

**INSTRUCTION MANUAL**  
**FOR**  
**CHEMICAL-RESISTANCE**  
**PRESSURE TRANSMITTER**  
**MODEL KL92**

 **NAGANO KEIKI CO., LTD.**

April 2005

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# KL92 Chemical-Resistance Pressure Transmitter Instruction Manual

Thank you for selecting the KL92 Chemical-Resistance Pressure Transmitter. In order to fully utilize this machine, please read this instruction manual to the end.

## Warning

- Do not apply more than the maximum allowable pressure. Human injury or damage to surroundings may result due to burst or blow-up of the pressure elements.
- Do not use these devices on measured objects which are corrosive to fluid or gas contacting areas. Human injury or damage to surroundings may result due to burst or blow-up of the pressure elements and exposure of dangerous measured objects.
- Do not apply excessive weight, vibration or shock. Human injury or damage to surroundings may result due to burst or blow-up of these devices and exposure of dangerous measured objects.
- Use with the unspecified power supply may cause fire hazard or electric shock.
- Use with the instrument temperature range. Use outside the instrument temperature range may cause human injury or damage to surroundings due to burst or blow-up of the devices.
- Connect wiring accurately according to the wiring drawings or instructions in the operation manual. Incorrect wiring may result in human injury or fire hazard.
- Use devices with an explosion-proof construction when operating in places liable to have explosive gas, or otherwise runs the danger of explosion.
- If the measured object is oxygen, use devices with anti-oil treatment. Standard devices may possibly contain remaining oil, and there is danger of combustion and explosion if oil reacts with oxygen.
- Accurately install these devices according to the installation instructions in the operation manual.
- Never attempt to neither reconstruct the main body of devices nor add any new function to the devices, etc. Contact us for repairs.
- For applications where a failure, a malfunction or other defect of this product might result in a serious damage, accident, etc., use multiple units of this product and configure protective circuits [1 out of 2], [2 × (1 out of 2)], [2 out of 3] etc. according to their importance.

Note: Please contact NKS in advance when using these products may possibly result in a fatal or a serious injury due to malfunction or incorrect operation of these products.

## Introduction

Check the specifications of the product on receiving it. A problem will occur if the range, power source, output or other specifications of the unit are different from your operating conditions. Use a model of the specifications that suit your operating conditions.

## Overview

This product is an electrical capacitance pressure transmitter using a ceramic diaphragm in the pressure-detecting element. Wetted parts are made of all fluorocarbon resin and employ O-ring-free structure, which is devised as to minimize the generation of contaminant and the elution of metal.

## Specifications

Pressure range	0 ~ 0.3MPa , 0 ~ 0.5MPa	
Allowable maximum pressure	0.7MPa	
Fluid	Any Liquid compatible with PFA and PTFE	
Pressure connection	1/4"DIA, 3/8"DIA, 1/2"DIA	
Material of wetted parts	PFA,PTFE	
Output signal	4 ~ 20mA DC	1 ~ 5V DC
Supply voltage	24V DC±10%	12 ~ 24V DC
Load resistance	500 max.	10k min.
Operating temperature range	10 ~ 60	
Fluid temperature range	10 ~ 80	
Storage temperature range	10 ~ 65	
Operating humidity range	25 ~ 80%RH(non-freezing)	
Accuracy(23 ±2 )	±1.0%F.S.	
Temperature coefficient	±0.05%F.S./ (zero point)	
	±0.05%F.S./ (span)	
Insulation resistance	100M or more(500V DC)	
Material of case	Polypropylene,PTFE(PFA)	
Weight	140g approx. (include cable)	

The contents of these instructions are subject to change without notice. In the event of a problem please contact the closest Nagano Keiki sales office.

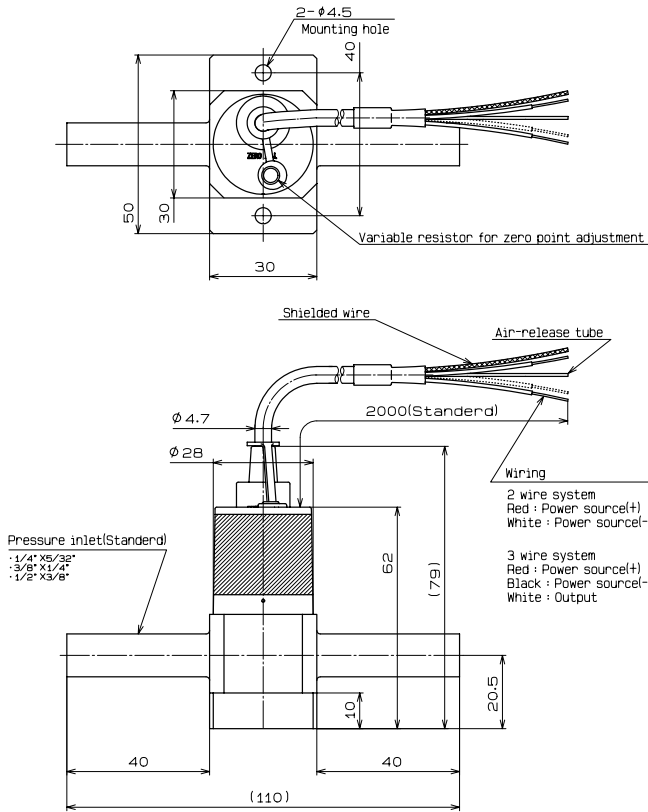
HEAD OFFICE & : 1-30-4,HIGASHIMAGOME OHTA-KU, TOKYO, JAPAN.  
OVERSEAS TELEPHONE :03 (3776) 5328  
SALES DEPT FAX :03 (3776) 5447  
e-mail :overseas\_sales\_dept@naganokeiki.co.jp

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OR AFFILIATES: U.S.A., KOREA, GERMANY  
OVERSEAS SALES NETWORK: AUSTRALIA, HONG KONG, INDONESIA,  
KOREA, MALAYSIA, PHILIPPINES,  
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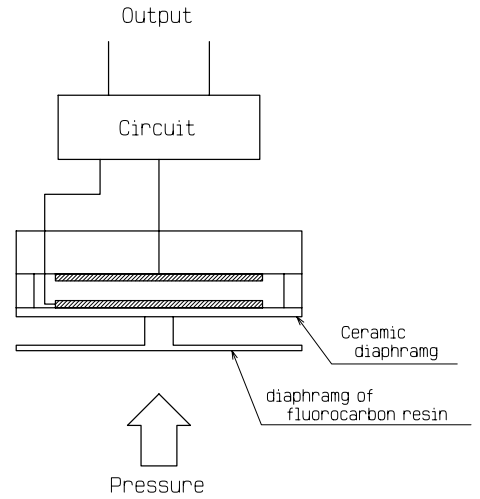
Outside dimensions diagram



Sensor operation

This instrument comprises a diaphragm of fluorocarbon resin that receives pressure, a pressure transmitting mechanism that transmits force, a diaphragm made of ceramics, a sensor consisting of an electrode formed on the ceramic diaphragm and another fixed electrode formed a certain distance separated from said electrode, and a circuit that detects the capacitance of the sensor.

When the pressure of object substance acts on the diaphragm of fluorocarbon resin, it is transmitted as a force to the ceramic diaphragm, which is displaced in proportion to the force. This displacement is detected as a change in the capacitance of the sensor by the electrical circuit to be transmitted as DC voltage and current output.



Installation

To prevent the product from malfunctioning or deteriorating, be sure to avoid installing it in the following places:

- Places where temperature is high
- Places where temperature is low
- Places where corrosive or volatile gas is involved
- Places where strong vibration occurs
- Places where high noise exists
- Places where thunder is likely to hit
- Places that are splashed with liquid or submerged
- Mounting position where the process connection faces vertically upward

Transport

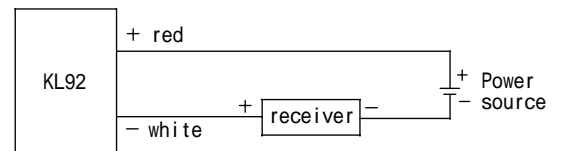
This is a precision instrument. The unit may become inoperable when it is dropped or given shocks. Transport the unit very carefully.

Storage

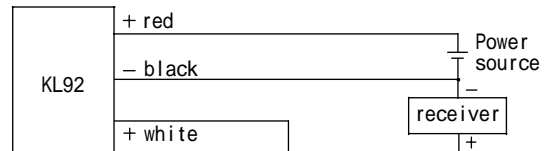
Store the unit in a dry and a vibration – free and dust – free place.

Wiring Diagram

2wire type



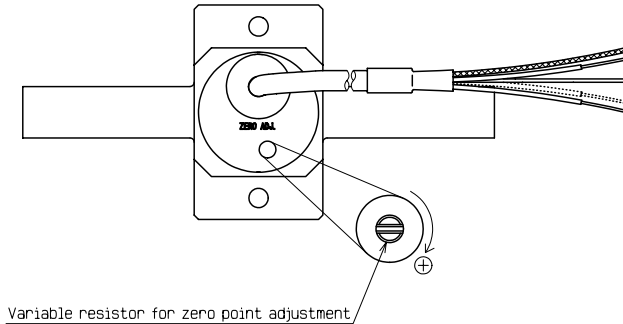
3wire type



\*When connecting equipment that causes surge, etc., from the same power source, a varistor or the like should be connected to protect the transmitter.

## Operation

After checking connection, turn the power on. When pressure is zero (atmospheric pressure), the reference value of 1 V DC must be output with three wire system; 4 mA DC with two wire system. If the output value at atmospheric pressure is shifted from these values, zero adjustment is necessary. Remove the cap, and you will find a variable resistor for zero point adjustment. Turn it with a standard screwdriver to adjust the output value to 1 V DC or 4 mA DC. Then, voltage or current value will be output in proportion to the pressure acting on the sensor. Should any abnormality be recognized, contact Nagano Keiki Co., Ltd.



## Maintenance

In general, according to the using condition, conduct a periodical inspection about twice a year. Should any abnormality be recognized, contact Nagano Keiki Co., Ltd.

Check Items:

- Visual inspection
- Pressure inlet for corrosion, dirt, clogging, leak, etc.
- Check the output with a standard pressure gauge.

## Measures against Noise

Noise problems in many cases are too complicate to be solved easily, and noise can affect a smooth operation. Sometimes the measured value may fluctuate or result in different values because of the noise.

In principle, if the power line is mixed with a noise, check the noise source for taking the preventive step. If a noise occurs regularly, insert a filter for one of the remedial measures. It is also important to connect to the power source other than the one mixed with the noise.

Noise can also come into the signal line from outside induction. For the prevention, move the noise source away, change the direction, apply a magnetic shield, electrostatic shield, etc.

## CE Marking

This instrument is approved for CE marking under the following conditions:

Conforming directive: 89/336/EEC

Conforming standard: EN61326: 1997, A1: 1998, A2: 2001 (EMI Class B/EMS Annex A)

In addition, this instrument is approved for CE marking on condition that it is used in the environment electrically protected against lightning surge. (EN61000-4-5: 1995, Annex B, B. 3, Class0) Therefore, this instrument must not be used in environments where there is an anxiety of lightning surge. Do not use this instrument for security applications.

## Chemicals

When chemical is used as the object fluid to measure, use this instrument in the range that the chemical does not corrode or permeate the material of the wetted part of the sensor. In addition, the service life when used with chemicals greatly depends on the working conditions, including the concentration of chemical, temperature and pressure. Especially when this instrument is to be used with strong acid or strong alkali, consult Nagano Keiki Co., Ltd. Resistance data against individual chemical requires a separate test. Sufficiently execute confirmation test under actual operating conditions before use.

## Miscellaneous

This instruction manual is not intended to be complete in every detail of the equipment or to cover all the variants. It is neither intended to provide for all necessary ancillary items regarding installation and maintenance.

Contact us when further details are required, or you are not fully satisfied with the above instructions.