

# BDP7000 DIGITAL POSITIONER FOR CONTROL VALVES



## Introduction

The Beary BDP7000 intelligent digital valve positioners are digital–pneumatic devices using microprocessor technology and the HART® (Highway Addressable Remote Transducer) communications protocol. HART® enables two–way field communications and makes it possible for additional beyond the normal process variable to be communicated to/from the positioner.

The HART® Protocol provides two communication channels one which is the 4–20mA analog signal which communicates the primary measured/set variable and the second a superimposed digital signal which contains the additional device information. The digital signal contains information from the device including device status, diagnostics, additional measured or calculated values, tuning/calibration parameters, etc. Together, the two communication channels provide the required field communication for high speed controls and data intelligence.

The Beary BDP7000 provides high responsiveness and precise control with its two–stage electropneumatic relay and 16–bit microprocessor. Even under normal operation the BDP7000 is able to perform accurate diagnosis of the valve and the actuator, which contributes for carrying out predictive maintenance, reducing overall operating costs and increasing the plant uptime.

The advanced, compact and rugged design allows the Beary BDP7000 Series positioners to be installed as double or single acting, linear and rotary actuators, and be used in all areas of industrial plants. Available options such as the stainless steel housing and remote mounting enables the Series to operate with reliability and durability even in harsh environments.

Reliability and ease–of–use with the intuitive quick setup/calibration make the BDP7000 one of the most advanced HART® positioner on the market.



## Powerful and Simple, Singularly Reliable

Digital module design New version Piezo Valve from Hoergiber Germany Integrated module, easy and reliable.

Piezo technology in pneumatics successfully applied worldwide, under extreme conditions.

The secret of the HOERBIGER valve's success lies its combination of precision mechanics, electro-technology and the consistent application of piezotechnology advantages. Despite their ultra-low power consumption,

HOERBIGER piezo valves are well-suited for demanding applications in the process and automation industry that require broad ranges for flow, tempera- ture and pressure control. High dynamics, German-engineered precision, non-self-heating operation and non-magnetic characteristics make the HOERBIGER piezo the valve of choice for the most demanding switching and control applications.

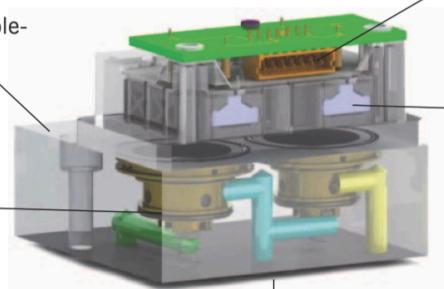
### Digital positioner module

- All pneumatic functions integrated in a compact unit
- Modules for single- and double-acting actuators
- Simple design, robust and reliable

### 2/2-way poppet valve

- Leakage-free
- High durability
- Short response times for high control performance

### Up to 50% lower manufacturing costs



### Electrical interface

- Connector plug for fast connection to electronics

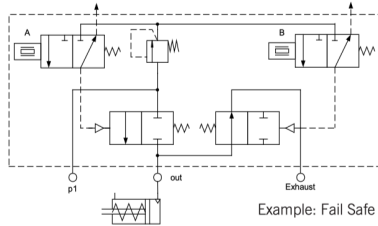
### Piezo pilot valves

- Fulfill requirements for intrinsically safe component
- Create reserves for additional diagnostic functions
- Very low air consumption

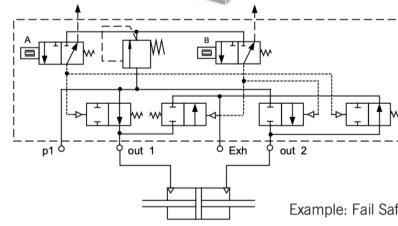
### Pneumatic interface

- Flange-mountable for fast installation
- Dirt screen at the inlet for reliable operation even with poorly conditioned air

for single-acting actuators

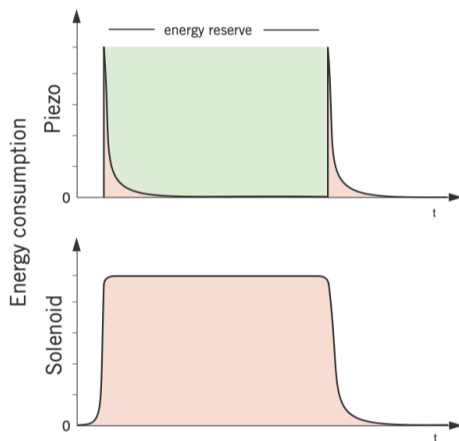


for double-acting actuators



## Ultra low air consumption

The energy-efficient operation of process and chemical plants is increasingly becoming the operators' center of attention. As much as half of the required compressed air can be achieved by a lower internal air consumption of the positioners used.

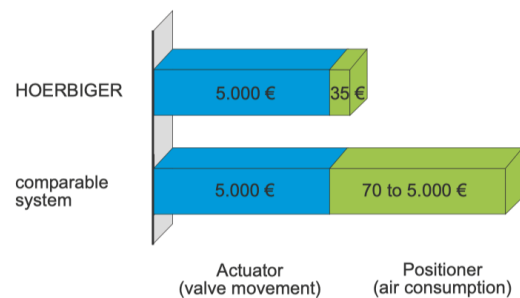


Up to 90% More Energy Reserve, E.G. For Diagnostics

The piezo-pneumatic pilot valves of the HOERBIGER positioner modules offer low air

consumption of < 0.4 l/min (0.024 m<sup>3</sup>/h), regardless of operating pressure.

Up to 50% lower costs for compressed air



Annual costs for compressed air in a plant containing 500 systems each consisting of a 4 kN control valve actuator with one operation per minute and costs for compressed air of 1.3 ct/m<sup>3</sup>

## Fail Last Position, Save Cost

It can realize valve position self-protection output or switch value interlock switching without solenoid valve and lock valve, which can avoid failure of regulating valve action and endanger production.

## Display and Push Buttons

LCD display for better readability. The valve status and diagnostic information can be viewed locally. Practically all menu items can be accessed using

the three buttons in the interface, with the positioner main cover closed and without the need of a handheld or laptop.

The fast and very intuitive menu facilitates configuration tasks that can be performed in a few minutes.

## Characteristics , Advantages

- Simple installation and automatic commissioning (self-adjustment of zero and span)
- Simple operation with Local operation (manual operation) and configuration of the device using three buttons and a user-friendly two-line display
- Easy and quick configuration/calibration
- Auto-tune for optimizing the response in a wide variety of actuator sizes
- "Fail in place" function: Current position is retained on failure of auxiliary electrical power and/or pneumatic failure
- Local configuration with the main cover in place — a handheld or PC is not needed
- Compatible with HART 7
- Die cast aluminum enclosure (IP66), epoxy painted, manufactured for harsh environments
- Explosion proof and intrinsically safe
- Single or double acting
- Mounts easily on typical linear or rotary valve actuators
- Low air bleed

# OVERVIEW

|                                |                                 |  |
|--------------------------------|---------------------------------|--|
| PNEUMATIC                      | Air supply pressure             | 0.14 ÷ 0.7Mpa  |
|                                | Air consumption in stable state | < 36 L / H   |
|                                | Air quality                     | According to ISO8573-1 Size and density of particulates: Class 4 Oil concentration: Class 4 Dew point: Class 4 or at least 10K below surrounding environment |
|                                | Valve leakage                   | < 0.6 L / H  |
| INPUT / OUTPUT                 | Actuator                        | Single acting, double acting   |
|                                | Input signal                    | 4 ÷ 20mA, Loop Power Supply system   |
|                                | Output specialty                | Linear, equal percentage, quick open or freely adjustable  |
|                                | Electrical connection           | M20x1.5 or NPT1/2  |
|                                | Pneumatic connection            | NPT1/4   |
|                                | Stroke                          | Linear actuator 10 ÷ 100mm<br>Rotary actuator 30 ÷ 120°  |
| DISPLAY                        | LCD                             | 2x7 digitals, dimension: 22x38 mm  |
| OPERATE                        | Manual                          | 3 keys on the front panel  |
|                                | Self tuning                     | Automatic calibrate the zero and span, dead band   |
|                                | Self diagnose                   | Show value of input current, travel time, dead band, etc.  |
| PRECISION                      | Accuracy                        | 0.5% F.S.  |
|                                | Hysteresis                      | 0.2% F.S.  |
|                                | Linearity                       | 0.5% F.S.  |
|                                | Sensitivity                     | 0.1% F.S.  |
|                                | Repeatability                   | 0.2% F.S.  |
|                                | Dead band                       | 0,1 ÷ 10% adjustable   |
|                                | Input impedance                 | 455Ω/20mA  |
| ENVIRONMENT                    | Environmental temperature       | -40 ÷ +80°C  |
|                                | Environmental humidity          | 5 ÷ 95% RH   |
|                                | Atmospheric pressure            | 86 ÷ 106KPa  |
|                                | Enclosure degree of protection  | IP66   |
| APPEARANCE                     | Weight                          | 2 kg (Aluminum alloy)<br>4 kg (Stainless Steel 316L)   |
|                                | Dimension                       | 170x96x96mm  |
|                                | Shell material                  | Aluminum alloy,Stainless Steel 316L  |
| Specification of Remote Sensor |                                 |  |
| Working temperature            |                                 | -40 ÷ 100°C  |
| Bearable vibration condition   |                                 | 27 ÷ 200Hz @ 6g (gravity)  |
| Length of the cable            |                                 | 5m, 10m  |

Beary Digital Positioner

|                             |                               |  |  |  |  |  |  |  |  |  |  |
|-----------------------------|-------------------------------|--|--|--|--|--|--|--|--|--|--|
| <b>BDP7</b>                 |                               |  |  |  |  |  |  |  |  |  |  |
| <b>Protocol</b>             |                               |  |  |  |  |  |  |  |  |  |  |
| 0                           | Without                       |  |  |  |  |  |  |  |  |  |  |
| 6                           | Hart                          |  |  |  |  |  |  |  |  |  |  |
| 7                           | FOUNDATION Fieldbus           |  |  |  |  |  |  |  |  |  |  |
| 8                           | PROFIBUS PA                   |  |  |  |  |  |  |  |  |  |  |
| <b>Certification</b>        |                               |  |  |  |  |  |  |  |  |  |  |
| G                           | General Purpose               |  |  |  |  |  |  |  |  |  |  |
| I                           | Intrinsically Safe            |  |  |  |  |  |  |  |  |  |  |
| E                           | Explosion Proof Exd IIC T4/T6 |  |  |  |  |  |  |  |  |  |  |
| <b>Connection</b>           |                               |  |  |  |  |  |  |  |  |  |  |
| I                           | 1/2" NPT, 1/4" NPT            |  |  |  |  |  |  |  |  |  |  |
| M                           | M20x1.5, 1/4" NPT             |  |  |  |  |  |  |  |  |  |  |
| G                           | M20x1.5, G1/4"                |  |  |  |  |  |  |  |  |  |  |
| P                           | 1/2" NPT, G1/4"               |  |  |  |  |  |  |  |  |  |  |
| <b>Action</b>               |                               |  |  |  |  |  |  |  |  |  |  |
| 30                          | single acting                 |  |  |  |  |  |  |  |  |  |  |
| 40                          | double acting                 |  |  |  |  |  |  |  |  |  |  |
| <b>Type of Actuator</b>     |                               |  |  |  |  |  |  |  |  |  |  |
| L                           | Linear                        |  |  |  |  |  |  |  |  |  |  |
| R                           | Rotary                        |  |  |  |  |  |  |  |  |  |  |
| <b>Local Indicator</b>      |                               |  |  |  |  |  |  |  |  |  |  |
| D                           | Digital Indicator             |  |  |  |  |  |  |  |  |  |  |
| M                           | Mechanical                    |  |  |  |  |  |  |  |  |  |  |
| <b>Gauges</b>               |                               |  |  |  |  |  |  |  |  |  |  |
| NG                          | Without gauges                |  |  |  |  |  |  |  |  |  |  |
| SS                          | stainless steel               |  |  |  |  |  |  |  |  |  |  |
| <b>Position Transmitter</b> |                               |  |  |  |  |  |  |  |  |  |  |
| N                           | Without                       |  |  |  |  |  |  |  |  |  |  |
| PT                          | 4-20 mA                       |  |  |  |  |  |  |  |  |  |  |
| <b>Signal fail position</b> |                               |  |  |  |  |  |  |  |  |  |  |
| S                           | Fail safe                     |  |  |  |  |  |  |  |  |  |  |
| F                           | Fail in place (freeze)        |  |  |  |  |  |  |  |  |  |  |
| <b>Special Options</b>      |                               |  |  |  |  |  |  |  |  |  |  |
| NO                          | No special options            |  |  |  |  |  |  |  |  |  |  |
| RM                          | Remote mounting               |  |  |  |  |  |  |  |  |  |  |
| **                          | Attached code                 |  |  |  |  |  |  |  |  |  |  |

## **BDP7000 POSITIONER ORDERING INFORMATION**

The information and specification contained in this bulletin are considered accurate. However, they are provided only for information purposes and should not be considered as certified. Beary products are continuously improved and upgraded and the specification, dimensions and information contained herein are subject to change without notice. For further information or to confirm these presented here, contact your Beary representative. The specific instructions for installation, operation and maintenance of the BDP7000 positioner are provided in Maintenance Bulletin.

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