Operating instruction manual OI/PS45-EN Rev. D

PS45
Magnetic level gauge switch

Magnetically actuated “no-bleed” switch
K-TEK Products

Measurement made easy

Introduction

This operation and instruction manual provides the following information:

- Application
- Operation
- Safety Guidelines
- Mounting and installation

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1.0 Description

The ABB PS45 is a point level (on - off) pneumatic switch device used in conjunction with the ABB KM26 Magnetic Liquid Level Gauge (MLG), LS Series Mechanical Cage Level switch or an External Chamber. The unique magnetic coupling action eliminates the need for such things as seals, diaphragms, springs or torque tubes. Since process connections to the switch are eliminated, the user is insured complete isolation from the process. Valves are **not** required to block off the switch from the process for maintenance or operational testing. Preventive maintenance functions are greatly reduced since the switch never contacts the process fluid.

2.0 Application

The PS45 is designed to provide a pneumatic control signal dependent on the liquid level within a vessel. The device is configurable such that actuation can occur on rising and falling level. When a magnetic float passes in the first direction, the PS45 will route the input supply gas through to its output port. When the float passes in the opposite direction, the supply gas is shut off (disconnected) from the output port and the output port typically vented to the atmosphere. The PS45 thus provides the user with a pneumatic signal that can be used to activate alarms and/or open and close control valves. An example application would be the pneumatic operation of safety shutdown systems on oil and gas production equipment.

The process temperature limits the T class as follow:

T6 For process temperatures up to 80°C
T5 For process temperatures up to 95°C
T4 For process temperatures up to 130°C
T3 For process temperatures up to 195°C
T2 For process temperatures up to 295°C
T1 For process temperatures up to 445°C

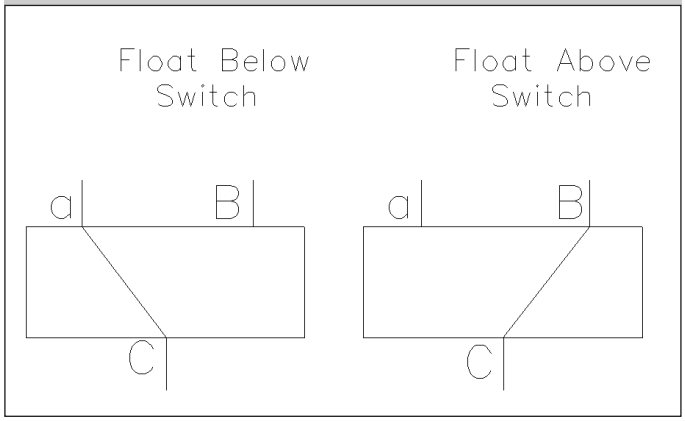
3.0 Operation

The PS45 switch mechanism consists of the following integral components:

1. Actuating cam-spindle-magnet assembly
2. Precision Micropilot™ valve assembly
3. User connections.

As the magnetic float travels past the switch, the cam-spindle-magnet assembly actuates the Micropilot™ valve assembly. The switch will then provide for a path for the supply gas to travel between ports A-C or B-C, depending on the position of the float relative to the switch (see Figure 1). A continuous gas supply is not required for normal operation since the PS45 is not a pilot operated device. The PS45 is easily configured in the field as direct or reverse acting by simply changing the field connections at ports A & B. All user connections are 1/8 inch FNPT.

Figure 1



4.0 Safety Guidelines

Relevant Standards: Switch installation shall be done according to the local standards and special conditions for safe use as stated in this Manual.

Fail-Safe: Switches and their related components can and do fail without warning for different reasons.
User shall design all systems and equipment in a fail-safe mode, so that failure of associated switch products will not endanger persons or property.

Pressure and Temperature Ratings: Never exceed the rated service pressure and temperature of the switch as stated in product specifications.

Environment: Many environmental conditions can affect the integrity and suitability of a product for a given application. The pneumatic switch is designed for use in general purpose industrial applications and ATEX hazardous location applications. Product exposure to corrosive or caustic environments can shorten the useful life and lead to premature failure of the switches.

Air Supply: The air supply or control medium supplied to the pneumatic switch must be moisture-free if ambient temperature can drop below freezing.

Maintenance: The severity of the application, risk potential from a component failure, and experience with any known failures in the application or in similar applications should determine the frequency of inspections and the servicing or replacement of the pneumatic switch so that products are replaced before any failure occurs. A maintenance program must be established and followed by the user.

Visual Inspection: Any of the following conditions requires immediate system shut down and replacement of worn or damaged components:

- Air leakage: Look and listen to see if there are any signs of visual damage to any of the components in the system. Leakage is an indication of worn or damaged components.
- Damaged or degraded components: Look for any visible signs of wear or component degradation.
- Kinked, crushed, or damaged hoses and tubing. Kinked hoses or tubing can result in restricted air flow and lead to unpredictable system behavior.
- Excessive dirt build-up: Dirt and clutter can mask potentially hazardous situations.

Functional Test: Before initiating automatic operation, operate the system manually to make sure all required functions operate properly and safely.

Service or Replacement Intervals: It is the user's responsibility to establish appropriate service intervals. Pneumatic switches contain components that age, harden, wear, and otherwise deteriorate over time. Environmental conditions can significantly accelerate this process.

4.1 ATEX Special Conditions for Safe Use

For all installations, piping and pneumatic system shall be designed to prevent piping pressure piling and shockwaves, and shall include pressure regulators and surge prevention apparatus.

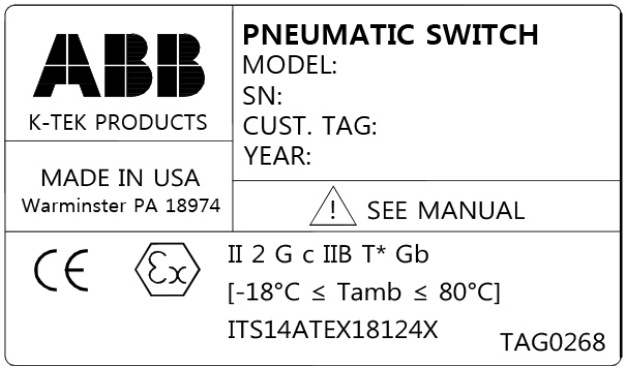
For hazardous location applications, the pneumatic switch shall not be used in a dusty environment or shall be protected from exposure to dust capable of entering the housing.

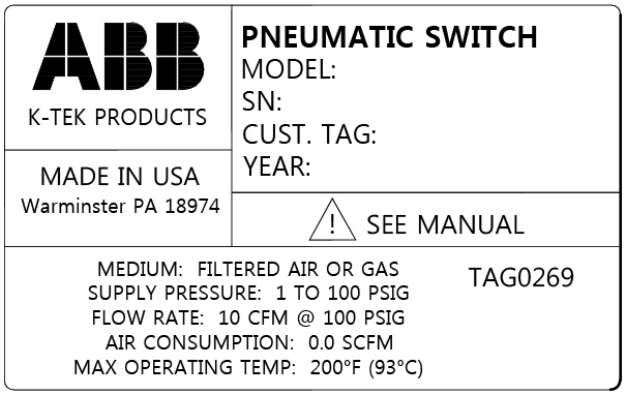
For hazardous applications, the supply port shall be connected to a filtered supply.
For hazardous applications, the supply port shall only be connected to an AIR supply of which the maximum temperature does not exceed 80^{0}C.

4.2 Markings

PS45 ATEX nameplate

Model Code: U4





4.3 Specifications

Medium	Filtered air or gas supply (For ATEX refer to section 4.1)
Supply Pressure	1 to 100 psig (0.7 to 6.9 bar)
Flow Rate	10 scfm @ 100 psig supply (0.3 scmm @ 6.9 bar supply)
User Connections	1/8" FNPT
Operating Temperature Range	0°F to 176°F (-18°C to 80°C)
Dead Band (hysteresis)	Approximately ±0.5" (±1.2cm) of float movement
Air Consumption	0.0 scfm
Housing	NEMA 4X Stainless Steel
Options	Filter on supply side of switch
Approvals	ATEX Constructional Safety

5.0 Mounting & Installation

The simplicity of mounting the PS45 switch housing is such that the only necessary tool is a small screwdriver. The switch is attached to the KM26 via two small stainless steel variable clamps. These clamps allow the switch to be positioned anywhere over the entire length of the float chamber, thereby providing an infinitely variable trip point setting. Loosening the clamps will allow the PS45 to be easily moved to provide a new trip point. Other switches can be added at any time without the concern for additional process piping or valves.

Note: Two switches can be mounted so they can trip at the same point or at two different points separated by less than the length of a switch. Optional filter can be supplied on input port of switch.

Figure 2

PS45 MAXIMUM OUTLINE DIMENSIONS

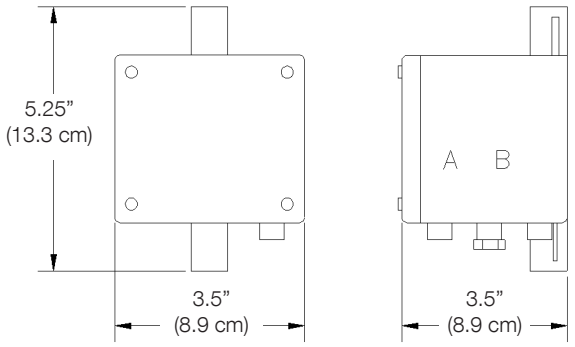
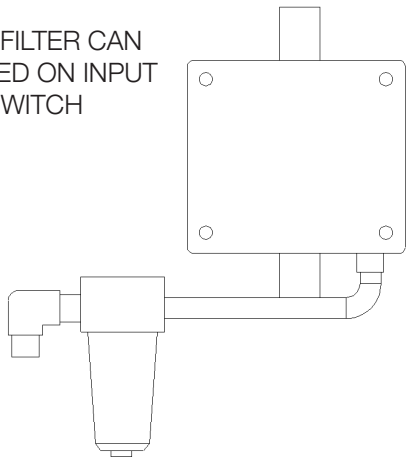


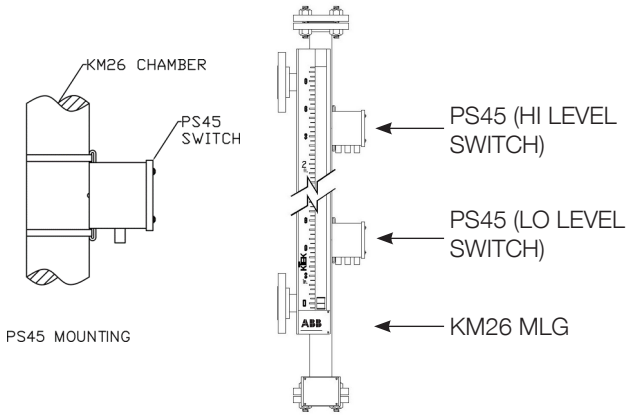
Figure 3

OPTIONAL FILTER CAN BE SUPPLIED ON INPUT PORT OF SWITCH

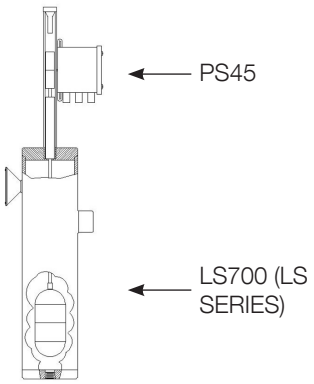


Note: The action of the pneumatic switch will be determined by user connection of Ports A, B & C. Option H or L will determine how the option filter and vent fitting are supplied from the factory. The filter and vent fitting are easily changed in the field. Reference PS45 (DS/PS45-EN) for ordering details.

Example Configurations:



PS45 MOUNTED ON KM26 MAGNETIC LEVEL GAUGE



PS45 MOUNTED ON LS SERIES MECHANICAL LEVEL SWITCH

6.0 EU Declaration of Conformity

For the latest EU Declaration of Conformity, please click the link below:
EU Declaration of Conformity
test

6.0 Warranty Statement

5 YEAR WARRANTY FOR:
KM26 Magnetic Liquid Level Gauges; MagWave Dual Chamber System; LS Series Mechanical Level Switches (LS500, LS550, LS600, LS700, LS800 & LS900) (does NOT include switching mechanisms, ie. MS30, MS40, MS41, PS35 & PS45); EC External Chambers, STW Stilling Wells and ST95 Seal Pots.

3 YEAR WARRANTY FOR:
KCAP300 & KCAP400 capacitance switches.

2 YEAR WARRANTY FOR:
AT100, AT100S and AT200 series transmitters; RS80 and RS85 liquid vibrating fork switches; RLT100 and RLT200 reed switch level transmitters; TX, TS, TQ, IX and IM thermal dispersion switches; IR10 and PP10 External Relays; MT2000, MT5000, MT5100 and MT5200 radar level transmitters; RI100 Repeat Indicators; KP paddle switches; A02, A75 & A77 RF capacitance level switches and A38 RF capacitance level transmitters; Buoyancy Level Switches (MS50, MS10, MS8D & MS8F); Magnetic Level Switches (MS30, MS40, MS41, PS35 & PS45).

1 YEAR WARRANTY FOR:
KM50 gauging device; AT500 and AT600 series transmitters; LaserMeter and SureShot series laser transmitters; LPM200 digital indicator; DPM100 digital indicators; APM100 analog indicators; KVIEW series digital indicators and controllers; GRANUPOINT and SLUDGEPOINT vibrating fork switches, SOLITRAK Electro-Mechanical Continuous Measuring Devices, KSONIK ultrasonic level switches, transmitters & transducers, ChuteMaster Microwave Transmitter / Receiver and TiltMaster Switches.

SPECIAL WARRANTY CONSIDERATIONS:
ABB does not honor OEM warranties for items not manufactured by ABB (i.e. Palm Pilots). These claims should be handled directly with the OEM.

ABB will repair or replace, at ABB's election, defective items which are returned to ABB by the original purchaser within the period specified above from the shipment date of the item and which is found, upon examination by ABB, to its satisfaction, to contain defects in materials or workmanship which arose only under normal use and service and which were not the result of either alterations, misuse, abuse, improper or inadequate adjustments, applications or servicing of the product. ABB's warranty does not cover the repair or replacement of units that fail from the effects of excessive vibration unless the units are originally designed for vibration application. In addition, ABB's warranty does not include on-site repair or services. Field service rates can be supplied on request.

If a product is believed to be defective, the original purchaser shall notify ABB and request a Returned Material Authorization before returning the material to ABB, with transportation prepaid by the purchaser. (To expedite all returns/repairs from outside of the United States, consult ABB's customer service team (service@ktekcorp.com) to determine an optimal solution for shipping method and turnaround time.) The product, with repaired or replaced parts, shall be returned to the purchaser at any point in the world with transportation prepaid by ABB for best-way transportation only. ABB is not responsible for expedited shipping charges. If the product is shipped to ABB freight collect, then it will be returned to the customer freight collect.

If inspection by ABB does not disclose any defects in material or workmanship, ABB's normal charges for repair and shipment shall apply (minimum 250.00 USD). The materials of construction for all ABB products are clearly specified and it is the responsibility of the purchaser to determine the compatibility of the materials for the application.

THE FOREGOING WARRANTY IS ABB'S SOLE WARRANTY AND ALL OTHER WARRANTIES EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OF FITNESS FOR A PARTICULAR PURPOSE, ARE EXCLUDED AND NEGATED TO THE MAXIMUM EXTENT PERMITTED BY LAW. NO PERSON OR REPRESENTATIVE IS AUTHORIZED TO EXTEND ANY OTHER WARRANTY OR CREATE FOR ABB ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OF ABB'S PRODUCTS. THE REMEDIES SET FORTH IN THIS WARRANTY ARE EXCLUSIVE OF ALL OTHER REMEDIES AGAINST ABB. ABB SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL, INCIDENTAL, OR SPECIAL DAMAGES OF ANY KIND. ABB'S SOLE OBLIGATION SHALL BE TO REPAIR OR REPLACE PARTS (FOUND TO BE DEFECTIVE IN MATERIALS OR WORKMANSHIP) WHICH ARE RETURNED BY THE PURCHASER TO ABB.

7.0 ABB RMA FORM

ABB, Inc.
K-TEK Products
17100 Manchac Park Lane (Suite B)
Prairieville, LA 70769
Phone: +1 (225) 408-0800
Fax: +1 (225) 408-0897
Email: ktek-service@us.abb.com

***** IMPORTANT CUSTOMER NOTICE: PLEASE READ PRIOR TO RETURNING PRODUCTS TO ABB*****

Be sure to include the Return Authorization (RA) number on the shipping label or package to the attention: Customer Service. A copy of this document should also be included with the packing list. ABB wants to maintain a safe work environment for its employees. In the event, the returned product or material has been in contact with a potentially hazardous chemical, per federal regulations, the customer must provide evidence of decontamination and the related chemical composition and characteristics. In order to expedite your return, please include the applicable Material Safety Data Sheets (MSDS) and decontamination tags by affixing these documents in close proximity to the shipment label for identification purposes. (January 18, 2006)

Return Authorization Form	
Customer:	Date:
Contact Name:	Product:
Contact Email:	Serial No:
Contact Phone:	Job No:
Contact Fax:	Service Rep:

Completed by Customer

Reason

Problem Found:

Action:
Requested:
Is expedited return shipping requested? ❑ Yes ❑ No
If yes, please provide a purchase order or your shipper's account number (ex. FedEx or UPS). ABB pays return transport via standard ground shipments only.

If purchase order is issued, a copy of purchase order must be included with return documentation.

Is ABB authorized to repair items determined to be non-warranty? ❑ Yes ❑ No
If yes, a copy of purchase order must be included with return documentation.

Account #:

Customer PO:

Date:

Has product been in contact with any potentially hazardous chemical? ❑ Yes ❑ No
If yes, documentation product and forward MSDS to ABB, "ATTN: Customer Service"

Return Repaired Product to Address	
Shipping Address:	Billing Address:
	Ship Via:

Contact us

ABB Inc.
Industrial Automation
125 E. County Line Road
Warminster, PA 18974 USA
Tel: +1 215 674 6000
Fax: +1 215 674 7183

ABB Inc.
17100 Manchac Park Lane - Suite B
Baton Rouge, LA 70817 USA
Phone: +1 225 408 0800
Service: +1 225 408 0898
Fax: +1 225 408 0897
Service e-mail: ktek-service@us.abb.com

ABB Engineering (Shanghai) Ltd.
No. 4528, KangXin Hwy.
Pudong New District
Shanghai, 201319, P.R. China
Phone: +86 10 64231407
Service: +86 21 61056421
Fax: +86 10 64371913
E-mail: norman-suijun.xia@cn.abb.com
Service e-mail: rola.li@cn.abb.com

www.abb.com/level

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