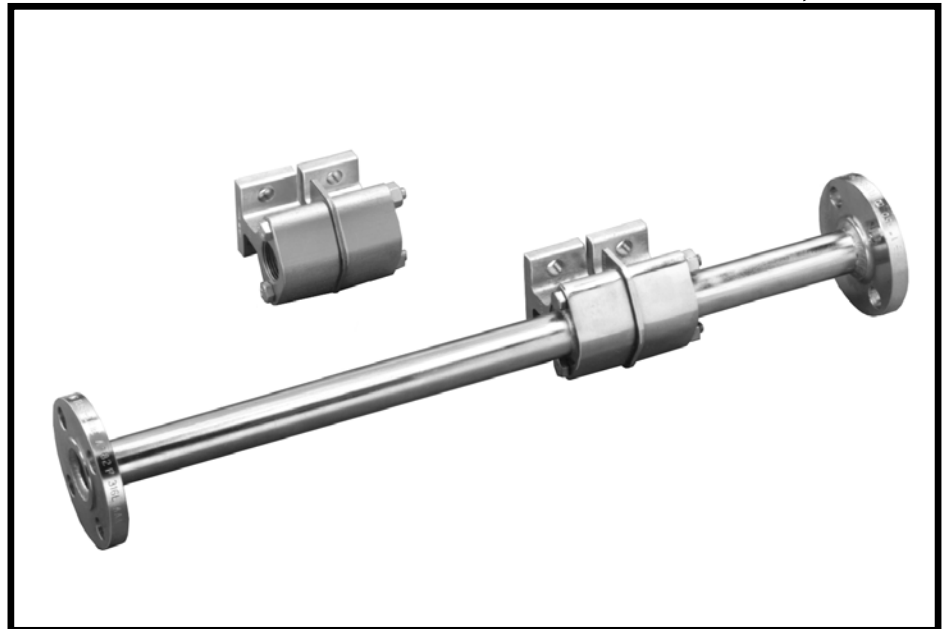


# ***INSTRUCTION MANUAL***

## ***INTEGRAL ORIFICE FLOW ELEMENT with Upstream and Downstream Piping and Threaded Connections***

*1330L Series, Model A*



IB-04H104\_8

## The Company

ABB Instrumentation is an established world force in the design and manufacture of instrumentation for industrial process control, flow measurement, gas and liquid analysis and environmental applications.

As a part of ABB, a world leader in process automation technology, we offer customers application expertise, service and support worldwide.

We are committed to teamwork, high quality manufacturing, advanced technology and unrivaled service and support.

The quality, accuracy and performance of the Company's products result from over 100 years experience, combined with a continuous program of innovative design and development to incorporate the latest technology.

The NAMAS Calibration Laboratory No. 0255(B) is just one of the ten flow calibration plants operated by the Company, and is indicative of ABB Instrumentation's dedication to quality and accuracy.

### BS EN ISO 9001



St Neots -  
Certificate No. Q5907  
Stonehouse -  
Certificate No. FM 21106

### ISO 9001



Rochester, USA -  
Certificate No. AQ-8618



### EN 29001 (ISO 9001)





Lenno, Italy -  
Certificate No. 90/90A





Stonehouse -  
Certificate No. 0255

## Use of Instructions

 **Warning.** An instruction that draws attention to the risk of injury or death.

 **Note.** Clarification of an instruction or additional information.

 **Caution.** An instruction that draws attention to the risk of the product, process or surroundings.

 **Information.** Further reference for more detailed information or technical details.

**Although Warning** hazards are related to personal injury, and **Caution** hazards are associated with equipment or property damage, it must be understood that operation of damaged equipment could, under certain operational conditions, result in degraded process system performance leading to personal injury or death. Therefore, comply fully with all **Warning** and **Caution** notices.

Information in this manual is intended only to assist our customers in the efficient operation of our equipment. Use of this manual for any other purpose is specifically prohibited and its contents are not to be reproduced in full or part without prior approval of ABB Instrumentation.

## Licensing, Trademarks and Copyrights

**Hastelloy-C** is a trademark of Haynes International, Inc; **LA-CO**  
**Oxytite** is a trademark of Lake Chemical Co.

## Health and Safety

To ensure that our products are safe and without risk to health, the following points must be noted:

1. The relevant sections of these instructions must be read carefully before proceeding.
2. Warning Labels on containers and packages must be observed.
3. Installation, operation, maintenance and servicing must only be carried out by suitably trained personnel and in accordance with the information given or injury or death could result.
4. Normal safety procedures must be taken to avoid the possibility of an accident occurring when operating in conditions of high pressure and/or temperature.
5. Chemicals must be stored away from heat, protected from temperature extremes and powders kept dry. Normal safe handling procedures must be used.
6. When disposing of chemicals, ensure that no two chemicals are mixed.

Safety advice concerning the use of the equipment described in this manual may be obtained from the Company address on the back cover, together with servicing and spares information.

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## READ FIRST

### WARNING

#### INSTRUCTION MANUALS

Do not install, maintain, or operate this equipment without reading, understanding and following the proper factory-supplied instructions and manuals, otherwise injury or damage may result.

#### RETURN OF EQUIPMENT

All flowmeters and equipment being returned to the factory for repair must be free of any hazardous materials (acids, alkalis, solvents, etc). A Material Safety Data Sheet (MSDS) for all process liquids must accompany returned equipment. Contact the factory for authorization prior to returning equipment.

Read these instructions before starting installation; save these instructions for future reference.

### **Contacting the Factory . . .**

Should assistance be required with any of the company's products, contact the following:

**Telephone:**

**24-Hour Call Center 1-800-HELP-365**

**E-Mail:**

**[ins.techsupport@us.abb.com](mailto:ins.techsupport@us.abb.com)**

# 1 INTRODUCTION

## 1.1 DESCRIPTION

The ABB Integral Orifice Flow Elements are primary measuring elements which sense fluid flow and develop a differential pressure as a function of the volume flow rate. This differential pressure is measured by an ABB differential pressure transmitter. The differential pressure measurement can be related to volume flow rate by using either a calibration report for the specific element or a standard flow equation applying to all integral orifice elements. A calibration report based on an ABB Flow Laboratory calibration is supplied with the element when specified on the order. Refer to **3.2 Accuracy** and **3.3 Flow Equations**.

The element connects directly to a standard differential pressure transmitter with a 2-1/8 inch center-to-center distance between the high and low pressure ports to make a complete flowmeter. The ABB transmitters which accept these flow elements are available with either electronic or pneumatic output.

The elements are available with several different orifice bore diameters to provide the required differential pressures over a wide range of flow rates. The orifice plate is removable, permitting the orifice bore to be changed in the field if the process requirements change. Elements with threaded connections have an optional cleaning for use on oxygen service applications.

On elements with piping, the upstream and downstream piping is welded to the body of the element. The piping is available in either 1/2-inch, 1-inch, or 1-1/2-inch sizes, and the pipe sections have flanged end connections with several flange options available. The pipe sections provide the minimum straight pipe length required for accurate measurement. The material of the orifice body, pipe, and flanges is type 316 SST.



## 1.2 EXPLANATION OF SERIAL AND CATALOG NUMBERS

The serial number stamped on the data plate consists of the catalog number and a sequential identification number. The catalog number describes the construction of the element. An X before the catalog number indicates that the element has been built to meet a customer's special requirements.

## INTRODUCTION

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### BASIC CATALOG NUMBER

1330L - Integral Orifice Flow Element

### ELECTRICAL CODE

Z - No Electrical Components

### PIPE SIZE AND ORIFICE BORE

Refer to Table 1-1 for description of digits

### UPSTREAM & DOWNSTREAM PIPING AND MATING FLANGE CONNECTIONS

- 0 - None
- 1 - Class 150 ANSI flanges / Sch 40 Pipe
- 2 - Class 300 ANSI flanges / Sch 40 Pipe
- A - Class 150 ANSI flanges / Sch 80 Pipe
- B - Class 300 ANSI flanges / Sch 80 Pipe

### MATERIAL OF CONSTRUCTION

- 0 - Type 316 SST with Type 316 SST Orifice Plate
- 4 - Type 316 SST with Hastelloy C Orifice Plate

### CALIBRATION

- 0 - Not Calibrated
- 1 - Water Calibration
- A - No Calibration w/ Factory Mounting of Transmitter
- B - Water Calibration w/ Factory Mounting of Transmitter

### EXAMPLE:

Serial number 1330LZ21101-555A identifies an integral Orifice Flow Element with upstream and downstream piping. It has no electrical components (Z). The pipe size is 1 inch (2), the orifice bore in 0.020 inch (1) and the flange connection is Class 150 ANSI (1). The material of construction is Type 316 SST with Type 316 SST orifice plate (0) and the pipe section has been water calibrated (1). The sequential identification number is 555 and the design level is Model A.

### 1.3 TECHNICAL CHARACTERISTICS

#### ACCURACY

Refer to Table 1-2

#### MAXIMUM WORKING PRESSURE (Elements with Threaded Connections)

1/2 and 1-inch Elements: 3000 psig (21 000 kPa)

1-1/2-inch Element: 1500 psig (10 500 kPa)

#### MAXIMUM WORKING PRESSURE (Elements with Piping)

Refer to Table 1-3

#### GASKET MATERIAL

Silicate Ceramic Filled TFE

#### MAXIMUM OPERATING TEMPERATURE

300°F (149°C)

Table 1-1. Description of Pipe Size and Orifice Bore Digits of the Catalog Number

Pipe Size and Orifice Bore Digit of Catalog No.	Pipe Size Inches	Orifices Inches	Orifices mm
01	1/2	0.020	0.51
02	1/2	0.035	0.89
03	1/2	0.065	1.65
04	1/2	0.113	2.87
05	1/2	0.150	3.81
06	1/2	0.196	4.98
07	1/2	0.270	6.86
08	1/2	0.340	8.64
09	1/2	Special	-
11	1	0.150	3.81
12	1	0.270	6.86
13	1	0.612	15.54
21	1	0.020	0.51
22	1	0.035	0.89
23	1	0.065	1.65
24	1	0.113	2.87
25	1	0.196	4.98
26	1	0.340	8.64
27	1	0.500	12.70
28	1	0.735	18.67
29	1	Special	-
31	1-1/2	0.500	12.70
32	1-1/2	0.612	15.54
33	1-1/2	0.750	19.05
34	1-1/2	0.918	23.32
35	1-1/2	1.127	28.63
39	1-1/2	Special	-















































