



**Installation and Maintenance Manual**  
**Automatic Leak Detection System (ALDS)**  
**Series INOA-8660-1**



**1 Safety Instructions**

This manual contains essential information for the protection of users and others from possible injury and/or equipment damage.

- Read this manual before using the product, to ensure correct handling, and read the manuals of related apparatus before use.
- Keep this manual in a safe place for future reference.
- These instructions indicate the level of potential hazard by label of "Caution", "Warning" or "Danger", followed by important safety information which must be carefully followed.
- To ensure safety of personnel and equipment the safety instructions in this manual and the product catalogue must be observed, along with other relevant safety practices.

<b>Caution</b>	Indicates a hazard with a low level of risk, which if not avoided, could result in minor or moderate injury.
<b>Warning</b>	Indicates a hazard with a medium level of risk, which if not avoided, could result in death or serious injury.
<b>Danger</b>	Indicates a hazard with a high level of risk, which if not avoided, will result in death or serious injury.

**2 Specifications**

**2.1 Specifications**

Model	INOA-8660-1-04	INOA-8660-1-06	
Fluid	Air/Inert gas		
Flow Characteristics (Valve)	C [dm <sup>3</sup> (s.bar)]	8.8	15
	b	0.13	0.17
	Cv	2.0	3.4
Flow rate measurement range	2 to 100 L/min		
Max. operating pressure	0.7 MPa		
Fluid temperature	0 to 50°C		
Ambient temperature	0 to 50°C		
Voltage	24 VDC		
Allowable voltage fluctuation	±10% of rated voltage		
Power consumption (Valve)	1.5 W		
Current consumption (Switch)	55 mA or less		

[Also refer to the operation manuals for Digital Flow switch - PFM7, and 3 Port Solenoid Valve - VP500/700].

**2.2 Piping connection**

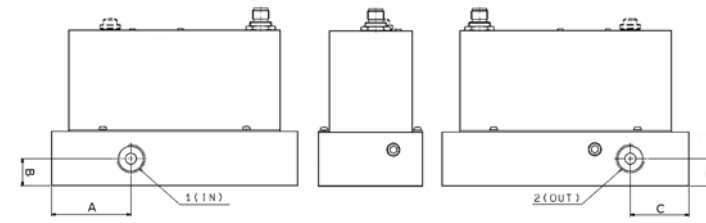


Figure 1

Model	Port Size		Dimensions (mm)			
	1 (In)	2 (Out)	A	B	C	D
INOA-8660-1-04	Rc, G 1/2	Rc, G 1/2	58.6	20	43	20
INOA-8660-1-06	Rc, G 3/4	Rc, G 3/4	78.5	21	54.5	21

Table 1

**3 Installation**

**3.1 Installation**



- Do not install the product unless the safety instructions have been read and understood.
- Install the product ensuring there is sufficient space for maintenance.
- Give careful consideration to the operating conditions such as the application, fluid and environment and use within the operating ranges specified in this document.

**3.2 Environment**



- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not use in an explosive atmosphere.
- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact. Check the product specifications.
- Do not mount in a location exposed to radiant heat.

**3.3 Piping**



- Before piping make sure to clean up chips, cutting oil, dust etc.
- When installing piping or fittings, ensure sealant material does not enter inside the port. When using seal tape, leave 1.5 to 2 threads exposed on the end of the pipe/fitting.
- Tighten fittings to the specified tightening torque.

Thread	Tightening Torque (N•m)
Rc, G 1/2	28 to 30
Rc, G 3/4	28 to 30

Table 2



- Ensure that the air supply system is filtered to 5 microns.

**3 Installation (continued)**

**3.4 Electrical connection**



**M12 Connector Pin assignment**

Pin No.	Assignment
1	DC (+)
2	OUT (1)
3	OUT (2)
4	DC (-)
5	Solenoid (+)
6	Solenoid (-)
7	Not used
8	

Table 3

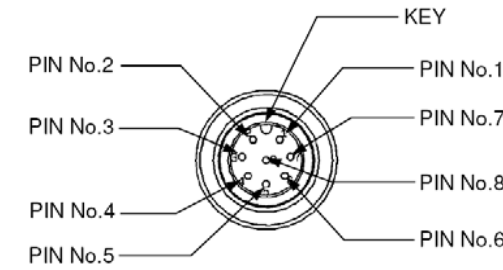


Figure 2

**3.5 Mounting**

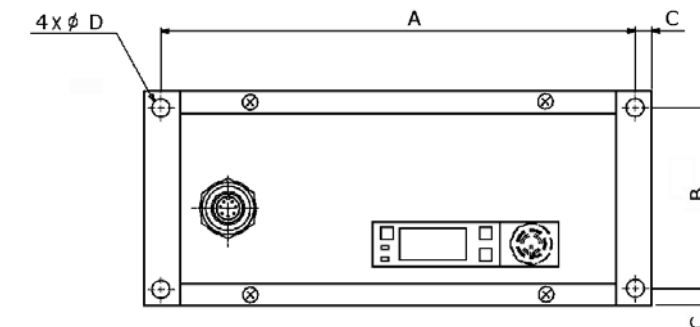


Figure 3

Model	Dimension (mm)			
	A	B	C	D
INOA-8660-1-04	170	65	6	6.5
INOA-8660-1-06	195	70	7.5	8.5

Table 4

**3.6 Lubrication**



- SMC products have been lubricated for life at manufacture, and do not require lubrication in service.

**4 Settings**

Refer to the operation manual for Digital Flow Switch Series PFM7.

**5 Circuit symbols**

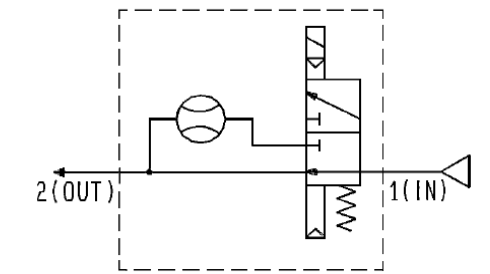
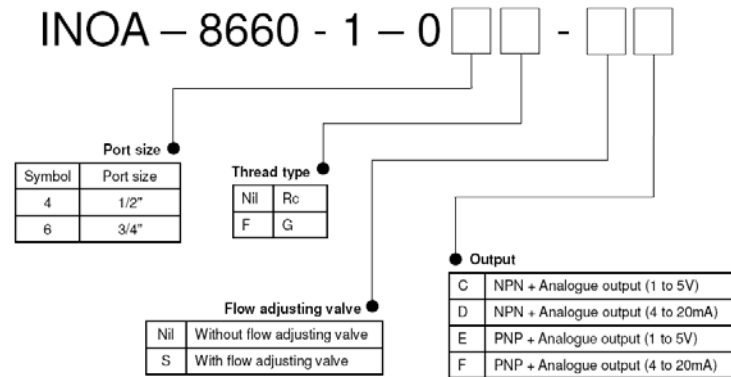


Figure 4

**6 How to Order**



**7 Outline Dimensions (mm)**

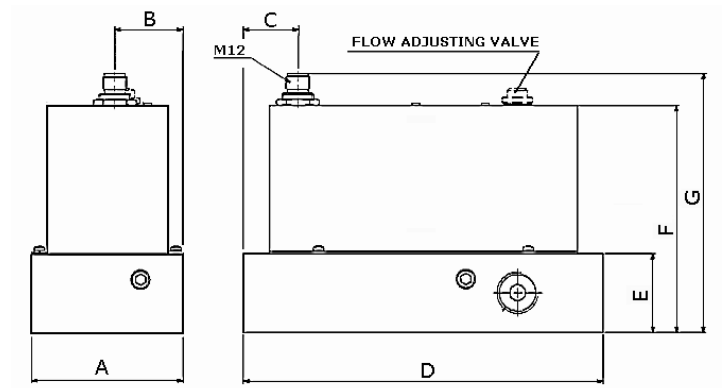


Figure 5

Model	Dimension (mm)						
	A	B	C	D	E	F	G
INOA-8660-1-04	77	35	30	182	40	126	132
INOA-8660-1-06	85	24	45	209	45	123.5	140

Table 5

**8 Maintenance**

**8.1 General Maintenance**



- Not following proper maintenance procedures could cause the product to malfunction and lead to equipment damage.
- If handled improperly, compressed air can be dangerous. Maintenance of pneumatic systems should be performed only by qualified personnel.
- Before performing maintenance, turn off the power supply and be sure to cut off the supply pressure. Confirm that the air is released to atmosphere.
- After installation and maintenance, apply operating pressure and power to the equipment and perform appropriate functional and leakage tests to make sure the equipment is installed correctly.

## 8 Maintenance (continued)

- Do not make any modification to the product.
- Do not disassemble the product, unless required by installation or maintenance instructions.

## 9 Limitations of Use

### Warning

- Do not exceed any of the specifications in Section 2 of this document or the specific product catalogue.

## 10 Concept of ALDS

### 10.1 Basic Concept

- The ALDS is for compressed air leak detection on industrial automation machine.
- To implement air leak detection, the machine must have an electronic system for controlling its movements (e.g. a PLC).
- Such a system supervises the machine's movements following a cycle we can call a Production Cycle.
- The same electronic system will have to supervise the search for leaks and record the values that will be measured by the ALDS in a cycle we will call the Step by Step Test Cycle.
- The ALDS device does not operate during the Production Cycle, so the Step by Step Test Cycle is executed when the machine is in stand-by (such as at the end of a work shift).
- Even though the ALDS does not operate during the machine's Production Cycle, its size must be chosen on the basis of the maximum instantaneous flow capacity of the machine in order to avoid slowdowns in production performance.

### 10.2 ALDS Requirements (see Figure 6)

#### A machine must have;

- A control system; Industrial PLC or equivalent electronic device.
- A board to acquire the 4-20 mA or the 1-5 V analog signals from the ALDS.
- A digital output for commanding the air-leak reading.
- A limit switch for controlling the position of the actuators. (Note 1)  
Note 1: Cases where a limit switch is not available, will be managed by a software timer i.e. the read signal will be given after a time that is considered to be the movement time + the pressure stabilisation time.

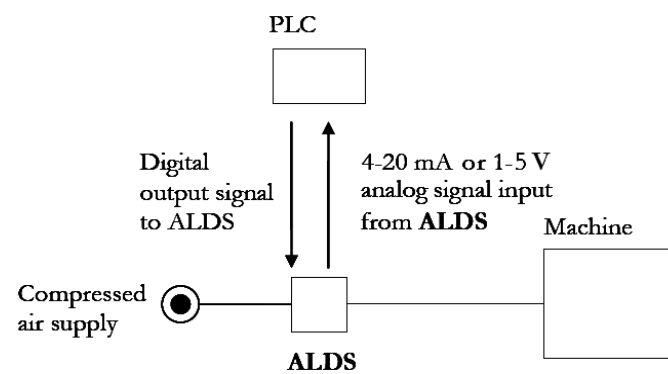


Figure 6

### 10.3 Installation of the ALDS

- The ALDS device is normally installed on the compressed air supply line of the machine to be checked, see Figure 7.
- It is fundamentally important that the maximum flow capacity of the ALDS, in litres/min, is not less than that required by the machine.
- Depending on the complexity of the machine, it is possible to equip it with several devices monitoring different areas, see Figure 8. This aspect is one of the technical choices made by the machine builder.

## 10 Concept of ALDS (continued)

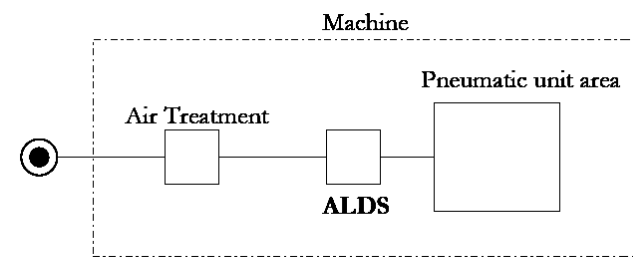


Figure 7

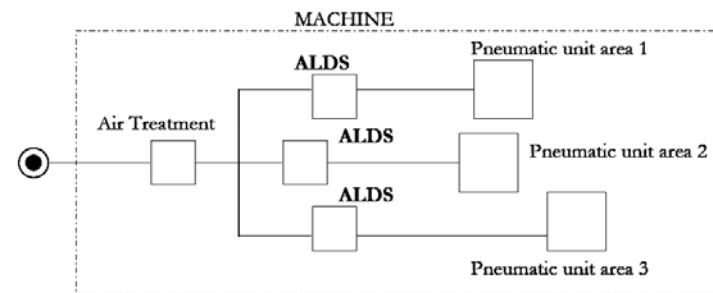


Figure 8

### 10.4 Basic Operating Principle of the ALDS

- The ALDS is based on the concept of pressure seal tests, i.e. by filling a generic capacity at a set pressure, there will be a flow of air for the entire filling phase.
- Assuming that the system has no leaks, at the end of the filling phase, the flow capacity must be zero.
- In the case of a leak, the ALDS measures the residual leak, providing this information to the PLC in the form of an analog signal.
- The maximum leak recorded is 100 litres/min.

## 11 Contacts

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URL : [http:// www.smcworld.com](http://www.smcworld.com) (Global) <http:// www.smceu.com> (Europe)  
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