

Instruction manual



Thank you for purchasing an in-line refractometer. This instruction manual is designed to guide you to understand the functions and characteristics of the sensor. Before using the instrument, please read this manual carefully to ensure safe and correct use. Please keep this manual for future reference

In-line Refractometer (Economical)

Model : CZ15/CZ53



Description

The In-line Brix-Monitor (Economical) CZ15/CZ53 is a refractometer that detects the Refractive Index of a sample and outputs

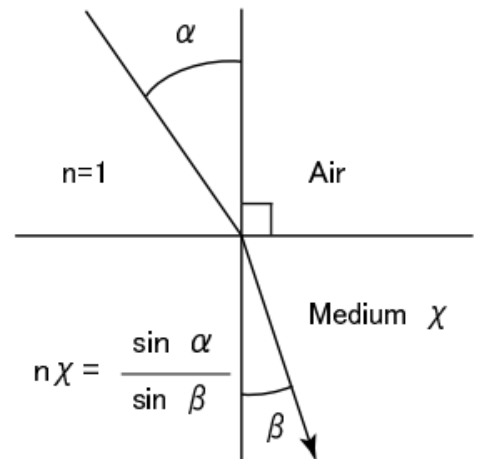
the Brix(%) can also transmit measured data to external devices via 4 to 20mA or RS485 .

CZ15/CZ53 series has the function of automatic temperature compensation according to the temperature of the tested medium , when the tested medium temperature changes , the Brix value (soluble solids) after temperature compensation is displays and the output changes accordingly

Working Principle

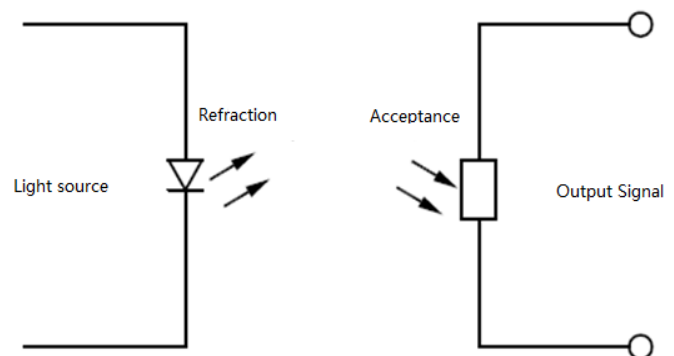
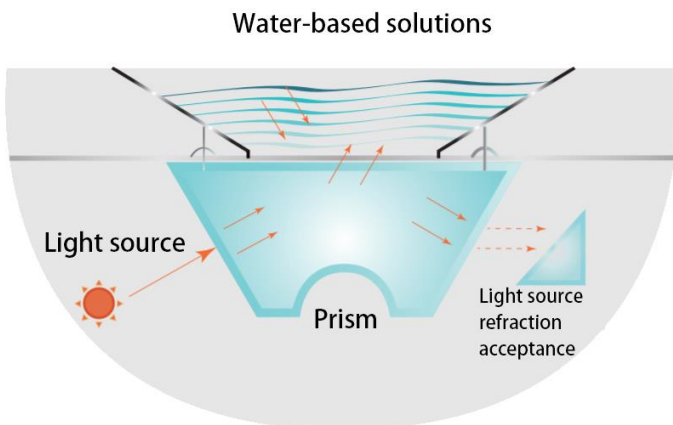
If the Refractive Index of air under atmospheric pressure is 1, then when light enters medium χ , the ratio of the sine of the incident angle α measured against the phase boundary to the sine of the refracting angle β is called the Refractive Index of the medium χ .

The Refractive Index varies with the wavelength of light and temperature and is represented as follows:



- n : Represents the Refractive Index
- t : Temperature (°C)
- D : D-line of natrium (589nm)

For example: Refractive Index of water at 20°C under the D-line is: $n_D^{20} = 1.33299$, (Generally expressed as $n_D = 1.33299$.)



Temperature correction & compensation

The Refractive Index of a substance varies with temperature. Thus, when using a refractometer to measure the Refractive Index of a liquid, the measurement value will vary with the sample temperature. The CZ15/CZ53 always detects the prism temperature. The value of the measurement is automatically corrected for temperature by a built-in processor, so that the displayed value is equal to the value measured at 20°C (provided that the sample temperature is within the range of 5 to 85°C), the Brix(%) values are automatically temperature compensated .

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Features

Automatic temperature compensation

Economical ,Lightweight , compact and easy to install on site .

Easy to operate, easy to connect with other devices for automatic control

Inline real-time monitoring and control of liquid substance concentration in various industries

Applications

Cutting oil , mold release agent , quenching liquid , cleaning liquid , emulsion in the machining industry

Chemicals and allied , pulp & paper , tobacco , environmental protection

Biorefining , Metals and mining

Food industry , Dairy , Beverage industry , Fruit and effect processing

Starch sweetener , Sugar and sweeteners

Water-based solutions

Why need to install in-line refractomter ?

In factories that produce liquid products such as beverages, medicines, chemicals, etc., the raw materials (stock solution) must be processed in multiple processes, or two or more mixed solutions must be added through multiple production lines and multiple processes, such as: juicing, filtering , cooking, dilution, blending, mixing, fermentation, etc., each process, the concentration will change. If only detectthe finished product concentration, when there is a substandard product, it is impossible to know which process has the problem, and the produced defective product causes cost waste. Therefore, an online refractometer is installed on the production line (production pipeline, tank) of each process. , It can continuously detect the concentration of samples in the pipeline in real time, monitor the quality of samples in each process, and discover unqualified products in time, which can reduce production costs, improve the pass rate and product quality. cost, improve inspection efficiency, real-time display of brix value , and intuitively guide production personnel to operate.

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Specification

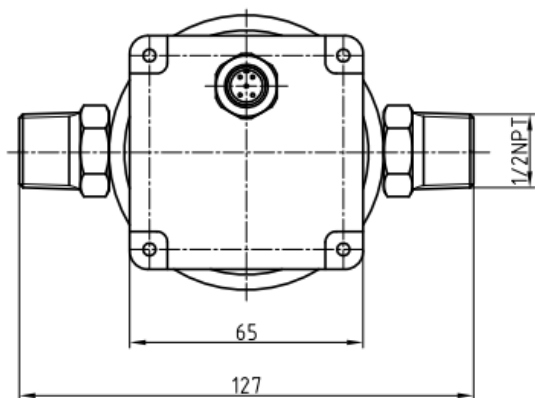
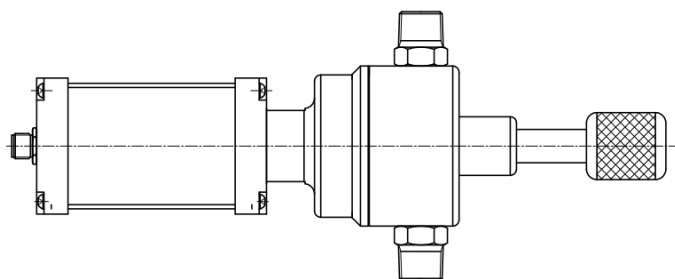
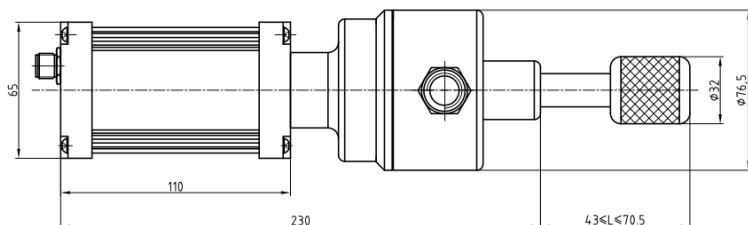
Model:	CZ15/CZ53
Measure Parameters:	Refractive index(nD), Brix (%), Temperature (° C)
Measure range:	CZ15(0-15%) , CZ53(0-53%)
Min Resolution Ratio:	Brix: 0.1% (Range for 15% & 53%)
Measurement Accuracy:	Brix:±0.3% (standard)
Measurement Temperature:	0-85°C(Automatic Temperature Compensation)
Operating current:	≤200mA
Display menu:	Refractive index(nD) , Brix(%), Temperature (° C)
Output :	4-20mA , 4-20mA+ RS485 optional
Power:	12-24V DC
Wetted parts material:	Prism: sapphire, Prism stage: ,SS316L (can be customized)
Max Pressure:	1MPa
Environment Temperature:	10-60°C
Protection grade:	IP65
Instrument Size:	230mm*170mm*65mm
Process connection	1/2NPT, other size supply free adaptor
Recorder output cable	2M ,3M ,5M,10M optional
Temperature sensor	Thin film platinum sensor

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Dimension



In-line Refractometer

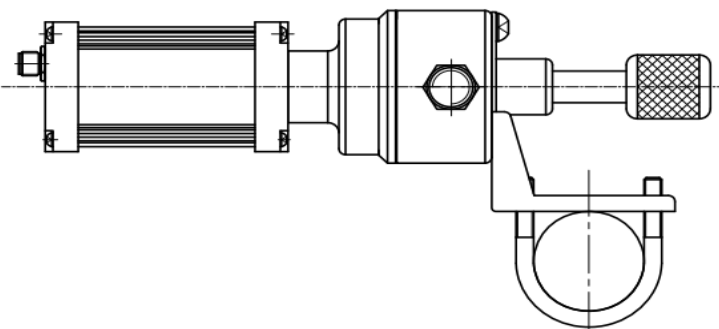
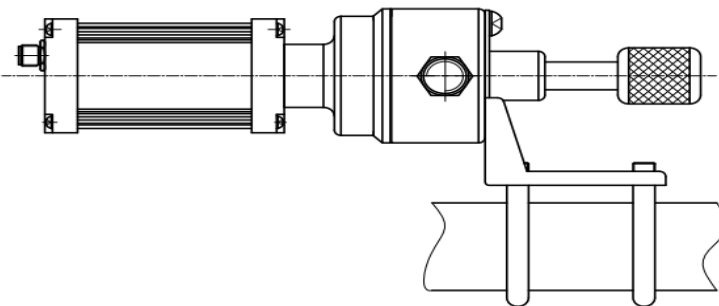
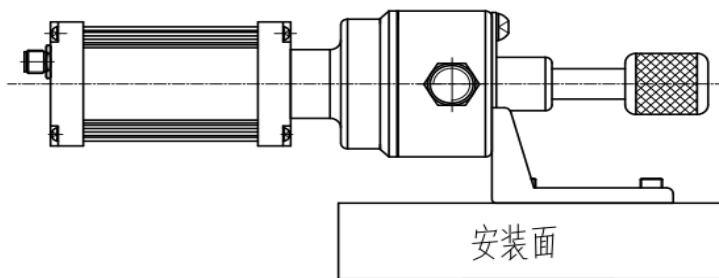
Model : CZ15/CZ53



Mounting Precautions

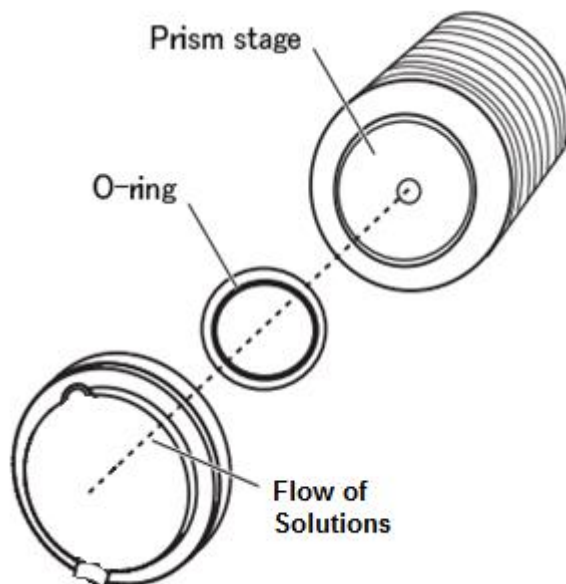
- ◆ The installation form of this product is a thread-installation type;
- ◆ When installing, please pay special attention not to scratch the prism and probe;
- ◆ When installing, please pay special attention to avoid strong impact on the instrument;
- ◆ When installing, please pay special attention not to miss the sealing ring;
- ◆ Ensure that the cable is correctly connected to the port;
- ◆ The power can be turned on only after the product is installed;
- ◆ Immediately turn off the power (DC24V) if the unit begins to overheat, smoke or emit an abnormal smell.

Mounting diagram :



Mounting procedure:

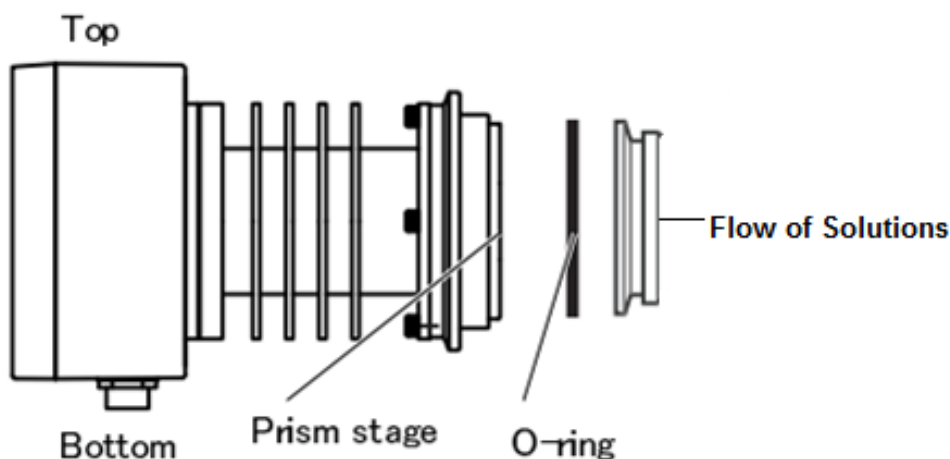
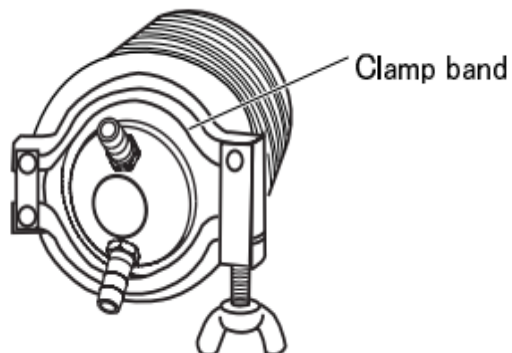
- ① Install the CZ15/CZ53 so that the prism surface is at a right angle to the ground.
- ② Attach the flow pipe to the CZ15/CZ53 with O-ring (accessory) inserted between them, and fasten them together with the clamp band (accessory).
- ③ The prism surface may become contaminated with solids, dirt and/or grease. If this happens, the prism surface must be cleaned by hand.



Note : Cleaning the Prism instruction in the next page

The sample inlet unit should be installed in such a manner that it can be easily removed to allow access to the prism for cleaning

Note : Suspending the CZ15/CZ53 when using the sample inlet unit to connect to the piping is dangerous , Use of the optional stand is recommended.



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Cleaning the Prism

- If the sample solution could potentially stain the prism, immediately clean the prism after measurement .
- Before running hazardous substance(s) through any precautions should be taken to ensure the safe handling of the hazardous system, necessary substance(s). If using a sample inlet unit, use caution when disconnecting the CZ15/CZ53 .
- Cleaning liquids up to 150°C can be used for CIP or SIP . The cleaning liquid can be used safely for 30 minutes at one time. The momentary difference between the sample liquid temperature and the cleaning liquid temperature must be no more than 80°C. When using cleaning liquids at temperatures over 150°C, the power source (DC24V) must be turned off.
- Detach the clamp band that connects the main unit to the sample inlet unit, piping or tank.
- Clean the prism surface carefully with a soft tissue soaked with warm water or ethyl alcohol. If the sample solution contains oil or grease, use ethyl alcohol to ensure the prism surface does not develop a film. Development of a film on the prism could cause erroneous measurements.
- NEVER clean the prism with an abrasive material.
- Cleaning the prism with an abrasive material could cause scratches on the prism which could lead to erroneous measurements.
- After cleaning is complete, re-attach the CZ15/CZ53 unit to the sample inlet unit, piping or tank. The procedure is described on the instruction manual.

Note :we also can supply Auto or manual washing device for optional, if need , Please specify when confirming the order

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Environmental conditions:

- If the unit begins to overheat, smoke, or emit an abnormal smell , immediately turn off the power and unplug the unit from the power supply.
- DO NOT measure any sample that can damage the prism or the sample inlet unit , sample temperature should be kept between 5°C and 100°C when the power is turned on .
- Do not put the instrument in a damp place, Maximum average relative humidity: 95% RH (25°C);
- Atmospheric pressure: 80kPa ~ 106kPa;
- Places where there is no corrosion or destruction of insulating gas, steam or dust;
- Use the instrument at altitudes below 2000 meters (altitude).
- Use the instrument indoor.
- Do not change the ambient temperature of the instrument suddenly
- Do not use instrument in areas with large amount dust and strong vibrations
- Do not put the instrument in low temperature place
- Do not put heavy objects on the instrument
- Do not install the instrument In direct sunlight or near the heating source.

Breakdowns And Trouble Shooting :

If measurement of concentration transmitter is abnormal, please check input power supply first. If power supply is ok, check if the measurement window of transmitter has been covered by contamination or not, and make sure that measurement window can contact solution well at the mean time. If it is problem of transmitter itself, please return it to the factory for maintenance.

Caution :

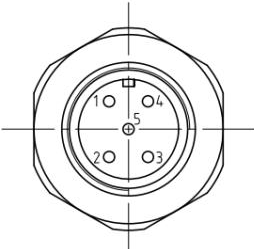
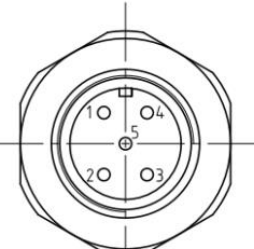
- Protected from direct rain and snow, the packaged transmitter can be applied to various modes of transportation, such as water, land and air transportation.
- The packaged transmitter can be stored for more than 12 months with temperature ranging from -40°C~60°C, and relative humidity less than 90%
- Live plug-in and pull-out should be strictly prohibited under live working condition, otherwise, it will damage the concentration and infrared transmitter easily.

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Plug wiring definition:

5-pins plug for output (4-20MA)		Pin 1: VCC: Red Pin 2: GND , Yellow Pin 3: Iout , Blue Pin 4: K1, White Pin 5: DGND: Black
5-pins plug for output (RS485)		Pin 1: VCC: Red Pin 2: GND , Yellow Pin 3: RS485A , Blue Pin 4: RS485B , White Pin 5: NC

NOTED: Maintenance and troubleshooting

(1) Routine maintenance

If the instrument becomes dirty, please use a soft cloth to wipe it. Do not use gasoline, paint thinner, etc. to clean the instrument

(2) Regular/scheduled maintenance (can be operated by cleaning device)

2-1 :Wipe the prism of the concentration sensor probe clean, add 0.3mL distilled water for test, and if the value is not equal to 4mA, reset it by short circuiting the reset line or sending the reset command (RS485 output)

2-2 :The concentration sensors for measuring high-temperature and corrosive media or operating under vibration conditions shall be calibrated once half a year.

2-3: After the concentration sensor has operated for 5 years, an insulation resistance test shall be conducted, and the insulation resistance shall be above 500M Ω

Product and accessories :

- 1: Main unit (1)
- 2: Instruction Manual (1)
- 3: Certificate (1)
- 4: 5-pins plug mating cable (1)
- 5: Mounting bracket (1)
- 6: U clam band (2)

Ordering guide :

with * are required, with --- is optional

Model	Range (%)	Output	Process connection	Electric connection	Accuracy	Other requirement
CZ15/53	*	*	*	*	*	---
Example: CZ15-15%-4-20mA-1/2NPT-5pins -0.5%						

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