyzer indication may become inaccurate due to the adsorption of gases.
- Piping connections are Rc1/4 (1/4 NPT) female-threaded. Cut the pipe as short as possible for obtaining quick response. Pipe of approx. ∅4 mm (inside diameter) is recommended.
- Entry of dust in the instrument may cause operation fault. Use clean pipes and couplings.

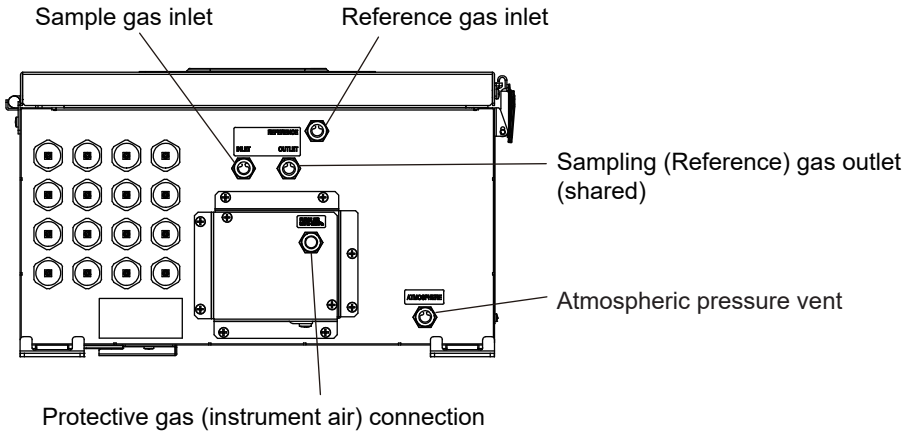


Figure 2.4

Sample gas inlet: Connect the pipe so that zero/span calibration standard gas or measured gas pretreated with dehumidification is supplied properly.
Gas inlet pressure to be introduced (at the inlet of the analyzer);
4.9 to 9.8 kPa (both sample and reference). Note that the variations with respect to the set pressure are ±2%.

Sample gas (reference gas) outlet: Measured gas is exhausted after measurement. Connect the pipe so that the gas may escape through the gas outlet into the atmosphere.

Protective gas connection: This is a gas inlet for purging a container with pressurized enclosure explosion protected construction. Use dry N_2 or instrument air as the protective gas. Since the protective gas requires the pressure described in the table below, use general instrument air as the air source and pipe it through a pressure regulator valve to the analyzer.

Suffix code		Specification/Description Description	Protective gas pressure
Air purge gas flow rate	-10	100 L/min highly concentrated flammable gas concentration	400-500kPa
	-05	50 L/min medium density combustible gas concentration	350-500kPa
	-02	20 L/min low-concentration combustible gas concentration	350-500kPa

Reference gas inlet: The IR810S can use air, instrument air or N_2 with a stable moisture content below 5°C saturation. Minimize the moisture difference between the sample gas and the reference gas.
However, if atmosphere or instrument air is used when the CO measuring range is less than 500 ppm (-E1), remove CO from the reference gas using a reference gas purifier or similar.
If the CO_2 measuring range is less than 5 vol%, use N_2 as the reference gas.

Gas inlet pressure to be introduced (at the inlet of the analyzer);

4.9 to 9.8 kPa (both sample and reference)
Note that the variation with respect to the set pressure is ±2%.

2.4 Wiring

WARNING

- NEVER energize the product with the top cover (or front door) of the product open.
- Turn off external switches and circuit breakers when working with the top cover (or front door) of the product open.
- NEVER energize the converter or equipment connected to the converter until all wiring work has been completed.

CAUTION

This equipment conforms to the CE marking

The following wiring installation is required when CE Mark compliant performance is required.

- An external switch or circuit breaker should be installed to power the converter.
- Use external switches or circuit breakers rated 10 A and compliant with IEC947-1 or 947-3.
- It is recommended that the external switch or circuit breaker be installed in the same room where the converter is installed
- External switches or circuit breakers should be located within reach of the operator and marked as being the power switch for this equipment.

How to wire

Signal and power lines should be installed under the following conditions.

(1) Be sure to wire the power supply line with three-pole wiring and protective grounding equivalent to JIS Class D (Class 3) grounding (grounding resistance 100 Ω or less).

(2) The shield must be connected to the FG terminal of the converter. (The object is the RS-485 cable.)

WARNING

- Use protective grounding cables with a cross-sectional area of 0.75 to 2.1 $mm^{2.}$
- Use cables with a heat resistance of 85°C or higher for wiring.

NOTE

Grounding of Shielded Cable

Shielded cables are very effective for noise rejection. The method of grounding the shield depends on the usage conditions.

Single-ended grounding, in which the shield is connected only to the ground of the product, is effective for noise rejection when the cable length is long and there is a potential difference between the ground of the connection partner and the ground of the product.

If there is no electric potential difference between the ground of the connection partner and the ground of this device, double-ended grounding may be effective by connecting to the ground of the connection partner as well. (It may also be effective to ground both ends and connect a capacitor in series to one side of the ground.

2.4.1 Wiring type and location

Provide the following types of wiring. NOTE: The type of wiring required will vary depending on the specifications.

(A) For power wiring

(B) Wiring for annunciator contact output

(C) For external grounding wiring

(D) For input/output wiring

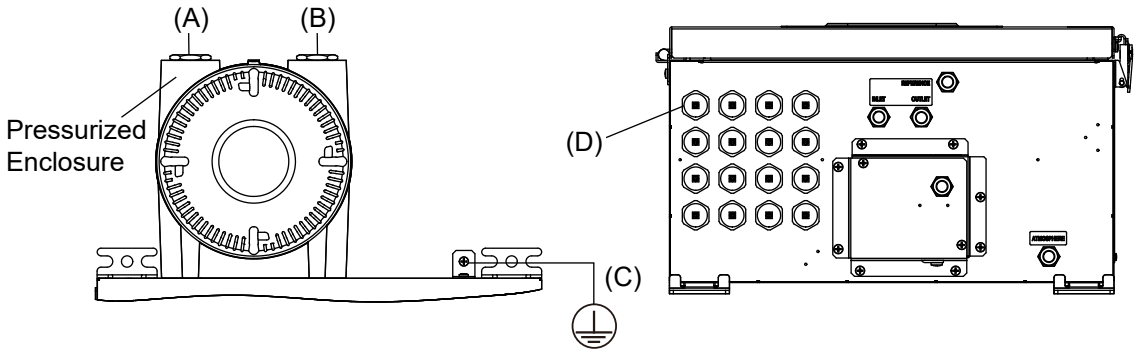


Figure 2.5 Cable position

2.4.2 Recommended Cables

WARNING

- Use cables with a heat resistance of 85°C or higher for wiring.
- Use cables with a cross section of 0.75 to 2.1 mm2 for protective grounding.

Port	Applicable cable diameter at cable port	Purpose	Terminal
A	Suffix code: -MC; diameter Ø9.5 to 15.4 mm (*1)	Power	M4 screw crimp-on terminal
B		Annunciator contact output	MKKDSN (*2)
C	not specified	External grounding	M4 screw terminal
D	Ø7.0 to 13.0 mm (Option code /CG and U. I. Lapp GmbH article number 53112720 (SKINTOP MS-M20ATEX) For other cases, use cable compatible with the respective cable gland.	Input-output	M3 screw terminal

(*1) For the suffix code -MN and -TN, use the recommended cable diameter for the cable gland to be used.
(*2) For detail see ■ Wiring annunciator.

2.4.3 Cable port, cable gland mounting

WARNING

- All wiring shall comply with IEC/EN 60079-14, Local Electric Codes and Requirements.
- In a hazardous area, use appropriate flameproof-certified parts for connecting cables.
- All externally powered input signals into the pressurized enclosure shall be isolated by external relays controlled by the Ex px protection system (Ex px safety device).

CAUTION

- The unused electrical connection ports should be closed with an appropriate flameproof-certified plug.
- Analyzers have pressurized enclosures. The cable end should be sealed in order to apply pressure to the pressurized enclosure. Otherwise, power does not supplied to the electronics section.

Connection port for power supply and annunciator contact outputs

(1) Remove the Plug attached at the time of shipment.

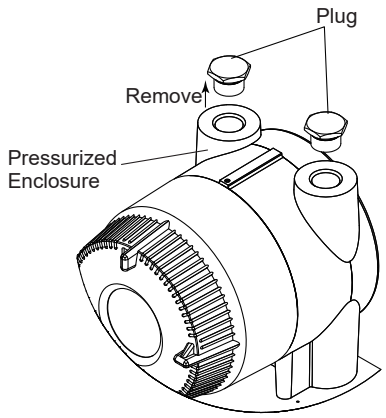


Figure 2.6

(2) Attach cable connection components for each suffix code.

For the suffix code “-MN”, use explosion protection certified cable connection parts conforming to M25 x 1.5.
Cable glands, adapters, and/or blanking elements shall have an IP66 rating, heat resistance of 85°C, and shall be certified to Ex d(db) IIC according to the applicable regulatory requirement: ATEX (-AT), IECEx (-EC), or GB standard (-NE). They shall be installed so as to maintain the specific degree of protection of the equipment.

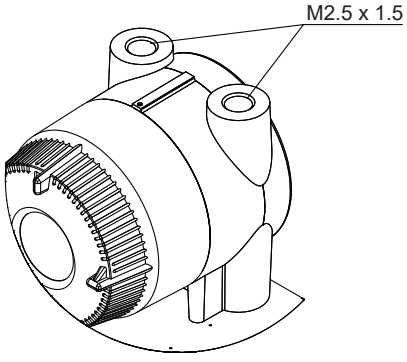


Figure 2.7

- For the suffix code -TN (3/4 NPT), attach an O-ring to the supplied connector and attach the connector to the pressurized enclosure. Use cable connection parts approved for the explosion protection type compatible with 3/4 NPT.
  Cable glands, adapters, and/or blanking elements shall have an IP66 rating, heat resistance of 85°C, and shall be certified to Ex d(db) IIC according to the applicable regulatory requirement: ATEX (-AT), IECEx (-EC), or GB standard (-NE). They shall be installed so as to maintain the specific degree of protection of the equipment.

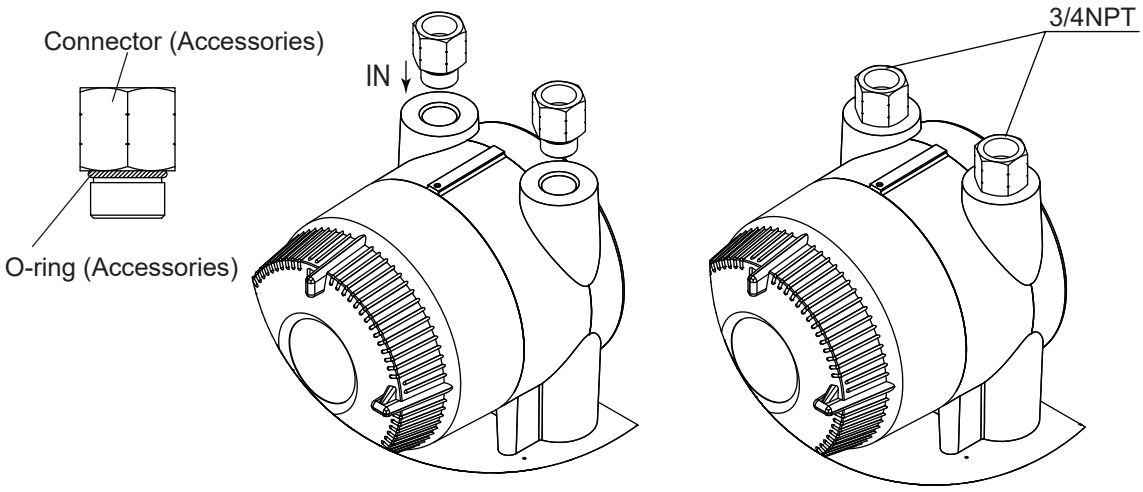


Figure 2.8

For the suffix code -MC (With Cable glands (M25)), attach an O-ring onto the supplied cable glands and install them on the pressurized enclosure.

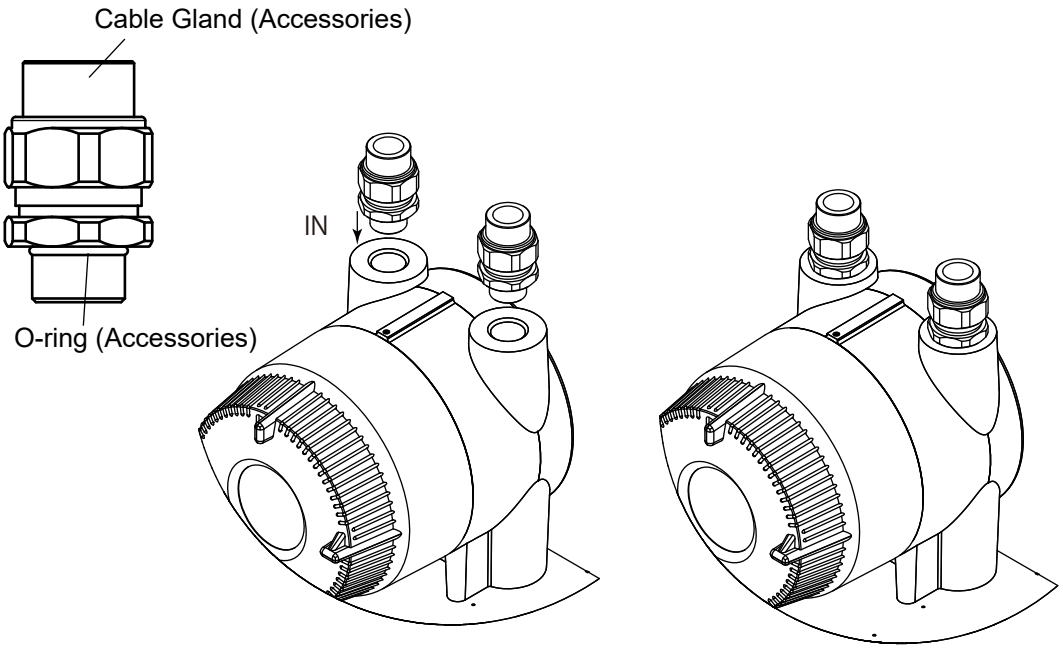


Figure 2.9

Opening/closing the door

This product has a door fastener with a lock. Lock the door when operating these devices. The same key is used for all the door fasteners. Keep the key safe and do not lose it. Confirm that the lever cannot be lifted up after locking.

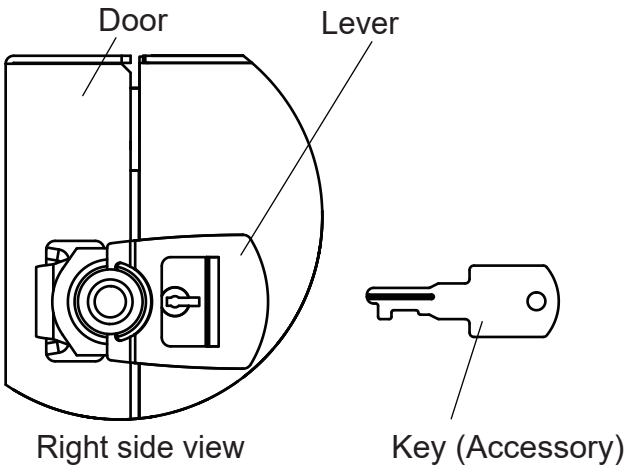


Figure 2.10

For cable glands, prepare one from the following (a) to (c).

(a) Order one from /CG1 to /CG4. Cable glands of the same type as in (b) are packaged with the product.

(b) Prepare cable glands, U. I. Lapp GmbH article number 53112720 (SKINTOP MS-M20ATEX Thread size: M20 × 1.5, cable diameter 7-13, Torque 12 N•m)

(c) Prepare cable glands according to each applicable certification standard.
Cable glands with thread size M20 × 1.5, IP66 rating, and heat resistance of 85°C shall comply with Ex d(db) IIC or Ex e(eb) IIC protection standards and be certified according to the applicable regulatory requirement: ATEX (-AT), IECEx (-EC), and GB standard (-NE), and shall be installed to maintain the specified degree of protection of the equipment.

Installation of IR810S cable gland for input/output/signal line wiring

Remove the plug and attach the cable gland to the specified torque. Unused wiring holes should remain plugged as supplied.

CAUTION

- Avoid injury from the edge of the housing hole, etc.
- To install the cable gland selected in (a) (b) or (c), tighten it with the specified torque: 12 N•m for (a), (b), and as specified for (c).

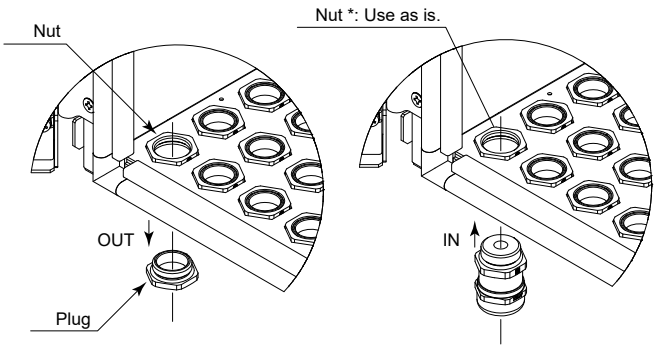


Figure 2.11 IR810S I/O (or signal) cable gland installation

Power wiring to the pressurized enclosure

WARNING

When the cover of the protection system is uninstalled, use a gas detector to check that the concentration of explosive gases in the ambient atmosphere is less than the allowable limit.

The protection system is a flameproof enclosure.

When handling the screws on the cover of the protection system, note the following to avoid damaging the screws since they cannot be repaired.

- Use a hex wrench (Nominal size:2.5 mm) to tighten/loosen the hexagon socketset screw.
- The cover should be placed in a clean plastic bag or on a clean space to prevent it from contamination.

Before installing the cover, confirm that the body and screws are not contaminated. If they are, make sure to clean them.

- Since the screws are coated with MOLYKOTE, do not lubricate them.
- When installing the cover, tighten the screws by hand; never use tools.

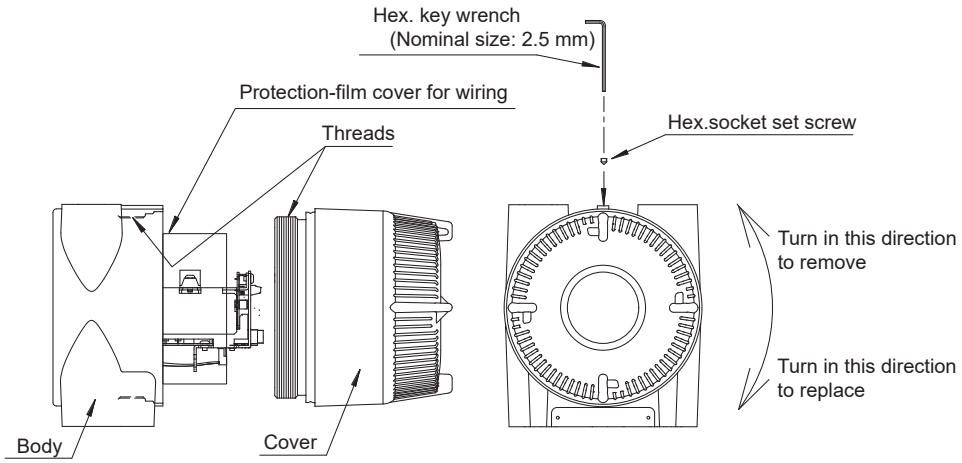
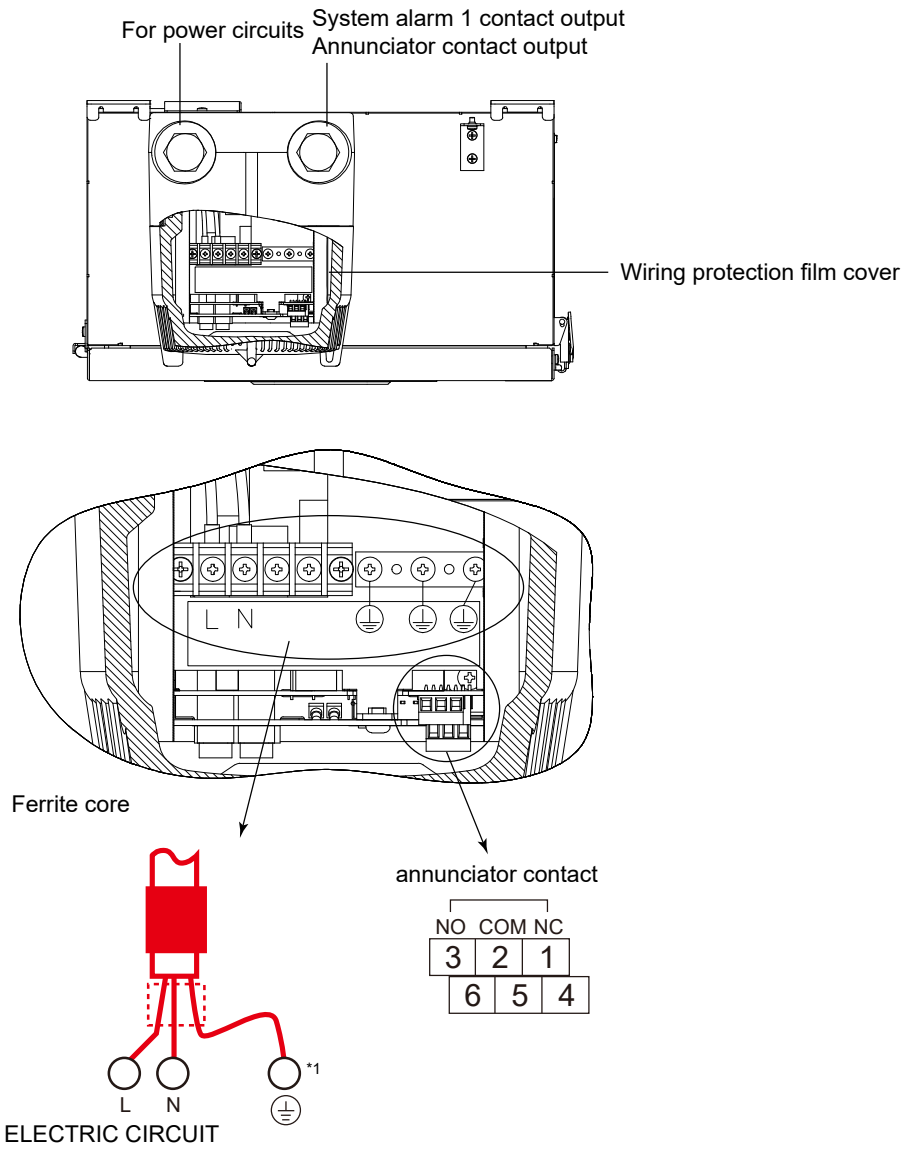


Figure 2.12 Opening/closing the cover of the protection system

The pressurized enclosure is powered by power supply wiring for electrical circuits. Attach the supplied ferrite core. The ground wire must also be wired. After wiring, do not forget to install the wiring protection film cover.



*1: The ground can be made at any of the three locations.

Figure 2.13

CAUTION

Use cables with a maximum allowable temperature of 85°C or higher.

Wiring power supply

Connect the specified power supply to the power terminal and connect a ground wire to the ground terminal. The grounding should be D-class grounding. Use crimp terminals (for M4) for the wires to be connected to the terminals. The tightening torque is 1.2 N-m.

WARNING

The minimum cross sectional area of the protective grounding wire should be 0.75 mm^2.
Use cables with a cross section of 0.75 - 2.1 mm^2.

Wiring annunciator

The Phoenix Contact MKKDSN series is used for the annunciator terminal block. The company's AI series is recommended as crimp terminals for these terminals. See IM 11G06D01-02EN for details.

Table 7 Cable diameter and crimp terminal compatibility

Terminal series	Nominal cross-sectional area	Outer Diameter	Model	Coated length to be stripped
MKKDSN	0.75 mm^2	ø2.8 mm or less	AI 0.75 - 6GY	Approx.6 mm
	1 mm^2	Ø3.0 mm or less	AI 1 - 6RD	
	1.5 mm^2	ø3.4 mm or less	AI 1.5 - 6BK	

When noise source is in the vicinity

- Do not install this instrument near electrical equipment that generates power supply noise. (high-frequency furnaces, electric welding machines, etc.) Keep the power lines completely separate to avoid noise when using the instrument near such devices.
- If noise is present in a relay, solenoid valve, etc. from the power supply, attach a varistor or spark killer to the noise source as shown in Figure 3.7. Note that placing the varistor or spark killer apart from the noise source will have no effect.

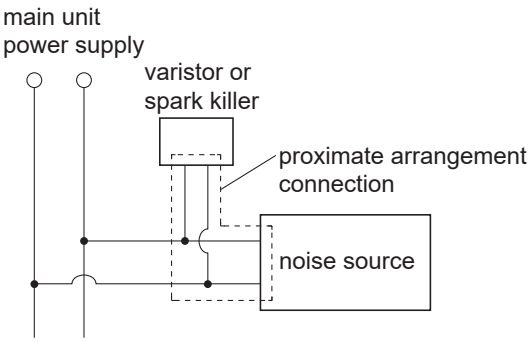


Figure 2.14

I/O terminals

NOTE

- Analog outputs are mutually non-isolated. We recommend that signals be isolated individually to eliminate unwanted signal wraparound and disturbance effects when drawing wiring outdoors, wiring longer than 30 m, or connecting multiple outputs to the outside.
- Isolated output (isolated between each DO and from the ground)

  To eliminate external influences on signals, separate the wiring to the power supply and contact output from the wiring to analog signals, O_2 analyzer input, and contact input.
- Be sure to earth ground the IR810S to prevent malfunctions due to external noise, etc.

IR810S

Applicable wire diameters for signal wiring lines are Φ 1.9 mm (AWG20) to Φ 2.1 mm (AWG18).

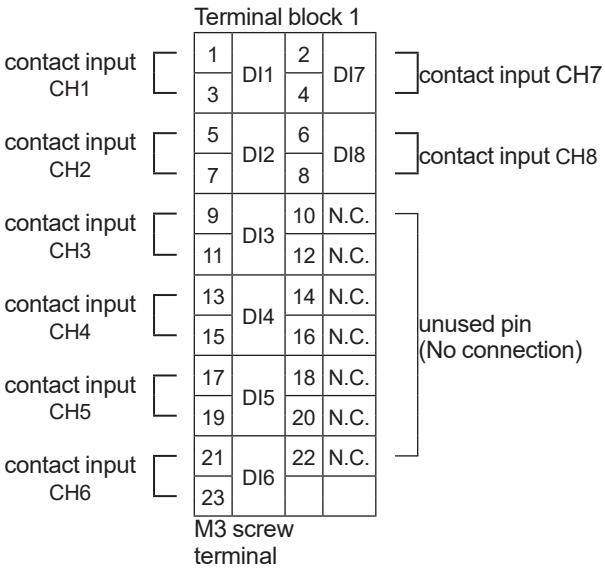


Figure 2.15 Terminal block 1: Contact input terminal

NOTE

After laying contact input/output signal lines, install the supplied ferrite cores for each terminal block at once.

The converter receives a contact signal and performs the configured function.

Cable specifications:

Each CH requires two cores for this wiring.

Select the number of cores according to the number of contacts to be used.

Wiring instructions:

(1) The terminal screw of the transducer is an M3 screw. The tightening torque is 0.6 N-m. Use crimp terminals compatible with these screws to terminate the cable.

(2) Resistance or voltage values determine the “ON/OFF” of this contact input. Switches must meet the conditions shown in the table below.

Table 8 ON/OFF” identification of contact input

	CLOSE	OPEN
Resistance	200 Ω or less	100 kΩ or more
Voltage value	-1 to 1 VDC	4.5 to 25 VDC

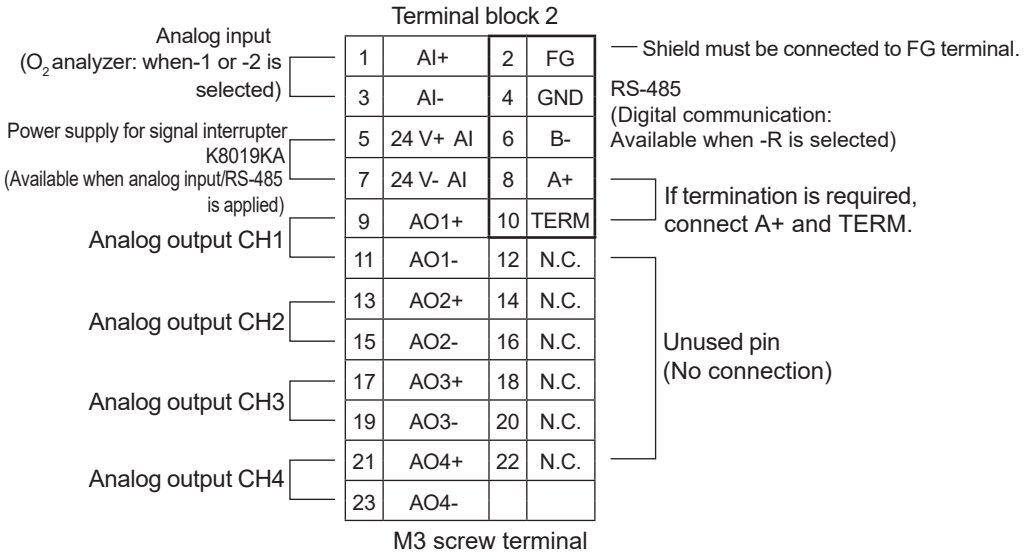


Figure 2.16 Terminal block 2: analog input/analog output/RS-485

This terminal block has the following three functions.

● Analog input (O_2 analyzer: available when "-1" or "-2" is selected)

When using an external oxygen meter to input the O_2 analyzer, use this terminal for current input (4-20 mA).

Cable specifications:

Use two-core cables for this wiring.

Wiring instructions:

(1) Use an M3 screw for the terminal screw of the converter. The tightening torque is 0.6 N-m. Use crimp terminals compatible with these screws to terminate the cable.

(2) Do not wire with reversed polarity. Wire carefully to avoid mistaking the “+” and “-” polarity.

● Analog output

This wiring is used to transmit the 4-20mA DC signal to a recorder or other device. The load resistance including wiring resistance should be 550 Ω or less

Cable specifications:

Each CH requires 2 cores for this wiring.

Select the number of cores according to the number of contacts to be used.

Wiring instructions:

(1) Use M3 threaded terminal screws on the converter. The tightening torque is 0.6 N-m. Use crimp terminals compatible with these screws to terminate the cable.

(2) Do not wire with reversed polarity. Wire carefully to avoid mistaking the “+” and “-” polarity.

- **RS-485 communication (digital communication: available when -R is selected)**

RS-485 (Modbus RTU) can be selected as an option for this product.

Use shielded cables to prevent malfunction due to external noise and to avoid radiation noise from the IR810S from affecting other equipment.

Table 9 RS-485 terminal assignment

Terminal block 2 Terminal No.	Terminal name	use
2	FG	Shield
4	GND	Signal GND
6	B-	Data (anode)
8	A+	Data (cathode)
10	TERM	For connecting a terminating resistor (110 Ω)

Use multi-core shielded cables with stranded (twisted pair) cores.

Connect the shield to terminal 2 on terminal block 2.

Terminate the signal with a built-in signal terminator (110 Ω resistance) according to the communication environment.

Connect terminals 8 and 10 of terminal block 2 when terminating.

Use M3 terminal screws. The tightening torque is 0.6 N-m.

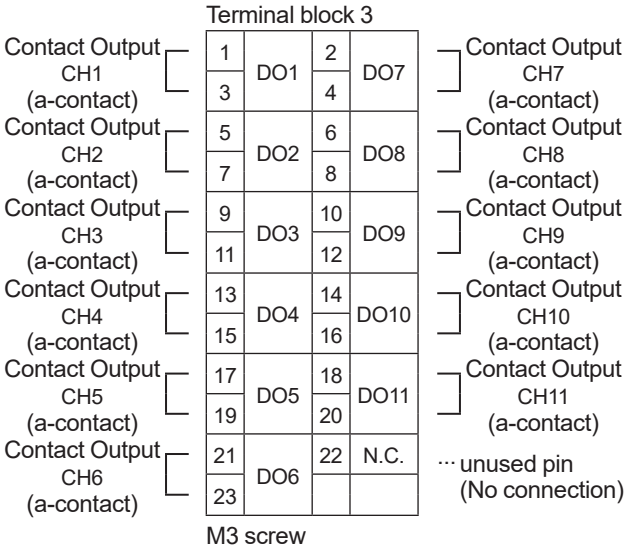


Figure 2.17 Terminal block 3: Contact output (a-contact)

The converter outputs up to 11 a-contact signals.

The function of contact outputs 1-4 is fixed, but the function of 5-11 is selectable (details in 00)

Cable specifications:

Each CH requires 2 cores for this wiring.

Select the number of cores according to the number of contacts to be used.

Use a cable with a diameter that fully satisfies the current capacity of the connection point.

Wiring instructions:

(1) Use M3 screws on the converter. The tightening torque is 0.6 N•m.
Use crimp terminals compatible with these screws to terminate the cable.

(2) The contact capacity of the relay for contact output is 30V DC 1 A. Connect loads (indicator lights, solenoid valves, etc.) so that these values are not exceeded.

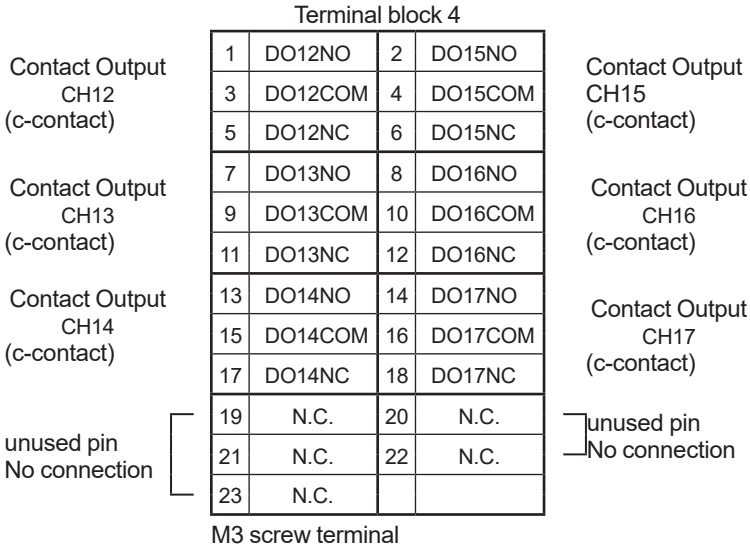


Figure 2.18 Terminal block 4: Contact output (c-contact)

Cable specifications:

Each CH requires 3 cores for this wiring.

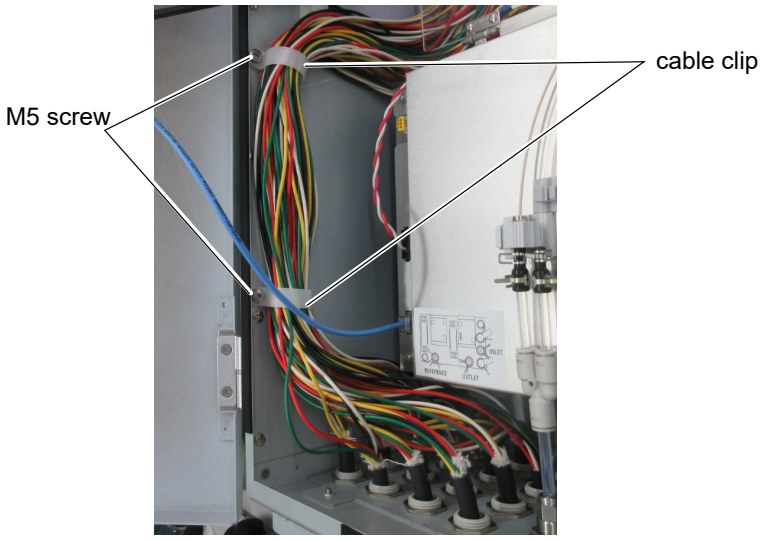
Select the number of cores according to the number of contacts to be used.

Use a cable with a diameter that fully satisfies the current capacity of the connection point.

Wiring instructions:

(1) Use M3 screws for the terminal screws of the converter. The tightening torque is 0.6 N-m.
Use crimp terminals compatible with these screws to terminate the cable.

(2) The contact capacity of the relay for contact output is 30 V DC 1 A. Connect loads (indicator lights, solenoid valves, etc.) so that these values are not exceeded.



Route the cable from the left side. After wiring, fasten the cable with the supplied cable clip and M5 screws. The tightening torque is 2.0 N-m.

Figure 2.19 IR810S Wiring

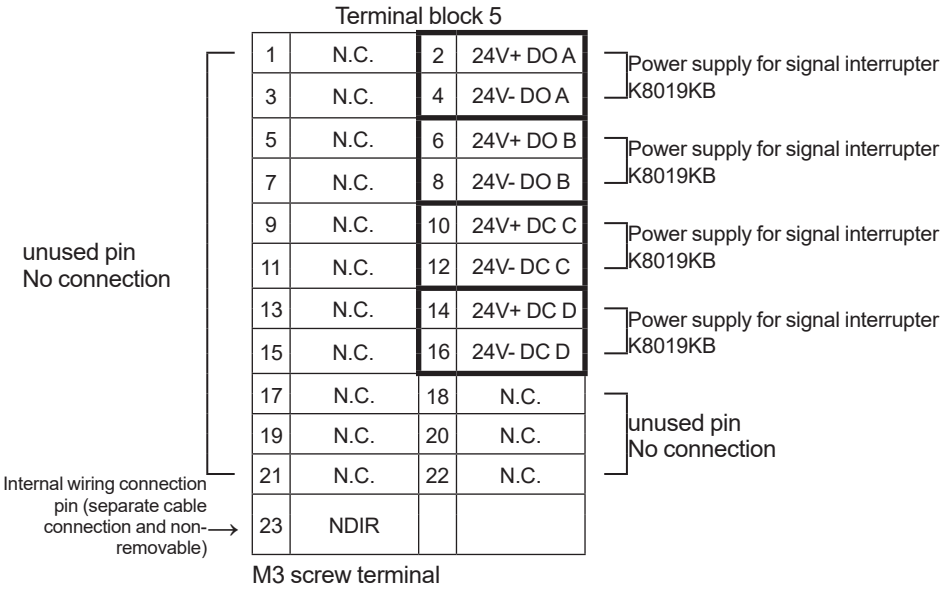


Figure 2.20 Terminal block 5: Power supply for signal interrupter

3. OPERATION

Check that the pipes are correctly connected to the gas sampling port and drain port. Check that the analyzer is correctly wired as specified.

3.1 Checking the pressure in the pressurized enclosure

How to check the Status Indication of the Protection System

The LED (Green) of "POWER" is turned ON and the LED (Red) of "ALARM" is turned OFF when the pressure of the electronics section is in the normal condition. See Figure 3.1 or Figure 3.2.

How to check the pressure in enclosure is as follows.

<Electronics section>

WARNING

When the cover of the protection system is uninstalled, use a gas detector to check that the concentration of explosive gases in the ambient atmosphere is less than the allowable limit.

The status of the protection system can be checked with the LEDs as shown in Figure 3.1. The meaning of each LED is written on the status display.

POWER: ON when power is supplied to the protection system

PRESSURE: ON when the specified internal pressure is applied to the electronics section. This LED is ON in the normal condition. If the internal pressure becomes low, it turns off.

PURGING: ON when purging the electronics section. After purging, it turns off.
When power is supplied and “PRESSURE” LED is on, this LED turns ON and purging begins.
After the electronics section is purged for 21 ± 3 min, the LED turns off and power is supplied to the electronics section. The LED is OFF in the normal condition after purging. If purging ends incompletely, the status of purging is reset and purging begins again.

OVERRIDE: ON when the override function is activated.

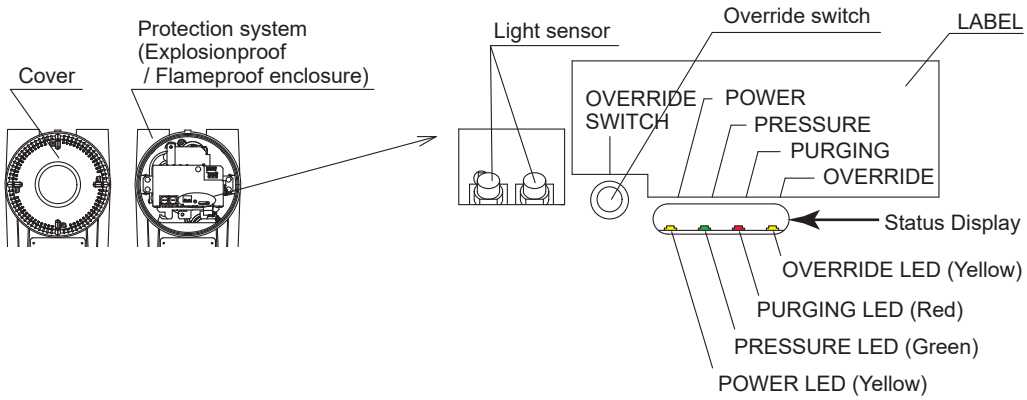


Figure 3.1

3.2 Power supply

Follow the steps below to supply power.

<Start power supply>

(1) Provide power to the internal pressure protection device (explosion protected container).
(2) Supply protective gas (instrument air) to the protective gas inlet (instrument air).
(3) When the internal pressure in the electrical circuits of the control unit and oven units 1 to 3 exceeds 392 (Pa), sweeping of the respective electrical circuits begins.
(4) After sweeping for 21 ± 3 minutes, power is supplied to the electrical circuit section of the control unit.

<Stop power supply>

(1) Stop supplying power to the pressurized enclosure.
(2) Wait at least 30 minutes after the shutdown
(3) Shut off the supply of protective gas (instrument air).

CAUTION

In an emergency, shut off the power supply immediately.

<When internal pressure is low>

A. The electrical circuitry of control unit and oven units 1-3

(1) If the internal pressure in the electrical circuitry falls below 392 (Pa), the pressurized enclosure (internal pressure protection system) immediately shuts off the power supply to the electric circuitry of the control unit and oven units 1 to 3.
(2) When the internal pressure of the electric circuit section is restored, it automatically starts operation as shown in <Start power supply> (4) and subsequent operations.

B. Each thermostatic chamber (or temperature rise chamber) section of oven units 1-3

(1) If the internal pressure of any thermostatic bath (or warming bath) drops below 392 (Pa), the electrical circuit section of the control unit immediately shuts off the power supply to the electrical circuit of the corresponding oven unit.

(2) When the internal pressure of the thermostatic bath (or temperature rise bath) returns, the "Start power supply" operation is automatically performed.

4. MAINTENANCE

WARNING

- NEVER energize the product with the top cover (or front door) of the product open.
- Turn off external switches and circuit breakers when working with the top cover (or front door) of the product open.
- When performing maintenance, inspection, or other work with the top cover (or front door) of the product open, be sure to safely shut off the measuring gas line and provide sufficient ventilation inside and around the product to prevent poisoning, fire, or explosion due to gas leakage or other causes.

4.1 Daily check and maintenance procedures

Regular maintenance

The front window should be kept clean to ensure clear visibility of the screen and proper operation of the touch panel. If dirty, wipe clean with a soft damp cloth or soft tissue.

When opening the front door or removing the cable gland and putting it back in place, clean the sealing area and fit it correctly to maintain the waterproofing of the case against water and vapor.

CAUTION

Never use potent chemicals or solvents. If the window is heavily soiled or scratched, parts may have to be replaced. Please consult our service.

Table 10 Maintenance and check list

Inspection cycle	Inspection point	Criteria	Remedy
Daily	Sample gas flow rate	0.5 to 1.0 L/min	If out of criterion, set the sample inlet pressure to 4.9 kPa to 9.8 kPa.

Inspection and maintenance should be performed once a day as needed.

Zero and span calibration

Perform zero calibration. Refer to “5.4 Calibration/Validation” and “6.1 Zero Calibration” for the calibration method.

After zero calibration is completed, perform span calibration. Refer to “5.4.2 Manual Span Calibration” and “6.2 Span Calibration” for calibration methods. Zero and span calibration should be performed once a week, or as needed.

Long-term maintenance parts

Plan the replacement of maintenance parts of this product according to the recommended replacement cycle.

The recommended replacement cycle is a standard guideline and varies depending on the site environment, measured gas conditions, and other factors.

The recommended replacement cycle does not constitute a warranty period.

Please contact us for maintenance services.

4.2 How to replace a fuse

Two fuses are installed in the main unit and two in the pressurized enclosure. If a fuse blows, replace it as follows. See IM 11G06D01-02EN for details.

CAUTION

A possible circuit malfunction may exist if the replaced fuse blows immediately. Examine thoroughly the cause of the blown fuse.

Appendix Explosion Protected Type Instrument

In this chapter, further requirements and differences for explosion protected type instrument are described. For explosion protected type, the description in this chapter is prior to other description in this user's manual. Refer to user's manual for IR810S.

CAUTION

IR810S has been tested and certified as being an explosion protected product. Please note that severe restrictions apply to these instruments' construction, installation, external wiring, maintenance and repair. A failure to abide by these restrictions could make the instrument a hazard to operate.

■ General Instruction

IR810S-AT (ATEX), IR810S-EC (IECEx)

Item		Descriptions
Applicable standards (Note 3)	IECEx	IEC 60079-0 Ed. 7.0 (2017) IEC 60079-1 Ed. 7.0 (2014) IEC 60079-2 Ed. 6.0 (2014)
	ATEX	EN IEC 60079-0:2018 EN 60079-1:2014 EN 60079-2:2014
Certificate number	IECEx	IECEx DEK 21.0077X
	ATEX	DEKRA 21ATEX0130 X
Specific Ex marking	IECEx	Ex db pxb IIB + H_2 T4 Gb
	ATEX	 II 2 G Ex db pxb IIB + H_2 T4 Gb
Tamb and Tprotective gas		0 °C ≤ Ta ≤ +45 °C (Note)
Process temperature		0 °C ≤ Ta ≤ +45 °C (Note)
Atmospheric pressure (Note 3)		80 kPa (0.8 bar) to 110 kPa (1.1 bar)
Enclosure		IP4X
Cable entry (Note 3)		(See “Installation and erection”)
Pollution degree (Note 3)		2
Overvoltage category (Note 3)		II
Power supply		100-240 V AC −15 % / +10 %
Battery		N/A
Power consumption		≤120 VA
Signals		AO : 4-20 mA DC x 4CH AI : 4-20 mA DC x 1CH DO : Contact capacity 24VDC 1A - 1A contact relays x 11CH, - 1C contact relays x 6CH DI : No-voltage contact Contact resistance less than 200 ohm 8 CH RS485
Power for signal interrupters		24V DC 3W x 4CH for DO signal interrupters 24V DC 1.5W x 1CH for RS485 and AI signal interrupters
RF source		N/A
Optical source (Note 3)		An infrared lamp inside the pressurized enclosure
Ultrasonic sources		N/A

(Note) Under actual operating conditions, the IR810S should be used under the following requirements.

Protective gas temperature; 5℃ ≤ Ta ≤ 45℃

Process temperature; 5℃ ≤ Ta ≤ 40℃

<table>
<tr><th>Item</th><th>Descriptions</th></tr>
<tr><td rowspan="5">Specific condition of use</td><td>Precaution shall be taken to minimize the risk from electrostatic discharges on the non-metallic parts (excluding glass parts) or coated parts of the equipment.</td></tr>
<tr><td>Flameproof joints are not intended to be repaired. Contact Yokogawa representative or Yokogawa office.</td></tr>
<tr><td>The flow rate of the measured flammable gas should be 0.8L / min</td></tr>
<tr><td>All externally powered input signals into the pressurized enclosure shall be isolated by external relays controlled by the Ex px protection system.(Ex px safety device).</td></tr>
<tr><td>The only installation method is wall mounting.</td></tr>
<tr><td>On-site assembling</td><td>N/A</td></tr>
<tr><td rowspan="7">Installation and erection</td><td>In order to prevent the earthing conductor from loosening, the conductor must be secured to the terminal, tightening the screw with torque of approx. 1.2 Nm (M4). Care must be taken not to twist the conductor.</td></tr>
<tr><td>Unused entries shall be closed with suitable certified blanking elements.</td></tr>
<tr><td>Cable entry devices suitable for the thread form and the size of the cable entries must be used, according to the following marking on the equipment.
<table>
<tr><th>Marking</th><th>Screw form / size</th></tr>
<tr><td>(Non-marking)</td><td>ISO M25 × 1.5</td></tr>
<tr><td>N</td><td>ANSI 3/4NPT</td></tr>
</table>
</td></tr>
<tr><td>The protective gas inlet is Rc1/4 or 1/4NPT. suitable for the thread form and the size of the inlet must be used on the equipment.</td></tr>
<tr><td>Cable entry devices suitable for the size of the cable holes for M20 must be used.</td></tr>
<tr><td>IECEx</td><td>The equipment shall be installed in accordance with IEC 60079-14 and relevant local codes and requirements.</td></tr>
<tr><td>ATEX</td><td>The equipment shall be installed in accordance with EN 60079-14 and relevant local codes and requirements.</td></tr>
<tr><td>Cable glands, adapters and/or blanking elements shall be installed so as to maintain the specified type of protection(s) and the rating of the equipment.</td></tr>
<tr><td>Putting into service</td><td>N/A</td></tr>
<tr><td rowspan="4">Use and setting-up (operation)</td><td>WARNING</td></tr>
<tr><td>POTENTIAL ELECTROSTATIC CHARGING HAZARD
In hazardous areas, risk from electrostatic discharge and propagating brush discharges caused by rapid flow of dust shall be avoided. Avoid any actions which generate electrostatic charges, such as rubbing the equipment with a dry cloth.</td></tr>
<tr><td>AFTER DE-ENEGING, DELAY 25 MINUTES
BEFORE OPENING.</td></tr>
<tr><td>Take care not to generate mechanical spark when access to the equipment and the peripheral devices in hazardous locations.</td></tr>
<tr><td rowspan="3">Maintenance and repair</td><td>WARNING</td></tr>
<tr><td>A modification of the equipment would no longer comply with the construction described in the certificate documentation.</td></tr>
<tr><td>Only personnel authorized by Yokogawa Electric Corporation can repair the equipment</td></tr>
</table>

IR810S-NE (NEPSI)

IR810S series Explosion-protected model infrared Gas Analyzer, manufactured by Yokogawa Electric Corporation, has been certified by National Supervision and Inspection Center for Explosion Protection and Safety of Instrumentation (NEPSI). The Explosion-protected model infrared Gas Analyzer accords with following standards:
GB/T 3836.1-2021 Explosive atmospheres-Part 1: Equipment – General requirements
GB/T 3836.2-2021 Explosive atmospheres-Part 2: Equipment protection by flameproof enclosures “d”
GB/T 3836.5-2021 Explosive atmospheres-Part 5: Equipment protection by pressurized enclosures “p”
The certificate number is GYJ24.1103X.
The Ex marking of the certified product is Ex db pxbⅡB+H2 T4 Gb.
The certified type codes are:
IR810S-a-*-b-*-*-*-*-*-*-*-*-c d-e-*-*-*-*/*
a indicates area classification, which could be NE.
b indicates type of O2 detector, which could be N, 1, 2, 3 or 4.
c indicates piping connection, which could be R or T.
d indicates type of cable entry, which could be MN, TN or MC.
e indicates parameter, which could be as follows:

由 Yokogawa Electric Corporation 生产的 IR810S 系列防爆型红外气体分析仪（以下简称分析仪），经检验，符合以下国家标准的规定：

GB/T 3836.1-2021 爆炸性环境 第 1 部分：设备 通用要求

GB/T 3836.2-2021 爆炸性环境 第 2 部分：由隔爆外壳“d”保护的设备

GB/T 3836.5-2021 爆炸性环境 第 5 部分：由正压外壳“p”保护的设备

产品防爆标志为：Ex db pxb ⅡB+H2 T4 Gb

防爆合格证号为 GYJ24.1103X。

本次认可的产品具体型号规格如下：
IR810S-a-*-b-*-*-*-*-*-*-*-*-c d-e-*-*-*-*/*
a 表示区域分类，代码可为 NE。
b 表示氧气检测器的类型，代码可为 N、1、2、3 或 4。
c 表示管道连接方式，代码可为 R 或 T。
d 表示电缆引入的类型，代码可为 MN、TN 或 MC。
e 表示参数，其代码和含义如下：

Parameters 参数	Model 型号 IR810S-a-*-b-*-*-*-*-*-*-*-*-c d-e-*-*-*-*/*		
	02	05	10
Minimum flow rate at the outlet of the pressurized enclosure 正压外壳出口处的最小流速	10 L/min	40 L/min	90 L/min
Minimum flow rate at the inlet of the pressurized enclosure 正压外壳入口处的最小流速	20 L/min	50 L/min	100 L/min
Maximum concentration of flammable gas at into the containment system 进入系统的可燃性气体的最大浓度	10%	55%	100%
LEL lower limit of flammable gas flowing at maximum concentration at into the containment system 以最大浓度进入系统的可燃气性体的爆炸下限	4.4%	4.4%	No limit 无限制
Minimum and maximum supply pressure to the pressurized enclosure 正压外壳的最小和最大供应压力	350 to 500 kPa 350~500 kPa	350 to 500 kPa 350~500 kPa	400 to 500 kPa 400~500 kPa

*: Number or letter not relevant for the explosion safety properties.
*: 与防爆安全特性无关的数字或字母。

1. Special conditions for safe use
Symbol "X" placed after the certification number denotes specific conditions of use:
- Electrostatic charging on the non-metallic parts and coating on the surface of enclosure shall be avoided.
- The flameproof joints are not intended to be repaired.
- The flow rate of containment system shall be less than 0.8 l/min (0.0008 m3/min).
- The infrared gas analyzer shall be installed in the vertical position only (wall mounting).

2. Conditions for safe use
2.1 The ambient temperature range of the Explosion-protected model infrared Gas Analyzer is 0° C to +45° C.
2.2 The power supply is 100 to 240 Vac, max. 120 W.
2.3 The analyzer is equipped with a grounding terminal, and users should be reliably grounded during installation and use.
2.4 The pressurization related data of Explosion-protected model infrared Gas Analyzer are as follows:
・ Free internal volume: app. 55.2 L (0.0552 m3)
・ Supply pressure: See type code “e”
・ Minimum purge flow: See type code “e”
・ Purge time: 18 min
・ Minimum overpressure: 392 Pa
・ Maximum overpressure: 1000 Pa
・ Maximum leakage rate: 25 L/min (0.025 m3/min)
・ Maximum flow rate of containment system: 0.8 L/min (0.0008 m3/min)
・ Maximum inlet pressure of containment system: 9.8 kPa
・ Flammable gases in the containment system shall be lighter than air.
2.5 When using and maintaining the analyzer on site, it is necessary to adhere to the principles of "strictly prohibit opening the cover with electricity" and "delay for 25 minutes after power off before opening the cover".
2.6 The cable entry of the analyzer must be equipped with a cable entry device that is recognized by a nationally authorized inspection agency, meets the requirements of GB/T 3836.1-2021 and GB/T 3836.2-2021, has an
explosion-proof grade of Ex db Ⅱ C Gb, and a thread specification of 3/4-14NPT or M25X1.5. The redundant cable
entry port must be effectively sealed with sealing components provided by the manufacturer.
2.7 Forbid end user to change the configuration to ensure the equipment’s explosion protection performance.
2.8 When installation, use and maintenance of Explosion-protected model Infrared Gas Analyzer, observe following standards:
GB/T 3836.13-2021 “Explosive atmospheres - Part 13: Equipment repair, overhaul and reclamation”
GB/T 3836.15-2017 “Explosive atmospheres - Part 15: Electrical installations design, selection and erection”
GB/T 3836.16-2022 “Explosive atmospheres - Part 16: Electrical installations inspection and maintenance”
GB 50257-2014 ”Code for construction and acceptance of electric equipment on fire and explosion hazard electrical equipment installation engineering”

3. Manufacturer’s Responsibility
3.1 Special condition for safe use specified above should be included in the instruction manual.
3.2 Manufacturing should be done according to the documentation approved by NEPSI.

一、产品安全使用特定条件

证书编号后缀“X”表明产品具有安全使用特殊条件：

・ 严禁干擦和使用溶剂清洗非金属部件和外壳表面的涂层，以防静电危险。

・ 涉及隔爆部件的接合面的维修须联系产品制造商。

・ 产品的流量应小于 0.8 L/min (0.0008 m3/min)。

・ 红外气体分析仪只能安装在垂直位置（壁挂式）。

二、产品使用注意事项

1. 分析仪的使用环境温度范围：0℃~+45℃。

2. 电源：100~240 Vac，最大 120 W。

3. 分析仪设有接地端子，用户在安装使用时应可靠接地。

4. 分析仪正压防爆保护和工艺数据相关参数如下：

・ 内部自由空间容积：55.2 升（0.0552 立方米）

・ 保护供应压力范围：参见型号代码“e”

・ 最小分组流量：见类型代码“e”

・ 吹扫时间：18 分钟

・ 最小正压：392Pa

・ 最大正压：1000 Pa

・ 最大泄漏流量：25 L/min（0.025 m3/min）

・ 产品的最大流量：0.8 L/min（0.0008 m3/min）

・ 产品的最大入口压力：9.8 kPa

・ 产品中的可燃性气体密度应比空气低

5. 现场使用和维护分析仪时，必须遵守“严禁带电开盖”及“断电后延迟 25 分钟方可开盖”的原则。

6. 分析仪的电缆引入口须配用经国家授权的检验机构认可、符合 GB/T 3836.1-2021 与

GB/T3836.2-2021 要求、防爆等级为 Ex db Ⅱ C Gb 且螺纹规格为 3/4-14NPT 或 M25X1.5 的电缆引入装置。冗余电缆引入口须采用生产商提供的封堵件有效封堵。

7. 用户不得自行随意更换该产品的电气零部件，应会同产品制造商共同解决运行中出现的故障，以免影响防爆性能和损坏现象的发生。

8. 产品的安装、使用和维护应同时遵守产品使用说明书、GB/T 3836.13-2021“爆炸性环境 第 13 部分：设备的修理、检修、修复和改造”、GB/T 3836.15-2017“爆炸性环境 第 15 部分：电气装置的设计、选型和安装”、GB/T 3836.16-2022“爆炸性环境 第 16 部分：电气装置的检查与维护”及 GB 50257-2014“电气装置安装工程爆炸和火灾危险环境电气装置施工及验收规范”的有关规定。

三、 制造厂责任

1. 产品制造厂必须将上述使用注意事项纳入该产品的使用说明书中。

2. 制造厂必须严格按照 NEPSI 认可的文件资料生产。

<table>
<tr><td rowspan="9">Installation and erection
安装</td><td>In order to prevent the earthing conductor from loosening, the conductor must be secured to the terminal, tightening the screw with torque of approx. 1.2 Nm (M4). Care must be taken not to twist the conductor.
为了防止接地导体松动，必须将导体固定到端子上，并用大约 10 扭矩拧紧螺钉。 1.2 牛米 (M4)。必须小心不要扭曲导体。</td></tr>
<tr><td>Unused entries shall be closed with suitable certified blanking elements.
未使用的入口应使用适当的经认证的消隐元件封闭。</td></tr>
<tr><td>Cable entry devices suitable for the thread form and the size of the cable entries must be used, according to the following marking on the equipment.
必须根据设备上的以下标记，使用适合螺纹形式和电缆入口尺寸的电缆入口装置。
<table>
<tr><td>Marking
记号</td><td>Screw form / size
螺杆/尺寸</td></tr>
<tr><td>(Non-marking)
(非标)</td><td>ISO M25 × 1.5</td></tr>
<tr><td>N</td><td>ANSI 3/4NPT</td></tr>
</table></td></tr>
<tr><td>The protective gas inlet is Rc1/4 or 1/4NPT suitable for the thread form and the size of the inlet must be used on the equipment.
保护气进口为 Rc1/4 或 1/4NPT。设备上必须使用适合螺纹形式和入口尺寸的螺纹。</td></tr>
<tr><td>Cable entry devices suitable for the size of the cable holes for M20 must be used.
必须使用适合 M20 电缆孔尺寸的电缆引入装置。</td></tr>
<tr><td>The equipment shall be installed in accordance with GB/T 3836.15-2017 and relevant local codes and requirements.
设备应按照 GB/T 3836.15-2017 以及相关当地规范和要求进行安装。</td></tr>
<tr><td>Cable glands, adapters and/or blanking elements shall be installed so as to maintain the specified type of protection(s) and the rating of the equipment.
应安装电缆密封套、适配器和/或消隐元件，以保持指定的保护类型和设备的额定值。</td></tr>
<tr><td>Use and setting-up (operation)
使用和设置</td><td>WARNING
警告</td></tr>
<tr><td>POTENTIAL ELECTROSTATIC CHARGING HAZARD
潜在的静电危险
In hazardous areas, risk from electrostatic discharge and propagating brush discharges caused by rapid flow of dust shall be avoided. Avoid any actions which generate electrostatic charges, such as rubbing the equipment with a dry cloth.
在危险区域，应避免灰尘快速流动引起的静电放电和传播刷放电的风险。避免任何产生静电荷的行为，例如用干布擦拭设备。</td></tr>
<tr><td>AFTER DE-ENEGING, DELAY 25 MINUTES BEFORE OPENING.
断电后，延迟 25 分钟后再开放。</td></tr>
<tr><td>Take care not to generate mechanical spark when access to the equipment and the peripheral devices in hazardous locations.
在危险场所接触设备及外围设备时，注意不要产生机械火花。</td></tr>
<tr><td rowspan="3">Maintenance and repair
维护和修理</td><td>WARNING
警告</td></tr>
<tr><td>A modification of the equipment would no longer comply with the construction described in the certificate documentation.
设备的修改将不再符合证书文件中描述的结构。</td></tr>
<tr><td>Only personnel authorized by Yokogawa Electric Corporation can repair the equipment.
只有横河电机公司授权的人员才能维修设备。</td></tr>
</table>

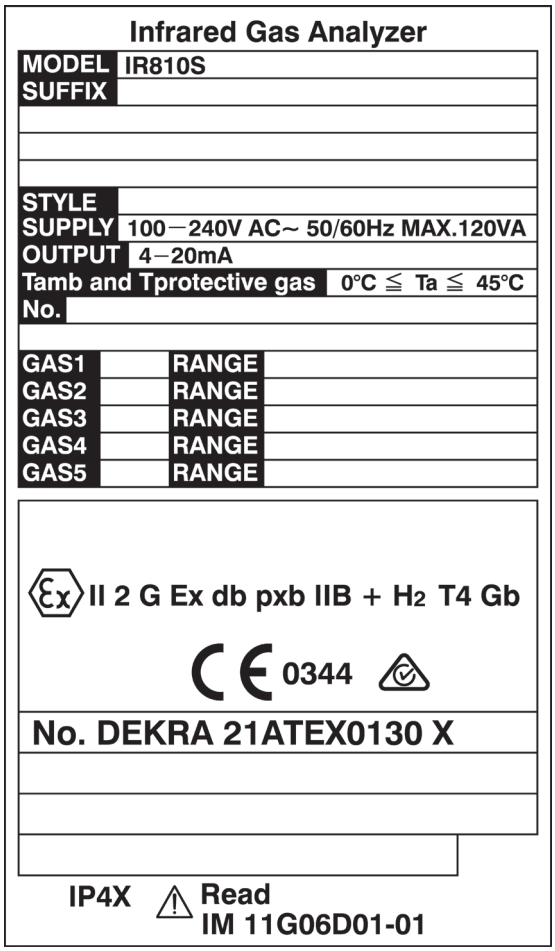
■ IR810S-AT (ATEX) : MARKING

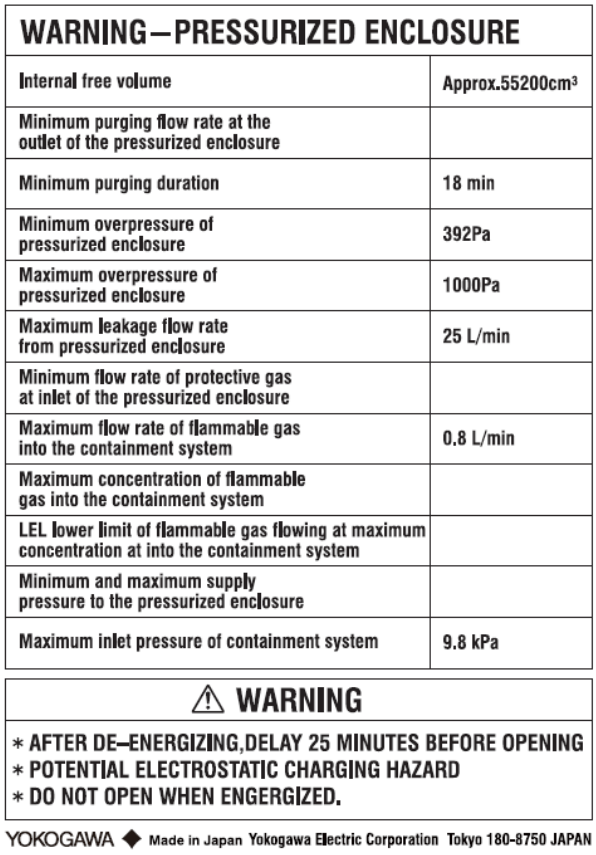
Item	Marking	
Name or registered trade mark of the manufacturer	Yokogawa Electric Corporation	
Address of the manufacturer	Tokyo 180-8750 JAPAN	
Type identification	MODEL SUFFIX	(Model code)
Serial number	NO.	(Serial number)
Year of construction	(YYYY-MM)	
Certificate number (ATEX)	DEKRA 21ATEX0130 X	
CE marking	CE 0344	
Specific Ex marking	Ⓔx II 2 G Ex db pxb IIB + H_2 T4 Gb	
Tamb and Tprotective gas	0 °C ≤ Ta ≤ +45 °C (Note)	
Ratings	100-240 V AC IP4X	
Parameters	Internal free volume	Approx.55200cm^3
	Minimum purging flow rate at the outlet of the pressurized enclosure	(See Table.1)
	Minimum purging duration	18 min
	Minimum overpressure of pressurized enclosure	392Pa
	Maximum overpressure of pressurized enclosure	1000Pa
	Maximum leakage flow rate from pressurized enclosure	25 L/min
	Minimum flow rate of protective gas at inlet of the pressurized enclosure	(See Table.1)
	Maximum flow rate of flammable gas into the containment system	0.8 L/min
	Maximum concentration of flammable gas into the containment system	(See Table.1)
	LEL lower limit of flammable gas flowing at maximum concentration at into the containment system	(See Table.1)
	Minimum and maximum supply pressure to the pressurized enclosure	(See Table.1)
	Maximum inlet pressure of containment system	9.8 kPa
Warning	WARNING	
	AFTER DE-ENEGING, DELAY 25 MINUTES BEFORE OPENING.	
	POTENTIAL ELECTROSTATIC CHARGING HAZARD.	
	SEE INSTRUCTIONS (Note 5)	
	DO NOT OPEN WHEN ENER GIZED. PRESSURIZED ENCLOSURE.	

(Note) Under actual operating conditions, the IR810S should be used under the following requirements.
Protective gas temperature; 5℃ ≤ Ta ≤ 45℃

Table. 1

Parameters	The contents to be printed by Air purge gas flow rate in Model and Suffix Code.		
	02	05	10
Minimum purging flow rate at the outlet of the pressurized enclosure	10 L/min	40 L/min	90 L/min
Minimum flow rate of protective gas at inlet of the pressurized enclosure	20 L/min	50 L/min	100 L/min
Maximum concentration of flammable gas at into the containment system	10%	55%	100%
LEL lower limit of flammable gas flowing at maximum concentration at into the containment system	4.4%	4.4%	No limit
Minimum and maximum supply pressure to the pressurized enclosure	350 to 500 kPa	350 to 500 kPa	400 to 500 kPa





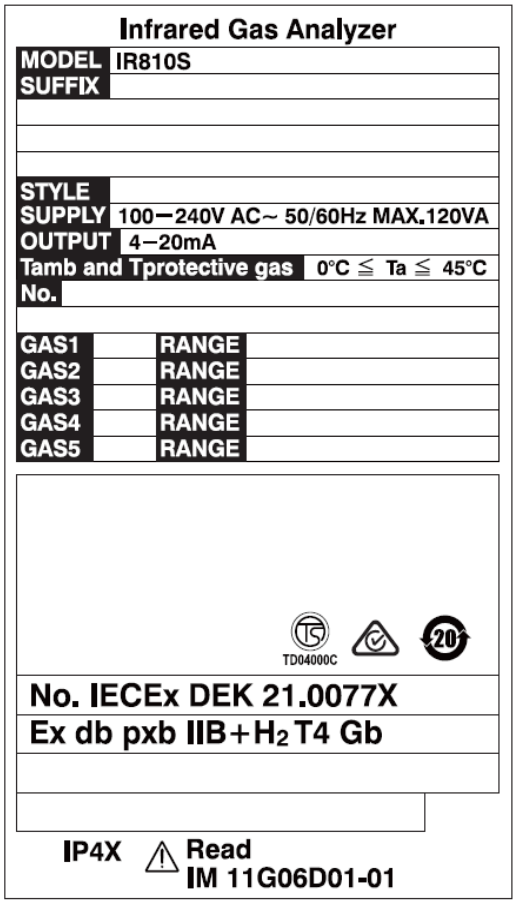
■ IR810S-EC (IECEx) : MARKING

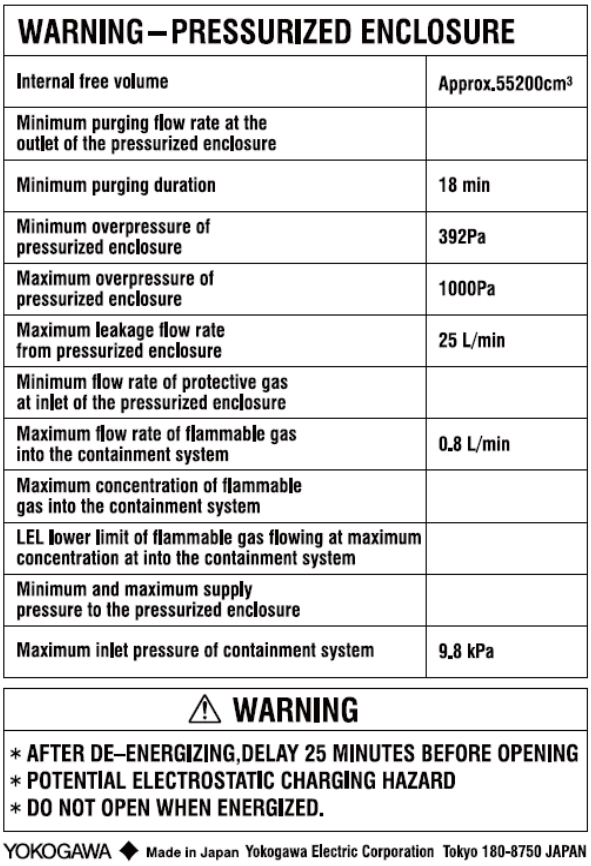
Item	Marking		
Name or registered trade mark of the manufacturer	Yokogawa Electric Corporation		
Type identification	MODEL SUFFIX	(Model code)	
Serial number	NO.	(Serial number)	
Certificate number	IECEx DEK 21.0077X		
Specific Ex marking	Ex db pxb IIB + H2 T4 Gb		
Tamb and Tprotective gas	0 °C ≤ Ta ≤ +45 °C (Note)		
Ratings	100-240 V AC IP4X		
Parameters	Internal free volume		Approx.55200cm^3
	Minimum purging flow rate at the outlet of the pressurized enclosure		(See Table.1)
	Minimum purging duration		18 min
	Minimum overpressure of pressurized enclosure		392Pa
	Maximum overpressure of pressurized enclosure		1000Pa
	Maximum leakage flow rate from pressurized enclosure		25L/min
	Minimum flow rate of protective gas at inlet of the pressurized enclosure		(See Table.1)
	Maximum flow rate of flammable gas into the containment system		0.8 L/min
	Maximum concentration of flammable gas into the containment system		(See Table.1)
	LEL lower limit of flammable gas flowing at maximum concentration at into the containment system		(See Table.1)
	Minimum and maximum supply pressure to the pressurized enclosure		(See Table.1)
	Maximum inlet pressure of containment system		9.8 kPa
Warning (Note 2)	WARNING		
	AFTER DE-ENEGING, DELAY 25 MINUTES BEFORE OPENING.		
	POTENTIAL ELECTROSTATIC CHARGING HAZARD.		
	SEE INSTRUCTIONS (Note 3)		
	DO NOT OPEN WHEN ENERGIZED . PRESSURIZED ENCLOSURE.		

(Note) Under actual operating conditions, the IR810S should be used under the following requirements.
Protective gas temperature; 5℃ ≤ Ta ≤ 45℃

Table. 1

Parameters	The contents to be printed by Air purge gas flow rate in Model and Suffix Code.		
	02	05	10
Minimum purging flow rate at the outlet of the pressurized enclosure	10 L/min	40 L/min	90 L/min
Minimum flow rate of protective gas at inlet of the pressurized enclosure	20 L/min	50 L/min	100 L/min
Maximum concentration of flammable gas at into the containment system	10%	55%	100%
LEL lower limit of flammable gas flowing at maximum concentration at into the containment system	4.4%	4.4%	No limit
Minimum and maximum supply pressure to the pressurized enclosure	350 to 500 kPa	350 to 500 kPa	400 to 500 kPa





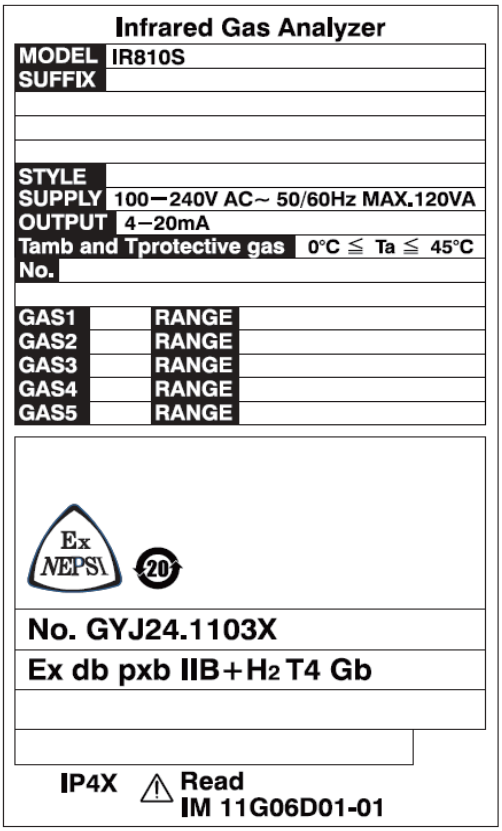
IR810S-NE (NEPSI): MARKING

Item	Marking	
Manufacturer 制造商	Yokogawa Electric Corporation Tokyo 180-8750, Japan	
Type codes (Model code) 产品具体型号规格	MODEL SUFFIX	Type codes (Model code) 产品具体型号规格
Serial number 序列号(编号)	NO.	(Serial number) 序列号(编号)
Certification mark 认证标志		
Cert No. 证号	GYJ24.1103X	
Ex marking 防爆标志	Ex db pxb IIB+H2 T4 Gb	
The ambient temperature range of the Explosion-protected model infrared Gas Analyzer 分析仪的使用环境温度范围	0 °C ≤ Ta ≤ +45 °C	
The power supply 电源	100-240 V AC	
The pressurization related data of Explosion-protected model infrared Gas Analyzer are as follows. 分析仪正压防爆保护和工艺数据相关参数如下	Free internal volume 内部自由空间容积	app. 55.2 L 55.2 升
	Minimum flow rate at the outlet of the pressurized enclosure 正压外壳出口处的最小流速	(See Table.1) (参见 Table 2)
	Purge time 吹扫时间	18 min 18 分钟
	Minimum overpressure 最小正压	392 Pa
	Maximum overpressure 最大正压	1000 Pa
	Maximum leakage rate 最大泄漏流量	25 L/min
	Minimum flow rate at the inlet of the pressurized enclosure 正压外壳入口处的最小流速	(See Table.1) (参见 Table 2)
	Maximum flow rate of containment system 产品的最大流量	0.8 L/min
	Maximum concentration of flammable gas at into the containment system 进入系统的可燃性气体的最大浓度	(See Table.1) (参见 Table 2)
	LEL lower limit of flammable gas flowing at maximum concentration at into the containment system 以最大浓度进入系统的可燃气性体的爆炸下限	(See Table.1) (参见 Table 2)
	Minimum and maximum supply pressure to the pressurized enclosure 正压外壳的最小和最大供应压力	(See Table.1) (参见 Table 2)
	Maximum inlet pressure of containment system 产品的最大入口压力	9.8 kPa
Warning	WARNING 警告	
	AFTER DE-ENEGING, DELAY 25 MINUTES BEFORE OPENING. (delay for 25 minutes after power off before opening the cover) 断电后，延迟 25 分钟方可开盖	
	POTENTIAL ELECTROSTATIC CHARGING HAZARD.	

	潜在静电电荷危险
	SEE INSTRUCTIONS 见使用说明书
	DO NOT OPEN WHEN ENERGIZED. (strictly prohibit opening the cover with electricity) 严禁带电开盖
	PRESSURIZED ENCLOSURE. 加压外壳

Table. 1

Parameters 参数	Model 型号 IR810S-a-*-b-*-*-*-*-*-*-*-*-c d-e-*-*-*-*/*		
	02	05	10
Minimum flow rate at the outlet of the pressurized enclosure 正压外壳出口处的最小流速	10 L/min	40 L/min	90 L/min
Minimum flow rate at the inlet of the pressurized enclosure 正压外壳入口处的最小流速	20 L/min	50 L/min	100 L/min
Maximum concentration of flammable gas at into the containment system 进入系统的可燃性气体的最大浓度	10%	55%	100%
LEL lower limit of flammable gas flowing at maximum concentration at into the containment system 以最大浓度进入系统的可燃气性体的爆炸下限	4.4%	4.4%	No limit 无限制
Minimum and maximum supply pressure to the pressurized enclosure 正压外壳的最小和最大供应压力	350 to 500 kPa 350~500 kPa	350 to 500 kPa 350~500 kPa	400 to 500 kPa 400~500 kPa



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Revision Information

- Manual Title : IR810S Explosion-protected model Infrared Gas Analyzer, Start-up and Safety Precautions
- Manual No. : IM 11G06D01-01EN

Edition	Date	Remark (s)
3rd	**June 2025**	Revised notes. (pages 1, 2) Updated Accessories (page 2) Additional changes. (pages 6, 10-16)
2nd	**June 2024**	Added explosion protection NEPSI, local Ex approvals: India, Taiwan (pages viii, 1, 26-28 33-34) Updated regulation marking (page 32) Overall reviewed
1st	**Jan. 2024**	Newly published

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http://www.yokogawa.com/an/

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YOKOGAWA

Doc. No. AEN726-C02

EU DECLARATION OF CONFORMITY

We **Yokogawa Electric Corporation**
2-9-32 Nakacho, Musashino-shi, Tokyo, 180-8750 Japan

declare under our sole responsibility that the product identified as:

Model code	Model name
IR810S	**Infrared Gas Analyzer**

further specified with model suffix and option codes:

As listed in General Specification: GS11G06D01-01EN (Ed.1)

are in compliance with the EU law and legislation providing for the CE-marking, as listed in Appendix 1.

Information relevant to the conformity and identification of these Products is provided in Appendix 2 and Appendix 3.

Subject products are:
- Produced according to appropriate quality control procedure.
- Provided with the CE-marking as from **2023**.

Signature:

(Manufacturer)

Tokyo, 17 August 2023

Tetsuo Ooshita
General Manager
Analyzer Development Dept.
Development Div.
Yokogawa Products HQ Sensing Center
Yokogawa Electric Corporation

(Authorized Representative in the EEA)

Amersfoort, 04 September 2023

DocuSigned by:
Gunter Klein
3051501CF33C498...

Günter Klein
QHSE Manager – Regional Process Owner
Yokogawa Europe B.V.
Euroweg 2, 3825 HD Amersfoort,
P.O.Box 163, 3800 AD Amersfoort,
The Netherlands

Appendix 1

The products are built in compliance with requirements of the following EU Directives and Standards:

EU Directives and Standards	
EU Directives	Standards
2014/30/EU (EMC)	**EN 61326-1:2013 Class A Table 2** Electrical equipment for measurement, control and laboratory use – EMC requirements- Part 1: General requirements **EN 61326-2-3: 2013** Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 2-3: Particular requirements – Test configurations, operational conditions and performance criteria for transducers with integrated or remote signal conditioning **EN 61000-3-2: 2014** **EN IEC 61000-3-2: 2019** Electromagnetic compatibility (EMC) -- Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≦ 16 A per phase) **EN 61000-3-3: 2013** **EN 61000-3-3: 2013 +A1:2019** Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≦ 16 A per phase and not subject to conditional connection
2014/35/EU (LVD)	**EN 61010-1:2010+A1:2019** Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General Requirement **EN IEC 61010-2-030:2021+A11:2021** Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use – Part 2-030: Particular Requirements for Equipment Having Testing or Measuring Circuits
2011/65/EU*1 (RoHS)	**EN IEC 63000:2018** Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

2014/34/EU (ATEX)	**EN IEC 60079-0:2018** Explosive atmospheres Part 0 : Equipment-General requirements **EN 60079-1:2014** Explosive atmospheres Part 1 : Equipment protection by flameproof enclosures “d” **EN 60079-2:2014** Explosive atmospheres Part 2: Equipment protection by pressurized enclosure "p"  II 2 G Ex db pxb IIB + H_2 T4 Gb
	The number of the EU-Type Examination Certificate: **DEKRA 21ATEX0130 X** is issued by: The Name of the Notified Body: **DEKRA Certification B.V.** The Identification Number of the Notified Body: **0344** The Address of the Notified Body: **Meander 1051 6825 MJ Arnhem, The Netherlands**
	Quality Assurance Notification is issued by: The Name of the Notified Body: **DEKRA Certification B.V.** The Identification Number of the Notified Body: **0344** The Address of the Notified Body: **Meander 1051 6825 MJ Arnhem, The Netherlands** The Number of Quality Assurance Notification: **DEKRA 11ATEXQ0127**

*1 : *Including the Commission Delegated Directive (EU) 2015/863 that defines the ten (10) restricted substances and amends Annex II to Directive 2011/65/EU.*

Appendix 2

The accessories in the list below have CE-marking significant compliance relevance, as indicated per EU-Directive; their application and use – as described in **IM11G06D01-01EN** – is supported by this EU Declaration of Conformity. The full list of accessories for this product can be found in **IM11G06D01-01EN**

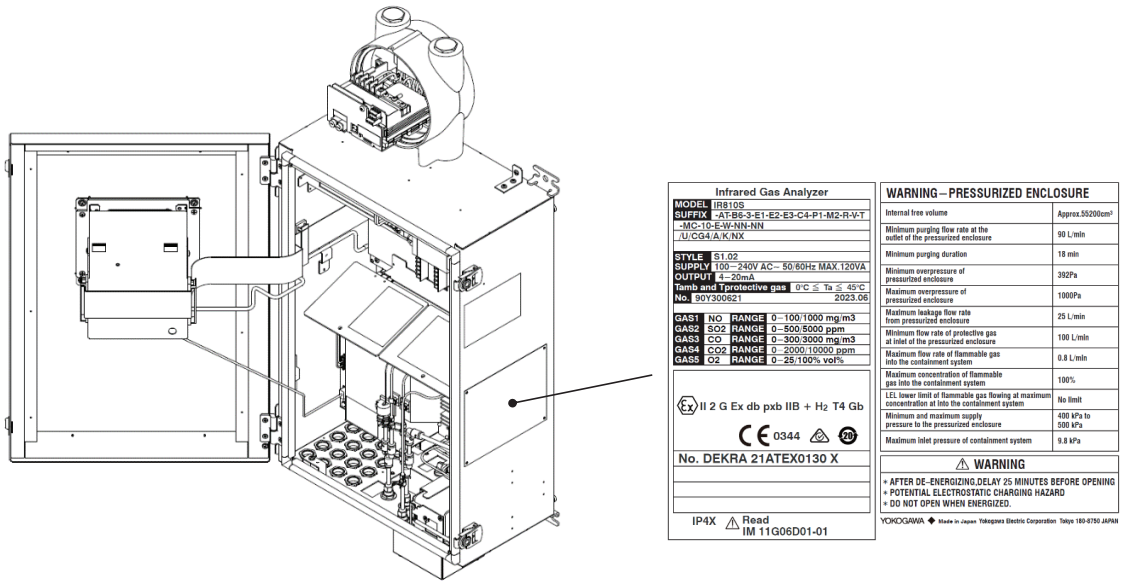
Indications: *'C' = The accessory conforms to the Directive as a part of the product.*
'R' = The accessory is relevant to the conformity of the product as a part of the product.
'NS' = The accessory does not support the Directive.
'NR' = The accessory is not relevant to the conformity of the product.

Model/Parts No.	Model Name	Relevant EU Directives			
		EMC	LVD	RoHS	ATEX
K8019KA	RS485/AI INTERRUPTER	C	NR	C	NS
K8019KB	DO(DC) INTERRUPTER	C	NR	C	NS
IM11G06D01-01EN	User's Manual	R	R	R	R

Appendix 3

External View of IR810S

Image of Nameplate
(Typical example; details may differ)



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