Installation
CONTENTS

1 INTRODUCTION .................................................. 2
  1.1 Function .................................................. 2
  1.2 Product Identification .................................. 2
  1.3 Air quality recommendations ........................... 3
  1.4 Safety Instructions ...................................... 3

2 INSTALLATION ................................................ 4
  2.1 Connections .............................................. 4
  2.2 General mounting instructions ......................... 5
  2.2.1 Mounting on rotary actuators ....................... 5
  2.2.2 Mounting on linear actuators ....................... 5
  2.3 Installation instructions for rotary actuators ....... 6
  2.3.1 Double acting .......................................... 6
  2.3.2 Single acting .......................................... 6
  2.4 Installation instructions for linear actuators ...... 7
  2.4.1 Double acting .......................................... 7
  2.4.2 Single acting .......................................... 7
  2.5 Cam .......................................................... 8
  2.5.1 Adjustments ............................................ 8
  2.5.2 Cam specifications ................................... 8
  2.6 4-20 mA connection ..................................... 9
  2.6.1 Connecting the control signal .................... 9
  2.6.2 Checking the control signal ....................... 9
  2.6.3 Bench test with calibrator ......................... 9
  2.7 Calibration ............................................... 10
  2.8 Front cover and Indicator ............................. 11

3 DIMENSIONS ................................................... 12
1 INTRODUCTION

1.1 Function

The V100 utilizes the force balance principal of operation.
The desired value, in the form of pressure, affects the membrane (1) with the force that is created transferred to the balance arm (2). The opposing force, which represents the actual value, is provided by the feedback spring (5) and works in the opposite direction on the balance arm (2).
The feedback spring, resting on the guide arm (3), is positioned by the shape and response of the cam. The cam (4) is connected to the cylinder’s (actuator) piston rod via the drive.

The pilot valve (6) is connected to the balance arm and follows the balance arm’s movement.
The system is stable when the spool (7) is in the neutral position and the forces that affect the balance arm is in equilibrium.
As soon as a signal change or a change in the position of the piston rod occurs, the force balance is also changed and the spool moves. Air immediately begins to flow into the part of the cylinder (C+ or C-) which allows the feedback mechanism to return the spool to the neutral position.

The system is self-stabilizing and searches for equilibrium.

1.2 Product identification

The V100 has two identification tags, the serial number tag (1), and the product model tag (2).
The latter contains information on control signal, maximum working pressure and temperature ranges.
Other information can be shown depending on the model.

The product model tag for V100P

The serial number tag
1.3 Air quality recommendations

Poor air quality is one of the causes of premature functional problems with pneumatic and electro pneumatic equipment. The pilot valve and I/P-converter are precision instruments and are therefore the most sensitive parts of the positioner.

a) Water in the supply air is a natural occurrence. This happens when air is compressed. The compression heats the air and the natural degree of water in the air can remain as moisture. When the air cools in pipes etc. the moisture condenses and becomes liquid water. Large quantities can build and sometimes flood small water separators. This excess water will eventually reach the control valve and positioner. This can cause corrosion damage to the I/P converter, causing the unit to malfunction.

We strongly recommend the use of water separators with adequate capacity. Coalesing filters from a reputable manufacturer is an inexpensive way to help prevent unit malfunctions or failures and add life to the product. These filters remove particles and moisture from air lines.

b) Oil in the supply air usually is from the main compressor. Oil can clog the small nozzles and disturb the flapper in the I/P-converter. It can also cause the spool to “drag” within the pilot valve. The result is poor control or in the worst case, failure.

c) Particles in the air usually occur because of corrosion. Dirt and particles can block the small nozzles of the I/P-converter. They can also cause the pilot valve to malfunction. The unit may completely fail.

To ensure normal operational safety with BLX positioner products, we recommend that a water separator and a <80 micrometer filter are mounted as close to the product as possible.

If larger amount of oil is present an oil separator should be installed as well.

To further increase operational safety, we recommend that the working air is clean, dry and free of moisture, water, oil, particles and other contaminants, in accordance with the international standard ISA S7.3-81.

1.4 Safety Instructions

**CAUTION: Beware of moving parts when positioner is operated!**

**CAUTION: Beware of parts with live voltage!**
A voltage, which is normally not dangerous, is supplied to the positioner. Avoid touching live parts and bare wires as well as short circuiting live parts and the housing.

**CAUTION: Do not dismantle a pressurized positioner!**
Dismantling a pressurized positioner will result in uncontrolled pressure release. Always isolate the relevant part of the pipeline. Release the pressure from the positioner and the piping. Failure to do this may result in damage or personal injury.

**CAUTION: Do not exceed the positioner performance limitations!**
Exceeding the limitations marked on the positioner may cause damage to the positioner, actuator and valve. Damage or personal injury may result.
2. INSTALLATION

2.1 Connections

**S** – Supply air
V100P: max. 145 PSI / 1 MPa
V100E: 23 - 145 PSI / 0.15 - 1 MPa

**I_p** – Input, pressure signal
V100P: 3-15 PSI / 20-100 kPa
V100E: Plugged

**I_e** – Input, current signal
V100E: 4-20 mA (Ri max 250 ohm)
V100P: Plugged

**C+** - Cylinder connection + stroke
**C-** - Cylinder connection – stroke

**EXHAUST** - All air from the cylinder, I/P and positioner is vented through this port.

Air connections for male 1/4" NPT or G 1/4".

Gauge connections
for male 1/8" NPT or G 1/8".

Cable entry for male 1/2" NPT,
PG 13.5 or M20 cable fitting.

The appropriate threads are clearly indicated by the markings on the housing.

Gauge ports **I**, **C+**, **C-** and **S** are factory plugged. Remove the plugs and replace with gauges.

Liquid sealant for threads, Loctite or similar, is recommended for all air connections.

The **I_p** connection must be plugged in V100E
The **I_e** connection should be plugged in V100P.
2.2 General mounting instructions.

The V100 has the ISO F05 hole pattern(1) for mounting kits.

2.2.1 Rotary actuator

The BLX V100 has a very stable and properly sized drive shaft bearing. However, the positioner drive(A) should be aligned properly to the rotary actuator spindle(B). A relatively small error combined with a rigid coupling can create very powerful radial forces, which can in turn overload and in short time wear out even the very best drive shaft bearing.

2.2.2 Linear actuator

When mounting on linear actuators, the positioner should be attached in such a way that its drive is in the center of the actuator’s stroke. Proper installation and alignment will minimize linearity error.
2.3 Installation instructions for rotary actuators

2.3.1 Double acting

2.3.2 Single acting
2.4 Installation instructions for linear actuators

2.4.1 Double acting

Direct (CCW)

Signal closes

Reverse (CW)

Signal closes

2.4.2 Single acting

Direct (CCW)

Signal closes

Reverse (CW)

Signal closes
2.5 Cam

The V100 is standard shipped with the C1-cam, factory set for 90° ±1°, direct (CCW) turning.

2.5.1 Adjustments

Remove the front cover and indicator. (see page 12)

1. Loosen the lock screw(1) and the cam nut(2).
2. Run the valve/actuator to the stop/end position at 0% input.
3. Turn the cam(3) so that the index mark(5) for the selected curve aligns with the ball bearing(4).
4. Tighten the cam nut by hand(2). Check that the lock screw(1) is still loose. (if not, loosen the lock screw slightly and tighten the nut again)
5. Tighten the lock screw(1).

2.5.2 Cam specifications C1

Index mark / Starting point of rotation *
5. 90° Linear 0-100% CCW
6. 180° Linear 0-100% CW
6. 90° Linear 0-50% CW split range
7. 90° Linear 50-100% CW split range
8. 90° Linear 0-100% CW
9. 180° Linear 0-100% CCW
9. 90° Linear 0-50% CCW split range
10. 90° Linear 50-100% CCW split range

*Increasing signal rotation
Most valves rotate CW to close / CCW to open

When field reversing action of positioner tubing must be reversed as well. (see page 7 and 8)
2.6 4-20 mA connection

2.6.1 Connecting the control signal

Remove the front cover and indicator. (see page 11)
Loosen the screw(1) enough so that the connection card can be lifted.
Secure the connection card into the small slot(2).
Terminal block screws are now easily accessible.
Connect the cables to its respective pole.
Max cable area 2,5 mm², ~AWG 13

2.6.2 Checking the control signal

The control signal can be checked without having to break the signal loop.
This is done by connecting a low ohmic ampere meter over the test points(3).

2.6.3 Bench test with the calibrator

When bench testing, it is possible to connect the control signal over the points(4) without having to loosen the connection card.

The I/P-converter is factory-adjusted. No extra range or zeroing adjustments are necessary.
2.7 Calibration

The V100 is delivered factory calibrated 0-100 % ±1%.

Calibration procedure

Zero position

1. Set 0% input signal.
2. Wait until the valve has adjusted.
3. Adjust the zero position by turning the zeroing screw(3), with a screwdriver from the outside or by using a slot(3a) on the yellow wheel.

Range

4. Increase to 100% input signal.
5. Wait until the valve has adjusted.
6. Adjust the range by turning the red range nut(6).

Check the zero position
Make fine adjustments if necessary.*

*With Split Range, where zeroing can be done by a signal other than 0%, the steps 1-6 must be repeated until the desired setting has been reached.
2.8 Front cover and indicator

Removing the front cover
Remove the four screws(1) and the front cover.

Changing the sealing in the front cover
Remove the indicator cover(2) by pressing from the backside.(see sketch)
Remove the rubber gasket(3) and replace with a new gasket.
Remove the O-ring(4) on the backside of the front cover and replace with a new O-ring.
Mount the indicator cover by installing its tap into the groove(5) of the front cover and lock it in place.

Removing the indicator
Pull the indicator(6) straight up.

Important Note!
Note the indicator’s position so it can be remounted in the same position.

Mounting the indicator
Install the indicator in place over the drive shaft and press it straight down.
Turn the indicator to the proper display position.
3. DIMENSIONS

* Dimensions with gauges are gauge brand dependent.