

# DEZURIK P30A\_INTELLIGENT DIGITAL POSITIONER



Instruction D10509  
July 2017

## Instructions

These instructions are for use by personnel who are responsible for the installation, operation and maintenance of DeZURIK valves, actuators or accessories.

## Safety Messages

All safety messages in the instructions are identified by a general warning sign and the signal word CAUTION, WARNING or DANGER. These messages indicate procedures to avoid injury or death.

Safety label(s) on the product indicate hazards that can cause injury or death. If a safety label becomes difficult to see or read, or if a label has been removed, please contact DeZURIK for replacement label(s).

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### **⚠WARNING**

**Personnel involved in the installation or maintenance of valves should be constantly alert to potential emission of pipeline material and take appropriate safety precautions. Always wear suitable protection when dealing with hazardous pipeline materials. Handle valves which have been removed from service with suitable protection for any potential pipeline material in the valve.**

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## Inspection

Your DeZURIK product has been packaged to provide protection during shipment; however, items can be damaged in transport. Carefully inspect the unit for damage upon arrival and file a claim with the carrier if damage is apparent.

## Parts

Replaceable wear parts are listed on the assembly drawing. These parts can be stocked to minimize downtime. Order parts from your local DeZURIK sales representative or directly from DeZURIK. When ordering parts please provide the following information:

**If the valve has a data plate:** please include the 7-digit part number with either 4-digit revision number (example: 9999999R000) or 8-digit serial number (example: S1900001) whichever is applicable. The data plate will be attached to the valve assembly. Also, include the part name, the assembly drawing number, the balloon number and the quantity stated on the assembly drawing.

**If there isn't any data plate visible on the valve:** please include valve model number, part name, and item number from the assembly drawing. You may contact your local DeZURIK Representative to help you identify your valve.

## DeZURIK Service

DeZURIK service personnel are available to maintain and repair all DeZURIK products. DeZURIK also offers customized training programs and consultation services. For more information, contact your local DeZURIK sales representative or visit our website at [DeZURIK.com](http://DeZURIK.com).

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### Introduction

The P30A\_ is an Intelligent Digital positioner designed primarily for controlling modulating valves. The positioner can be used with single or double acting actuators with either rotary or linear movement.

The P30A\_ can be equipped with modules for feedback, limit switches and pressure gauges. Pressure sensors can be installed to offer advanced diagnostics.

The modules can be factory assembled before delivery or fitted later. The modules for feedback and limit switches can contain 4-20 mA feedback and one of the following:

- Two mechanical contacts
- Two proximity switches
- Two inductive sensors

### Safety Instruction

Read the safety instructions in this manual carefully before using the product. The installation, operation, and maintenance of the product must be done by staff with the necessary training and experience. If any questions arise during installation, contact DeZURIK before continuing work.



#### **WARNING!**

The valve can open or close very quickly when in operation and, if handled incorrectly, may cause damage to fingers. There may also be unintentional effects due to it fully opening or shutting off the flow in the process pipe. Please note the following:

- If the input signal fails or is switched off, the valve operates quickly to its default position.
- If the compressed air supply fails or is turned off, rapid movements can occur.
- The valve is not controlled by the input signals when in the Out of Service mode. It will open/close in the event of an internal or external leak.
- If a high value is set for Cut off, fast movements can occur.
- When the valve is controlled in the Manual mode, the valve can operate quickly.
- Incorrect settings can cause self-oscillation, which can lead to damage.

#### **Important**

- Always turn off the compressed air supply before removing or disconnecting the air supply connection or the integral filter. Remove or disconnect with care as air connection "C-" is still under pressure even after the air supply is turned off.
  - Always work in an ESD (Electrostatic Discharge) protection area when servicing the Printed circuit boards (PCB's). Make sure the input signal is switched off.
  - The air supply must be free from moisture, water, oil and particles according to DIN/ISO 8573- 1-2001 3.2.3.
-

## **Storage**

### ***General***

The P30A\_ positioner is a precision instrument. Therefore it is essential that it is handled and stored in the correct way. Always follow the instructions in this IOM!

*Note:* As soon as the positioner is connected and started, internal air venting will provide protection against corrosion and prevent the ingress of moisture. For this reason, the air supply pressure should always be kept on unless repair/maintenance work of the positioner, actuator or valve equipment is in progress.

### ***Storage indoors***

Store the positioner in its original packaging. The storage environment must be clean, dry, and cool (59 to 79°F, 15 to 26°C).

### ***Storage outdoors or for a longer period***

If the positioner must be stored outdoors, it is important that all the cover screws are tightened and that all open ports/connections are properly sealed and/or plugged.

The red shipping plugs are not intended as a permanent outdoor plug. The unit should be packed with a desiccant (silica gel) in a plastic bag or similar, covered with plastic, and not exposed to sunlight, rain, or snow.

This is also applicable for long-term storage (more than 1 month) and for long transport by sea.

### ***Storage in a warm place***

When the positioner is stored - without air supply pressure applied - in a warm place with a high relative humidity and is subjected to daily temperature variations, the air inside the unit will expand and contract.

This means that air from outside the unit may be drawn into the positioner. Depending on the temperature variations, relative humidity, and other factors, condensation and corrosion can occur inside the unit, which in turn can give rise to functional disorders or a failure.

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### Installation

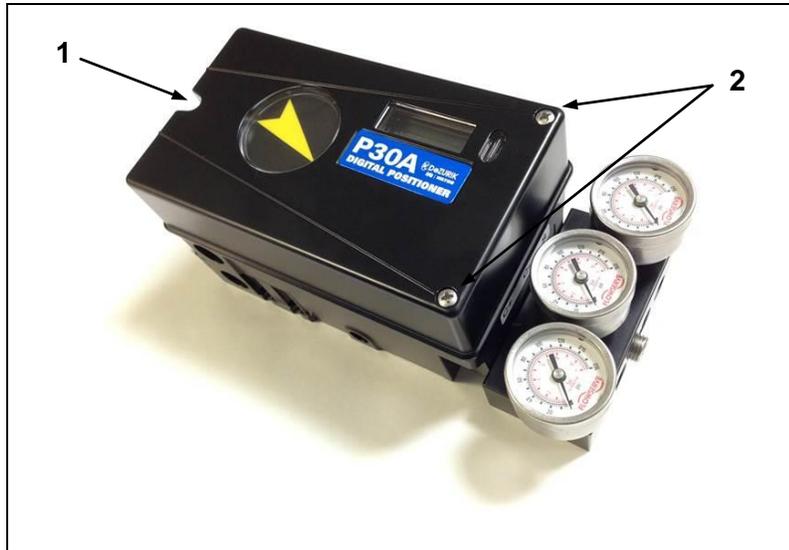
#### Removal of Cover

##### General purpose / Intrinsically safe

Remove cover by first loosening the screw 1 and then the two screws 2.

To install cover, first tighten the screw 1, then the two screws 2.

Tighten to 13 in lbs (1.5 Nm)  $\pm$  15%



#### Air Supply Requirements

Poor quality air supply is the main cause of problems in pneumatic systems. The air supply must be free from moisture, water, oil and particles and delivered @ 20-115 psi (138-793 kPa)

Standard: DIN/ISO 8573-1-2001 3.2.3

Filtered to 5 Micron, dew point  $-40^{\circ}\text{C}/\text{F}$  Oil 0,83 ppm by weight ( $1\text{mg}/\text{m}^3$ )

The air must come from a refrigeration dried supply or be treated in such a way that its dew point is at least  $18^{\circ}\text{F}$  ( $10^{\circ}\text{C}$ ) below the lowest expected ambient temperature.

To ensure a stable and problem-free air supply, we recommend the installation of a coalescing filter/regulator  $<5\mu$  as close to the positioner as possible.

Before the air supply is connected to the positioner, we recommend the hose is opened freely for 2 to 3 minutes to allow any contamination to be blown out. Direct the air jet into a large paper bag to trap any water, oil, or other foreign materials. If this indicates that the air system is contaminated, it should be properly cleaned before continuing.



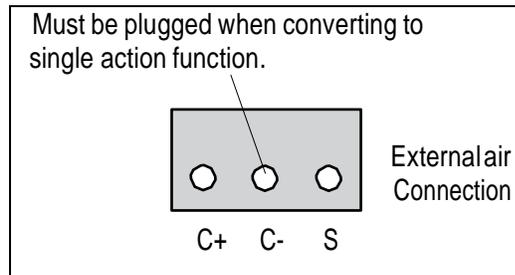
#### **WARNING!**

**Do not direct the open air jet towards people or objects because it may cause personal injury or damage.**

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**Connections****Air:**

- Port S            Supply air, 20-115 psi (138-793 kPa)  
Port C+          Connection to actuator, opening  
Port C-          Connection to actuator, closing (only for double action) Plug for single action, see below

**Electrical Connection**

See page 7.

**Dimensions**

Air connections: 1/4" NPT  
Electrical connection: NPT 1/2"

Loctite 577 or equivalent is recommended as a sealant.

For data on air and electrical connections, see section Technical Data on page 35.

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### ***Single acting positioner***

#### **Air-to-Open/Spring-to-Close Actuator**

When the actuator is mounted in the Air-to-Open/Spring-to-Close position, positioner port C+ is connected to the actuator. The positioner is piped for increasing signal to open valve. For Increasing signal to close valve, reverse C+ and C- ports and adjust the software as follows:

1. Navigate to **SETUP > Curr Range** in menu. Change Curr Range for 0%=20mA and **OK** button. Change 100%=4mA and **OK** button.
2. Run AutoCal and select Air-to-Close option.

#### **Air-to-Close/Spring-to-Open Actuator**

When the actuator is mounted in the Air-to-Close/Spring-to-Open position, positioner port C+ is connected to the actuator. The positioner is piped for increasing signal to close valve. For Increasing signal to open valve, reverse C+ and C- ports and adjust the software as follows:

1. Navigate to **SETUP > Curr Range** in menu. Change Curr Range for 0%=4mA and **OK** button. Change 100%=20mA and **OK** button.
2. Run AutoCal and select Air-to-Open option.

### ***Double acting positioner, Direct function***

#### ***Double acting actuator***

When the control signal increases, the pressure C+ to the actuator is increased. The valve rotates counter-clockwise (open). When the control signal is reduced, the pressure C- to the actuator increases and the valve closes. If the control signal disappears, the pressure goes to C-, C+ vents, and the valve closes.

#### ***Gauge block***

Gauge blocks are available for P30A\_ with 1/4" NPT air connections. To install, ensure seals are aligned, then use 2.2 ft lbs (3 Nm) of torque when fastening the gauge block to the positioner using the two screws supplied with the kit.



**Electrical connections****Terminal block diagram for the P30A\_.**

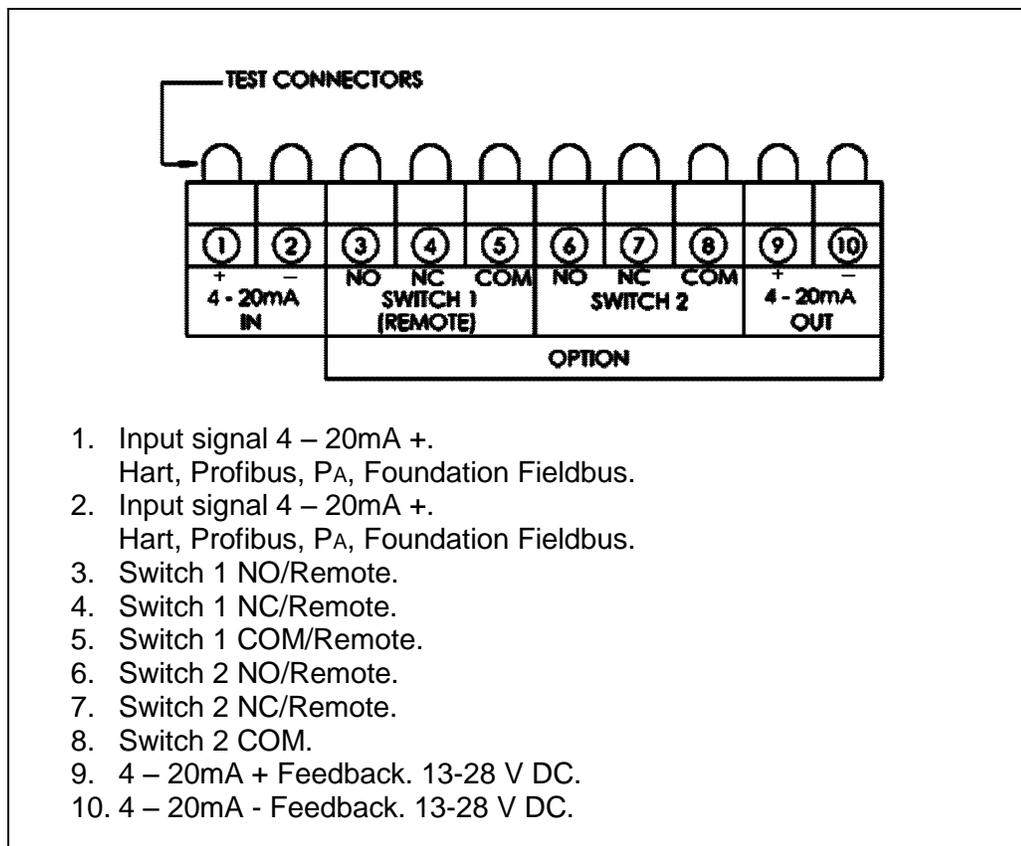
The terminal block (below) for the positioner is accessible when the aluminum cover is removed.

The P30A\_ Intelligent Digital positioner has been designed to operate correctly in electromagnetic (EM) fields found in typical industrial environments. Care should be taken to prevent the positioner from being used in environments with excessively high EM field strengths (greater than 10 V/m). Portable EM devices such as hand-held two-way radios should not be used within 12 in (30 cm) of the device.

Ensure proper wiring and shielding techniques of the control lines, and route control lines away from electro-magnetic sources that may cause unwanted noise.

An electromagnetic line filter can be used to further eliminate noise.

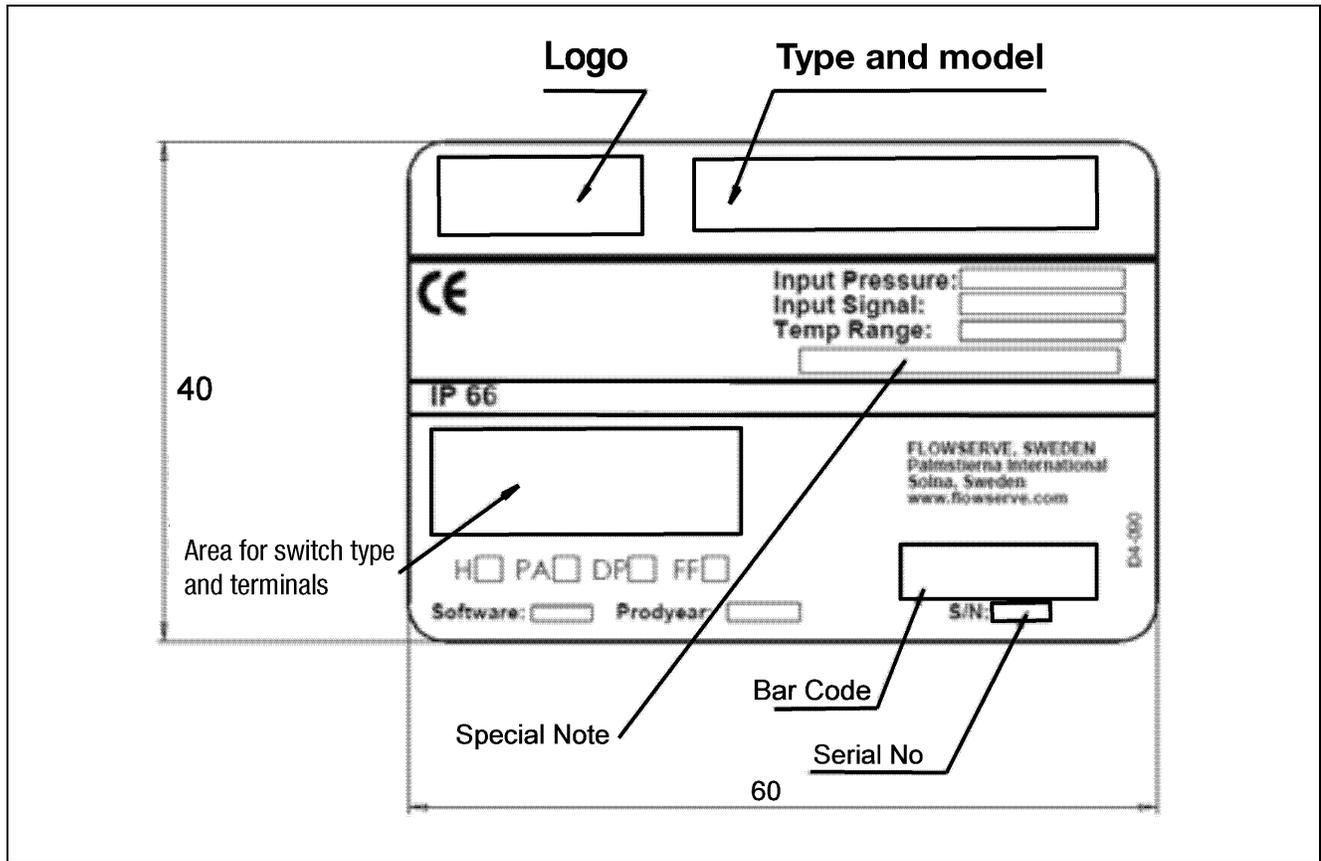
In the event of a severe electrostatic discharge near the positioner, the device should be inspected to ensure correct operability. It may be necessary to recalibrate the P30A\_ positioner to restore operation.



P30A\_, 10 Terminals

**WARNING!**

**In a hazardous environment where there is a risk of explosion, electrical connections must comply with the relevant regulations.**



**Type Sign Example**

## Control

### **Menus and Pushbuttons**

The positioner is controlled using the five push buttons and the display, which are accessible when the aluminum cover is removed. For normal functioning, the display shows the current value. Press the ESC button for two seconds to display the main menu.

Use the pushbuttons  to browse through the main menu and the sub-menus. The main menu is divided into a basic menu and a full menu. See page 13.

### **Other Functions**

#### **ESC**

Exit the menu without making any changes (as long as any changes have not been confirmed with **OK**).

#### **FUNC**

To select function and change parameters.

#### **OK**

To confirm selection or change of parameters.

#### **MENU INDICATOR**

Displays the position of the current menu row in the menu.

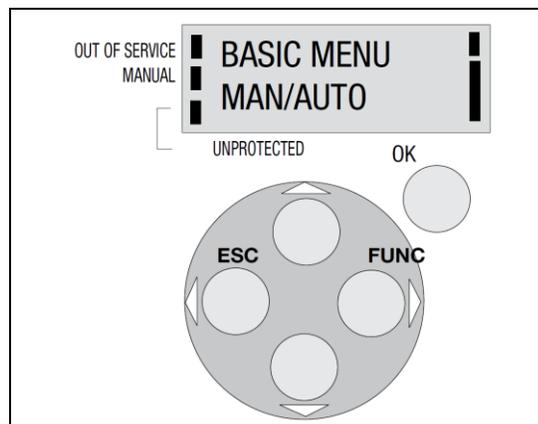
#### **IN SERVICE**

The positioner is following the input signal. This is the normal status when the positioner is working.

#### **OUT OF SERVICE**

The positioner is not following the input signal. Critical parameters can be changed.

#### **MANUAL**



The positioner can be stroked manually using the pushbuttons. See section “Man/Auto”, page 21.

#### **UNPROTECTED**

Most of the parameters can be changed when the positioner is in the “Unprotected” position. However, critical parameters are locked when the positioner is in the “In service” position.

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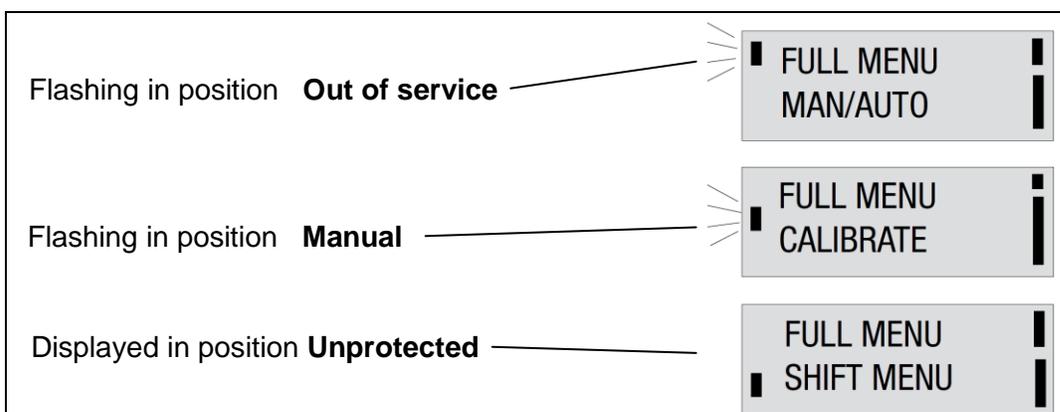
## P30A\_ Intelligent Digital Positioner

### LED BLINK CODES

LED color (R=red, Y=yellow, G=green)			
<b>Codes during In Service:</b>			
		R	Actual valve position deviates from requested/set position.
	G	Y	Fully open/closed valve using Cut Off (=OK)
		G	Controlling valve position (=OK)
<b>Calibration alarms:</b>			
	R	G	No feedback movement. Check linkage from actuator to positioner.
	R	Y	No Air available. If air relay doesn't work, check black/red cable inside.
R	G	G	No pot connection. Check pot cable inside positioner.
R	Y	Y	No air relay sensor. Check yellow/black/red cable inside positioner.
R	Y	G	Pot not calibrated. Calibrate->ExpertCal->Pot.
R	R	Y	Air relay problem. Replace it (located below positioner motherboard).

### Menu indicator

There are indicators at both sides of the display window and they indicate as follows:



The indicators on the right-hand side show the position in the current menu.

### Menus

To display the menus you can select:

- **Basic menu**, which means you can browse through four different menu items
- **Full menu**, which comprises ten steps. Use the Shift Menu to browse through the menu items

Full Menu can be locked out using a passcode.

The main menus are shown on the next page and the sub-menus on the subsequent pages.

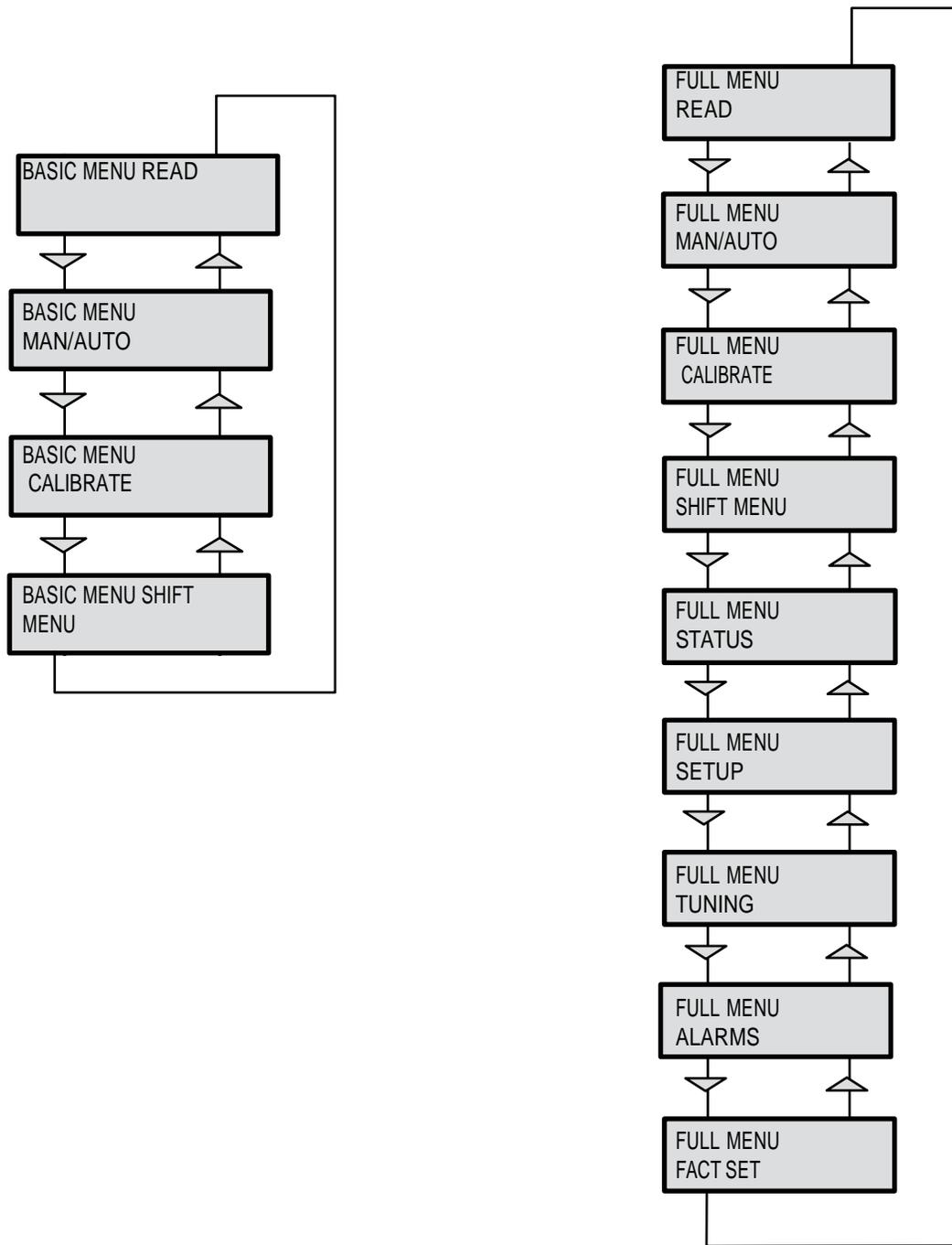
### Changing parameter values

Change by pressing  until the desired figure is flashing.

Press  to step to the desired figure. Confirm by pressing **OK**.

A change can be undone by pressing the **ESC** button, which returns you to the previous menu.

**Menu system**



The menus are described on the following pages

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## P30A\_ Intelligent Digital Positioner

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BASIC MENU  
CALIBRATE



### **First start**

“Calibrate” is displayed in the basic menu automatically, the first time power is applied. It can be selected from the basic or full menu at any time.

A complete auto-calibration takes up to 10 minutes depending on size of actuator and includes end limit calibration (zero and span), auto-tuning (dynamically sets the control parameters for the actuated package the positioner is controlling) and a check of the movement speed. Start the automatic calibration by selecting **Auto-Cal** and then answer the questions in the display by pressing **OK** or the respective arrow.

### **Calibration error messages**

If a fault occurs during calibration, one of the following error messages can be displayed:

**No movement/press ESC to abort** Typically the result of an air delivery issue to the actuator, a stuck valve or actuator, or incorrect mounting and/or linkage arrangement. Check for proper supply air to the positioner, pinched tubing, proper actuator sizing, proper linkage and mounting arrangement.

**Pot uncalibrated/press ESC to abort** The potentiometer is out of range. The potentiometer is aligned using the Calibrate - Expert cal - pot Menu. The calibration sequence must be restarted after the fault is corrected.

**Tip! Instant quick calibration** The P30A\_ can be instantly calibrated by pressing the top and bottom buttons for 5 seconds (see picture). This function is available from any menu position.

### **First start, Profibus PA**

For Profibus PA, connect the input signal at pos 1 and 2 on the terminal block. See Electrical connections in the manual. In the SETUP/Devicedata/Profibus: change the address from 126 to any number between 1-125. Never use the same number with more than one unit. Install values in failsafe mode, for communication when loss of signal.

Calibrate the unit.

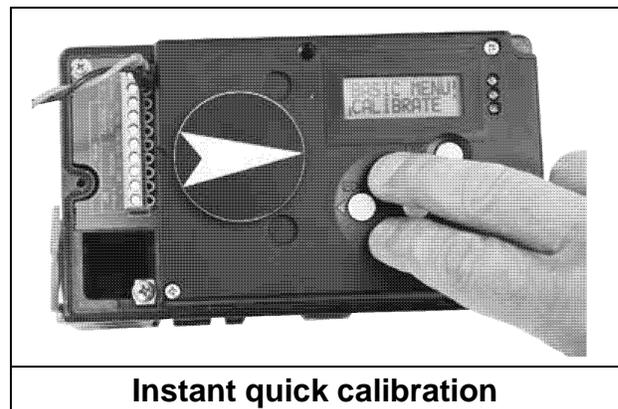
GSD files are available on the manufacturer’s D30 web-page [www.pmv.nu](http://www.pmv.nu)

### **To install the P30A\_\_PROFIBUS.DDL file to Siemens SIMATIC PDM.**

1. Move the file to the directory where the DeviceInstall.exe is located.
2. Run DeviceInstall.exe

**For Expert Calibration parameters - see page 27**

**For further information on calibrating the pot - see page 33**



Parameter		Description	
Byte	Name		
SP	Setpoint	The SP has 5 bytes, 4 bytes for the float value and one status byte. The status byte needs to be 128 (0x80Hex) or higher for the P30A to accept it.	4+1=5
READBACK	Position	The READBACK has 5 bytes, 4 bytes for the float value and one status byte.	4+1=5
POS_D	Digital position	Returns actual position as a digital value with definitions as below: 0 = Not initialized 1 = Closed 2 = Opened 3 = Intermediate	2
CHECKBACK		Detailed information of the device, coded bit wise. Several messages can occur at the same time.	3
RCAS_IN	Remote Cascade	The RCAS_IN has 5 bytes, 4 bytes for the float value and one status byte.	4+1=5
RCAS_OUT	Remote Cascade	The RCAS_OUT has 5 bytes, 4 bytes for the float value and one status byte.	4+1=5

Status Byte Table			
MSB	LSB	Meaning	P30A info
0 0 0 0 1 0 x	x	Not connected	
0 0 0 0 1 1 x	x	Device failure	PROFibusPA module failure
0 0 0 1 0 0 x	x	Sensor failure	No sensor value
0 0 0 1 1 1 x	x	Out of service	AI Function Block in O/S mode
1 0 0 0 0 0 x	x	Good-Non cascade	Measured value OK All alarm values used
1 0 0 0 0 0 0	0	OK	
1 0 0 0 1 0 0	1	Below low limit Lo	Advisory alarm
1 0 0 0 1 0 1	1	Above High limit Hi	Advisory alarm
1 0 0 0 1 1 0	1	Lo-Lo	Critical alarm
1 0 0 0 1 1 1	1	Hi-Hi	Critical alarm

**Example** SP=43.7% and 50%

Float	Hex	Status
43.7	42 2E CC CD	80
50.0	42 48 00 00	80

### ***(FF) Foundation Fieldbus function blocks***

Function blocks are sets of data sorted by function and use. They can be connected to each other to solve a control process, or to a controlling DCS. To get a good introduction and understanding of FF look at [www.fieldbus.org](http://www.fieldbus.org) and download the “Technical Overview” from the About FF pages.

### ***(TB) Transducer Block***

The TB contains unit specific data. Most of the parameters are the same as parameters found on the display. The data and the order of data varies between different products.

The AO-block setpoint (SP) and process value (PV) parameters are transceived to the TB through a channel. The TB has to be in AUTO for the AO-block to be in AUTO.

The positioner has to be in menu-auto mode and in service to be controlled from the fieldbus. If the positioner is placed in menu-manual mode then the transducer block will be forced to (LO) local override. In this way a person in the field will be able to control the positioner from the keypad, without interference from the control loop.

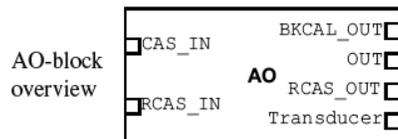
### ***(RB) Resource Block***

The RB is a set of parameters that looks the same for all units and products. The values of the RB define unit information that concerns the Fieldbus Protocol such as MANUFAC\_ID which informs the unique manufacturer id. For P30A it is 0x464C53. The RB has to be in AUTO for the AO-block to be in AUTO.

### ***(AO) Analogue Output Block***

The AO follows Fieldbus Foundation’s standard on content and action. It is used for transferring (SP) setpoints from the bus to the positioner.

CAS\_IN (cascade input) and RCAS\_IN (remote cascade input) are selected as inputs to the AO block depending on the MODE\_BLK parameter.



The selected input will be relayed to the SP parameter of the AO block. BKCAL\_OUT (back calculated output) is a calculated output that can be sent back to a controlling object so that control bumps can be avoided. Usually the BK- CAL\_OUT is set to be the (PV) process value of the AO-block, i.e. the actual measured position of the valve.

OUT is the primary calculated output of the AO block. During a limited action (ramping) of the AO block the RCAS\_OUT parameter will supply the final setpoint and the OUT parameter will be the limited output.

The transducer block is connected through a channel to the AO block. Through this channel the OUT value and SP are transceived.

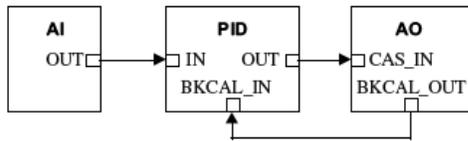
In order to set the AO block to AUTO, the TB and the RB have to be in AUTO. Further the AO block has to be scheduled. Using National Instruments Configurator; scheduling can be done by adding the unit to a project and then click on the “upload to device” icon.

To write a setpoint value by hand, add Man to MODE->Permitted parameter, and then choose MODE->Target to Man. Make sure that the unit is scheduled.

**Example**

A typical FF block loop control might look like the following:

Where the positioner is represented by the AO-block.



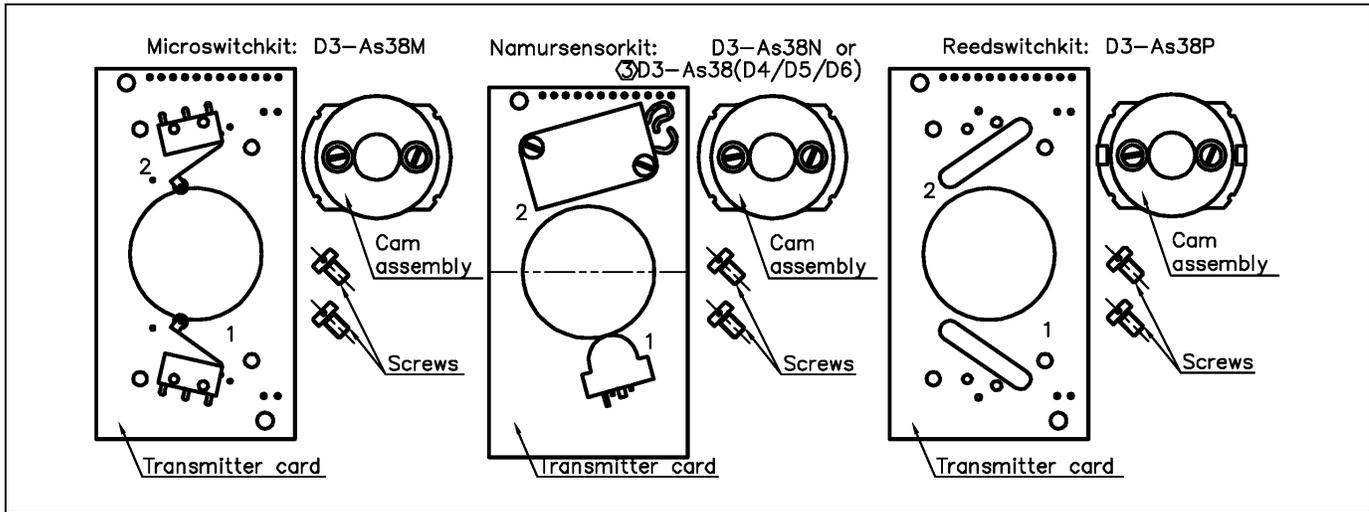
**Auto-Cal**



The various menu texts are described below.

<b><u>Auto-Cal</u></b>	<u>Auto-tuning and calibration of end positions</u>
<b>Start tune</b>	Starts the tuning. Questions/commands are displayed during calibration. Select the type of movement, function, etc. with  and confirm with <b>OK</b> .
<b>Lose prev value? OK?</b>	A warning that the value set previously will be lost (not during the first auto-tuning).
<b>Direction? Air-to-open.</b>	Select for fail close.
<b>Direction? Air-to-close.</b>	Select for fail open.
<b>In service? Press OK</b>	Calibration finished. Press <b>OK</b> to start positioner functioning. (If ESC is pressed, the positioner assumes the "Out of service" position but the calibration is retained).
<b><u>TravelCal</u></b>	<u>Calibration of end positions.</u>
<b>Start cal</b>	Start end position calibration.
<b>Lose prev value? OK?</b>	A warning that the previously set value will be lost. Confirm with <b>OK</b> . The calibration sequence starts.
<b>In service? Press OK</b>	Calibration finished. Press <b>OK</b> to start positioner functioning. (If ESC is pressed, the positioner assumes the "Out of service" position but the calibration is retained).
<b><u>Perform</u></b>	<u>Setting gain.</u>
<b>Normal</b>	100% gain.
<b>Perform G, F, E D,C, B, A</b>	Possibility to select a lower gain in steps.
<b>Note:</b> Original P. I. D. will always be shown in display.	

### Feedback option



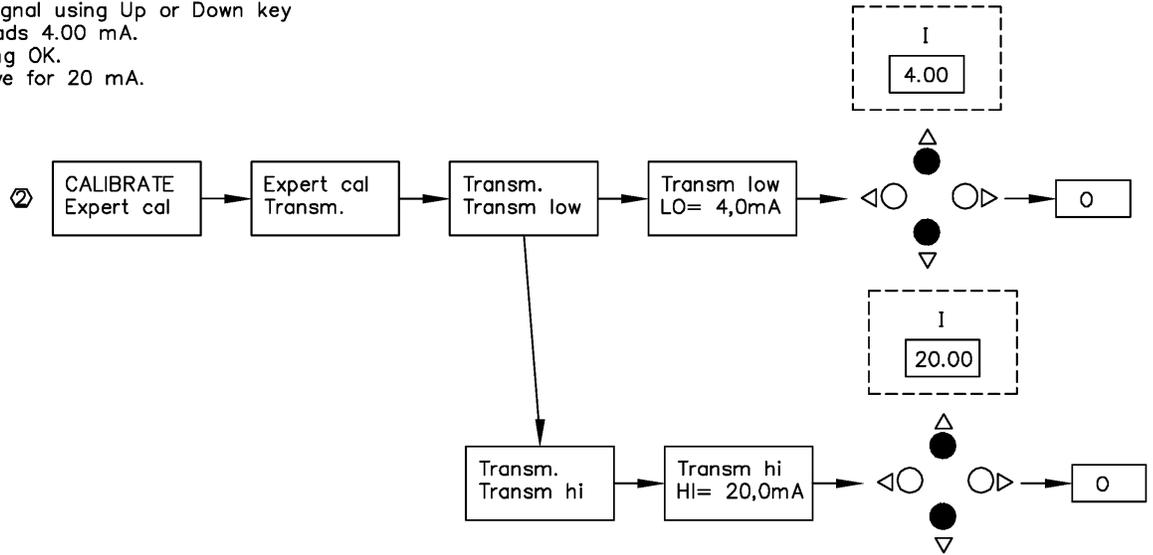
When installing the transmitter/switch card, make sure it is placed correctly over the connector pins before gently pushing it down until it rests on the supports. Secure the PC board with the two screws. Make sure the holes are centered before tightening the screws.

**Note!** When installing the cam assembly for mechanical switches, retract both switch arms first. Install the cam assembly and tighten the screws loosely to obtain enough friction to lock the cams. Adjust the lower cam first, then the upper cam.

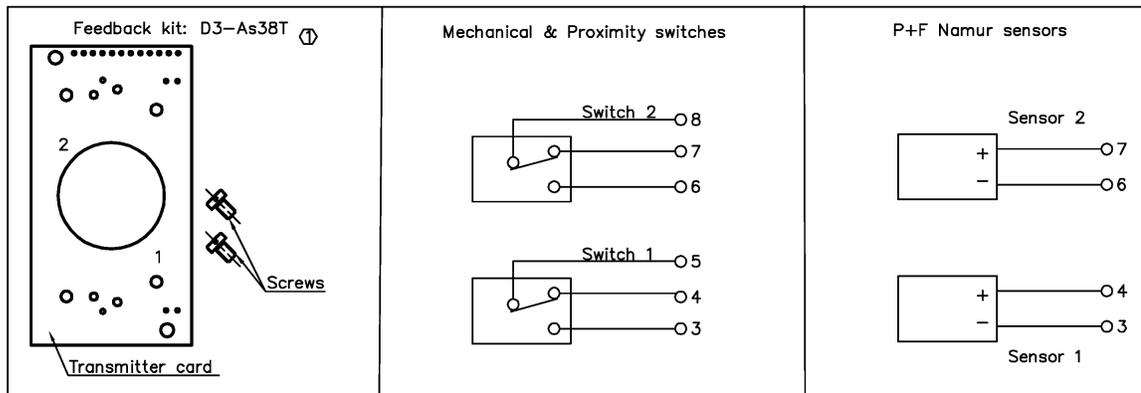
**Feedback option (cont.)**

**Calibration of the 4-20 mA transmitter**

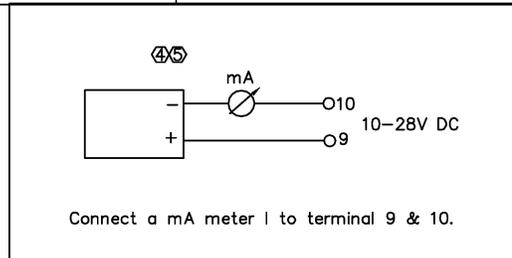
Go to menu shown in diagram.  
 Connect mA meter I and check reading.  
 Adjust output signal using Up or Down key  
 until meter I reads 4.00 mA.  
 Finish by pressing OK.  
 Repeat the above for 20 mA.



**Connecting the switches/sensors**



Note: Technical data of switches and transmitter – please see page 35



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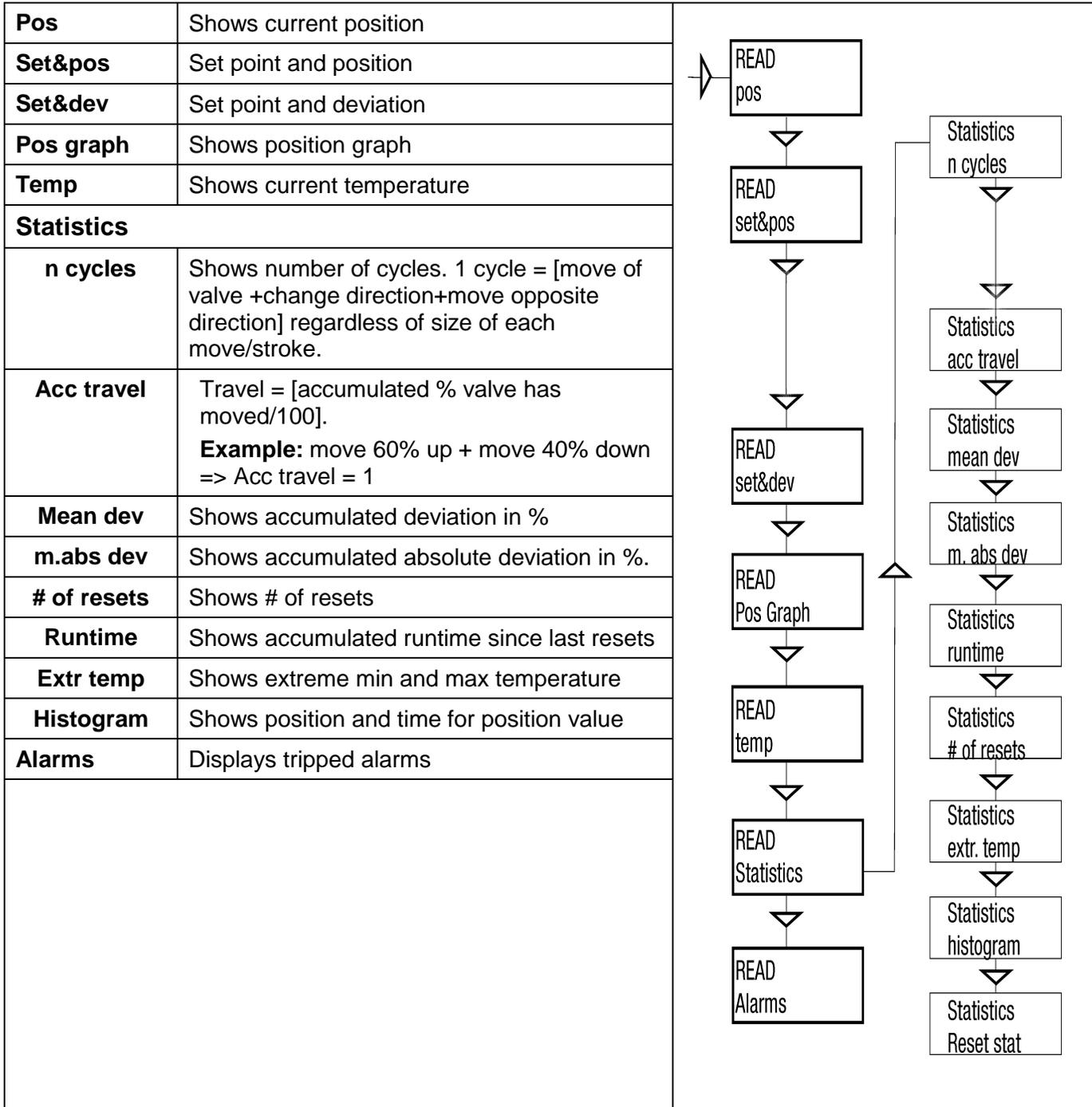
## P30A\_ Intelligent Digital Positioner

### Basic Menu Read

The menu contents are shown in the figures on the right and the texts are described below:



Current values can be read using the Read Menu and some values can be reset.

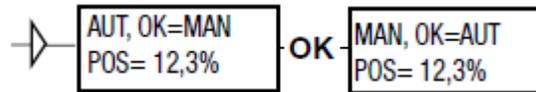


**Basic Menu Man/Auto**



The Man/Auto menu is used to change between manual and automatic modes.

The menu contents are shown in the figures on the right and the various texts are described below:



figures

**AUT, OK = MAN**

Positioner in automatic mode

**MAN, OK = AUT**

Positioner in manual mode

**Note:** When changing between **MAN** and **AUT** mode, the **OK** button must be pressed for 3 seconds.

In the **MAN** mode, the value of POS can be changed using  $\triangle$   $\nabla$ . The push-buttons increase/decrease the value in steps. The value can also be changed in the same way as for the other parameter values, as described on page 12.

**Other functions**

C+ can be fully opened by pressing  $\triangle$  and **OK** simultaneously.

C- can be fully opened by pressing  $\nabla$  and **OK** simultaneously.

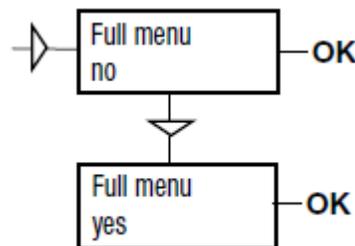
C+ and C- can be fully opened for blowing clean by pressing  $\triangle$   $\nabla$  and **OK** simultaneously.

**Basic Menu Shift Menu**



The Shift Menu is used to choose between the basic menu and the full menu.

The menu contents are shown in the figures on the right and the various texts are described below.



**No** Full menu selected.

**Yes** Basic menu selected.

The Menu can be locked with a passcode, see Setup menu.

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## P30A\_ Intelligent Digital Positioner

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### Full Menu Status

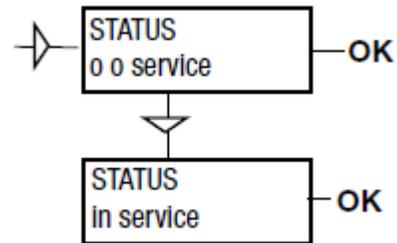


The Status Menu is used to select whether or not the positioner is in service.

The menu contents are shown in the figures on the right and the various texts are described below:

**o o service** Not in service. Flashing indicator in upper left hand corner of display.

**in service** Positioner in service. Critical parameters cannot be changed.



**Note:** When changing between **In service** and **Out of service**, the **OK** button must be pressed for 3 seconds.

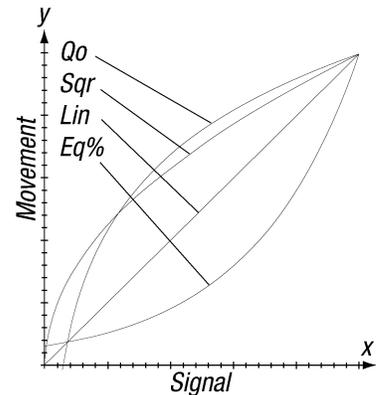
**Full Menu Setup**



The Setup Menu is used for various settings. The menu contents are shown in the chart on the next page and the various texts are described below:

Actuator	Type of actuator	Size of actuator	Time out
Rotating	Rotating actuator.	Small	10 s
Linear	Linear actuator.	Medium	25 s
		Large	60 s
		Extra large	180 s

<b>Lever</b>	Only for linear actuator.	
<b>Lever stroke</b>	Stroke length to achieve correct display. Input only needed in case display value is off.	
<b>Level cal</b>	Calibration of positions to achieve correct display.	
<b>Direction</b>		
<b>Direct</b>	Direct function (signal increase opens). Indicator/spindle rotates counter-clock wise.	
<b>Reverse</b>	Reverse function.	
<b>Character</b>		
<b>Linear (Lin)</b>	See diagram.	
<b>Equal% (Eq%)</b>		
<b>Quick open (Qo)</b>		
<b>Sqr root (Sqr)</b>		
<b>Custom</b>		
<b>Cust chr</b>		
<b># of point</b>	Specify number of points (3, 5, 9, 17, or 33)	
<b>Cust curve</b>	Enter values on X and Y axes.	
<b>Curr range</b>		
	(Use this function to split range.)	
<b>0%=4.0 mA</b> <b>100%=20.0 mA</b>	Possibility of selecting which input signal values will correspond to 0% and 100% movement respectively. Examples of settings: 4 mA=0%, 12 mA=100%, 12 mA =0%, 20 mA=100%	



# DeZURIK

## P30A\_ Intelligent Digital Positioner

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<b>TRVL range</b>	Setting end positions
<b>0% = 0.0%</b>	Select Out of Service. Set percentage value for desired end position (e.g. 3%).
<b>Set 0%</b>	Select In Service. Connect to calibrator. Move forward for desired end position (0%) and press <b>OK</b> .
<b>100%=100.0%</b>	Select Out of Service. Set percentage value for desired end position (e.g. 97%).
<b>Set 100%</b>	Select In Service. Connect calibrator. Move forward to desired end position (100%) and press <b>OK</b> .
<b>Trvl ctrl</b>	Behavior at set end position.
<b>Set low</b>	Choose between Free (positioner will control until a mechanical stop is reached), Limit (stop at set end position), and Cut off (Default value. Go directly to a mechanical stop at a predefined setpoint).
<b>Set high Values</b>	Similar to Set low. Select position for Cut off and Limit at the respective end positions.
<b>Passcode</b>	Setting passcode for access to the menu. Numbers between 0000 and 9999 can be used as passcodes. 0 = no passcode required.
<b>Appearance</b>	On display.
<b>Language</b>	Select menu language.
<b>Units</b>	Select units.
<b>Def. Display</b>	Select value(s) to be displayed during service. The display reverts to this value 10 minutes after any change is made.
<b>Start menu</b>	Start in Basic menu or Full menu.
<b>Orient</b>	Orientation of text on display.
<b>Par mode</b>	Display of control parameters such as P, I, D or K, Ti, Td.
<b>Devicedata</b>	
<b>HW rew</b>	
<b>SW rew</b>	General parameters.
<b>Capability</b>	
<b>HART</b>	Menu with HART parameters. Only amendable with HART communicator. It is possible to read from display.
<b>Profibus PA</b>	
<b>Status</b>	Indicates present status.
<b>Device ID</b>	Serial number
<b>Address</b>	1-126
<b>Tag</b>	Allotted ID

<b>Descriptor</b>	ID description
<b>Date</b>	SW release date
<b>Failsafe</b>	Value = preset pos Time = Set time +10sec= time before movement Valve act = failsafe (preset pos) or last value (present pos) Alarm out= On/Off
<b>Foundation Fieldbus</b>	
<b>Device ID</b>	Serial number
<b>Nod address</b>	Address on the bus provided by the DCS system
<b>TAG-PD_TAG</b>	Name on the bus provided by the DCS system
<b>Descriptor</b>	P30A_ positioner
<b>Date</b>	SW release date
<b>Sim jumper</b>	Simulate jumper, FF simulation functionality activated = ON

**Full Menu Tuning**



The menu contents are shown in the chart on the next page and the various texts are described below:

<b>Close time</b>	Minimum time from fully open to closed.
<b>Open time</b>	Minimum time from closed to fully open.
<b>Deadband</b>	Setting deadband. Minimum 0.1%.
<b>Expert Control</b>	Advanced settings. See explanations below.
<b>Togglestep</b>	Test tool for checking functions. Overlays a square wave on the set value.
<b>Self test</b>	Internal test of processor.
<b>Undo</b>	You can read last 20 changes.

**P,I,D and K,Ti,Td parameters**

If one of the gains is changed, the corresponding value in the other gain set is changed accordingly.

**Spring adjust**

The spring adjust function compensates the air flow linearly with the actuator C+ chamber volume (for a constant position error), so that low volumes get less flow.

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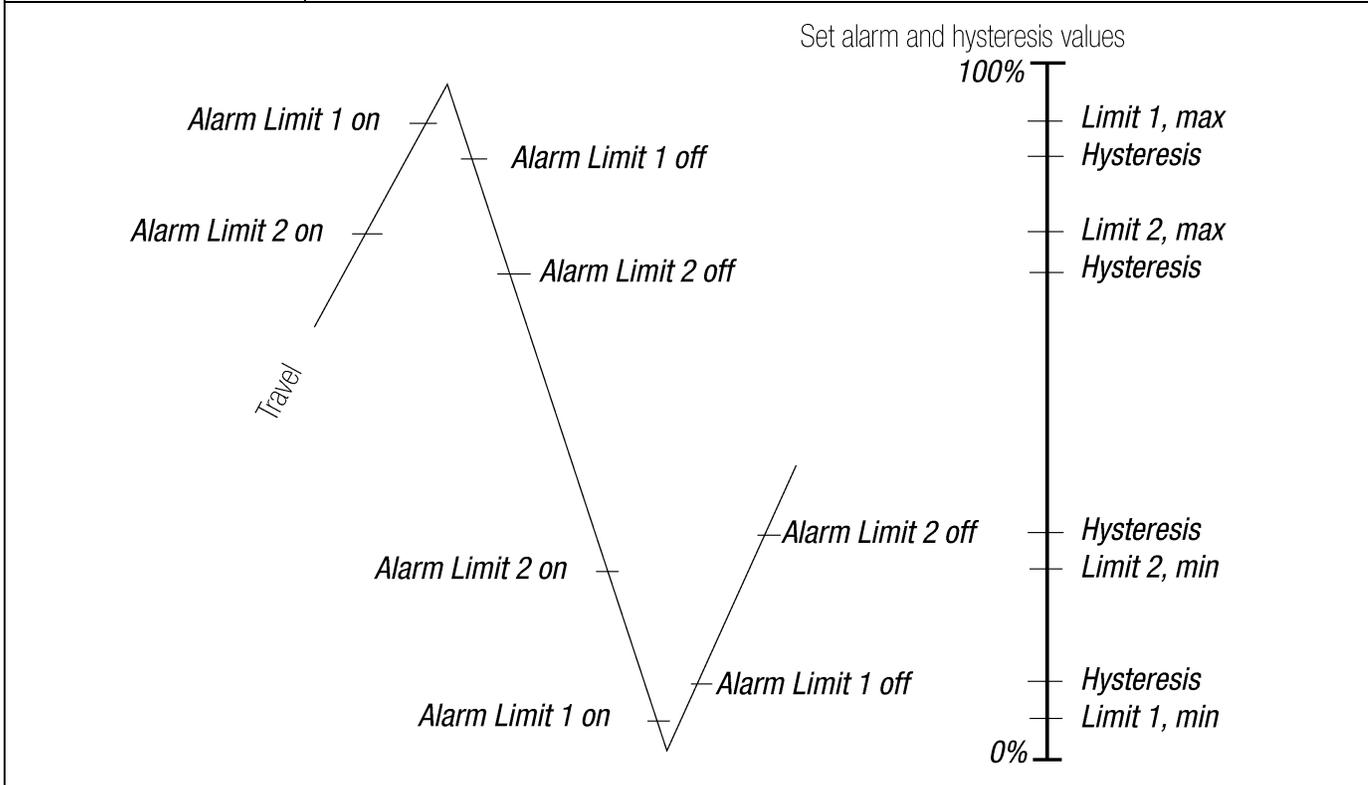
## P30A\_ Intelligent Digital Positioner

### Full Menu Alarms



The menu contents are shown in the chart on the next page and the various texts are described below:

<b>Deviation</b>	Alarm generated when deviation occurs.	
<b>On/Off</b>	Alarm on/off.	
<b>Distance</b>	Allowed distance before alarm is generated.	
<b>Time</b>	Total deviation time before alarm is generated.	
<b>Alarm out</b>	Select ON/OFF offers output on terminals.	
<b>Valve act</b>	Behavior of valve when alarm is generated.	
<b>Limit 1</b>	Alarm above/below a certain level.	
<b>On/Off</b>	Alarm on/off.	
<b>Minipos</b>	Setting of desired min. position.	See diagram below.
<b>Maxpos</b>	Setting of desired max. position.	
<b>Hysteresis</b>	Desired hysteresis.	
<b>Alarm on</b>	Select ON/OFF offers output on terminals.	
<b>Valve act</b>	Behavior of valve when alarm is generated.	
<b>Limit 2</b>	See Limit 1.	



<b>Temp (Alarm based on temperature.)</b>	
<b>On/Off</b>	Temperature alarm on/off.
<b>Low temp</b>	Temperature setting.
<b>High temp</b>	Temperature setting.
<b>Hysteresis</b>	Allowed hysteresis.
<b>Alarm out</b>	Select ON/OFF offers output on terminals.
<b>Valve act</b>	Behavior of valve when alarm is generated.

<b>Valve act</b>	
<b>No action</b>	Alarm generated only. Operations not affected.
<b>Goto open</b>	Valve moves to 100%. Positioner changes to position Manual.
<b>Goto close</b>	Valve moves to 0%. Positioner changes to position Manual.
<b>Manual</b>	Valve stays in unchanged position. Positioner moves to position Manual.

***Expert Calibration***

When entering “ExpertCal” mode-walk through the list of parameters described below. Set values where applicable. Confirm by pressing **OK**.

Set point LO: Use a calibrator set to 4 mA (or set another value on the display). Press **OK**.

Set point HI: Use a calibrator set to 20 mA (or set another value on the display). Press **OK**.

Pressure LO: Use a supply of 20 psi (138 kPa) (or set another value on the display). Press **OK**.  
Pressure read out only possible on P30A\_ with built in pressure sensor.

Pressure HI: Use a supply of 115 psi (793 kPa) (or set another value on the display). Press **OK**.  
Pressure read out only possible on P30A\_ with built in pressure sensor.

Transmitter: Connect 10-28 VDC. Connect an external mA meter in the loop. Read low value on mA meter and adjust with up/down key. Press **OK** to set low value. Repeat procedure to set High value.

Pot: Potentiometer setting, see page 33.

Full reset: Resets all set values and enters Factory mode.

To reset the values only, use FACT SET in main menu, see below.

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## P30A\_ Intelligent Digital Positioner

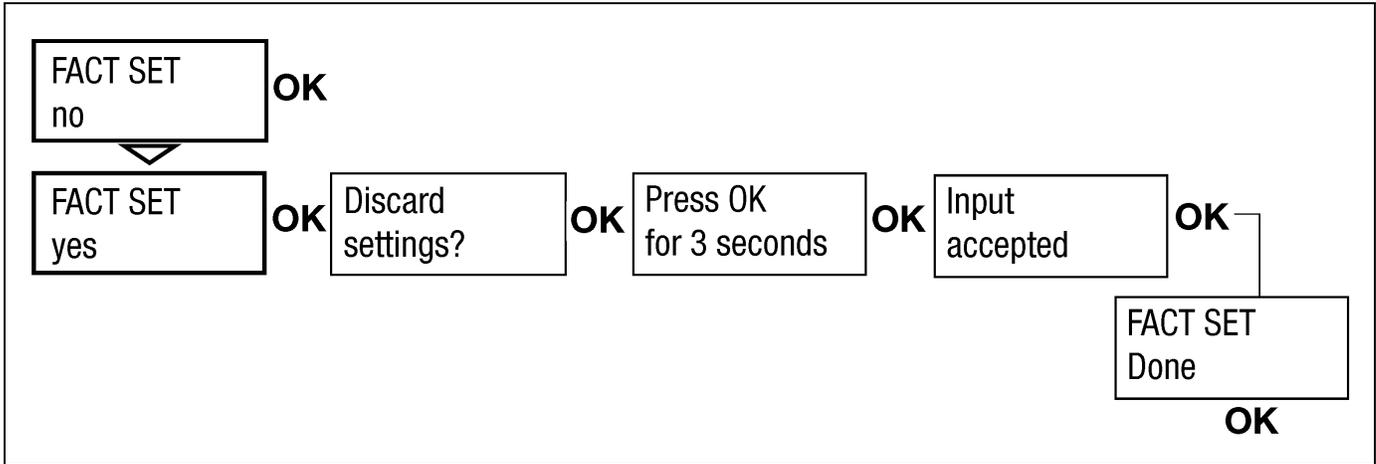
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### Full Menu Fact Set



The menu contents are shown in the chart below.

The default values that were set on delivery can be reset using the Fact Set menu. Values from calibration and from other settings will then be lost.



<b>READ</b>					pos				
<b>MAN/AUTO</b>	AUT,OK=MAN	MAN,OK=AUT			set&pos				n cycles
<b>CALIBRATE</b>	AutoCal			normal	set&dev				acc travel
	TravelCal			preset G Max	Pos Graph				mean dev
	Balance			preset F	Pressure**				m. abs dev
	Perform			preset E	C+ & C-**				runtime
	Expert cal			preset D Default	temp				# of reset
<b>SHIFT MENU</b>				preset C	statistics				extr temp
	Basic menu		Setpoint	preset B	alarms				histogram
	Full menu		Pressure**	preset A Min					reset stat
			Transm.						
			Pot						
			Full reset						
<b>STATUS</b>	O O SERVICE								
	IN SERVICE								
		Type	rotating		small				
		Function	linear		medium				
		Size		double act	large				
<b>SETUP</b>	Actuator			single act	Extra large				
	Lever (*)	Stroke							
		Lever cal		AirToOpen					
	Direction			AirToClose					
	Character				linear				
	Cust chr	#of points	X0=		equal %				
		Cust curve	Y0=		quick open				
	Curr range	0% =		0% =	custom				
		100%=		Set 0%	sqr root				
	Trvl range			Set 100%					
	Trvl ctrl	Set low	free	Cutoff Low					
		Set high	cutoff	Cutoff Hi	direct				
		Values	limited	Limit Low	reverse				
	Transm.			Limit Hi	Position				
	Passcode	Old	New 0=Off		pos/set				
					Trans.Card				
	Appearance	Language	English		D3-81				
			Svenska		D3-38				
			Deutsch						
			Français						
			Italiano	percent					
			Español	mA					
			Chinese	mm	percent				
			Portuguese	cm	mm				
	Units	Setpoint	inch	degrees	cm				
		Position			inch				
		Pressure**			degrees				
		Temp			bar				Grad C
	Def. Displ				psi				Grad F
	Start menu				kPa				Kelvin
	Start Logo	On/off							
	Orient.	normal							
		flipped							
	Devicedata								
					HW rev				Message
					SW rev				Tag
					Capability				Descriptor
					Hart				Date
<b>TUNING</b>	Close time	Control (x)	P,I,D						Device ID
	Open time	Togglestep	K,Ti,Td						Poll adr
	Deadband	Self test	Spring Adj						Assemblyno
	Expert	leakage	Friction						Univ cmd
		Undo							Spec cmd
					run time				Burst
					cycle time				On/off
					size				Burst Mode
					start				Pos (PV)
					Abort step				Set (SV)
									4 Dynamic
<b>ALARMS</b>	Deviation								
	Limit 1	On/off			On/off				
	Limit 2	Minpos			Distance				
		Maxpos			Time				
		Hysteresis			Alarm out				
		Alarm out			Valve act				
		Valve act							
	Temp			On/off					
				Low temp					
				High temp					
				Hysteresis					no action
				Alarm out					goto open
				Valve act					goto close
									manual
<b>FACT SET</b>	yes								

(\*) appear if Linear set  
 (\*\*) appear if pressure sensor exist  
 (x) Position is show in upper row (PID, KTTTd)

### Maintenance/Service

When carrying out service, replacing a circuit board, etc., it may be necessary to remove and refit various parts of the positioner. This is described on the following pages.

**Read the Safety Instructions on page 4 before starting work on the positioner.**

**Cleanliness is essential when working with the positioner. Contamination in the air ducts will inevitably lead to operational disturbances. Do not disassemble the unit more than described here.**

**DO NOT take the valve block apart because its function will be impaired.**

**When working with the P30A\_ positioner, the work place must be equipped with ESD (Electrostatic Discharge) protection before the work is started.**

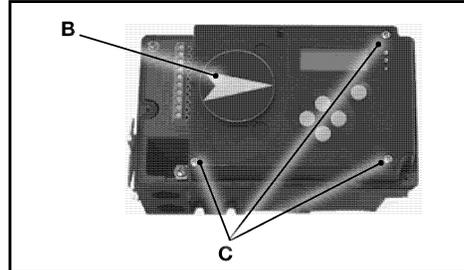
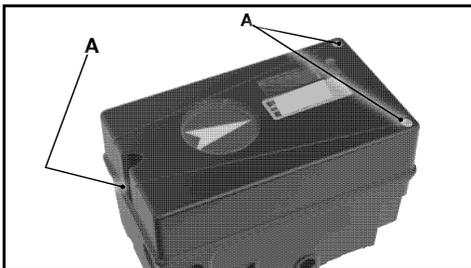
**Always turn off the air and electrical supplies before starting any work.**

**Please contact DeZURIK for information regarding proper procedures.**

#### *Disassembling P30A\_*

##### **Removing cover and inner cover**

- Unscrew the screws A and remove the cover. When mounting cover – see page 6.
- Pull off the arrow pointer, B.
- Unscrew the screws C and remove the inner cover.



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**Circuit boards (PCB)**

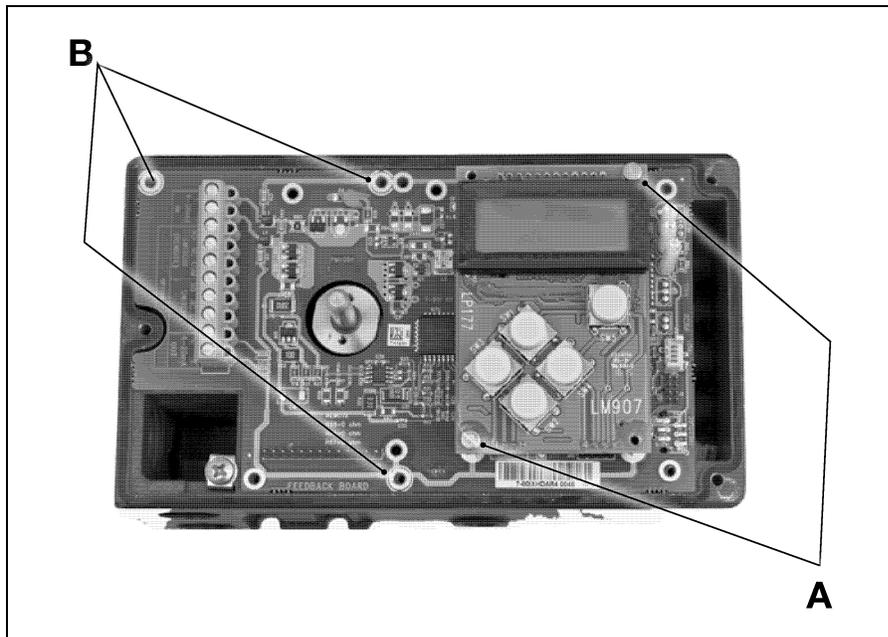
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**WARNING!**

**Disconnect or switch off the electric power supply before starting any work.**

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To lift off the display PCB, first unscrew the two screws A. Release the cable connections. Unscrew the three screws B and lift up the circuit board.



# DeZURIK

## P30A\_ Intelligent Digital Positioner

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### Valve block



#### WARNING!

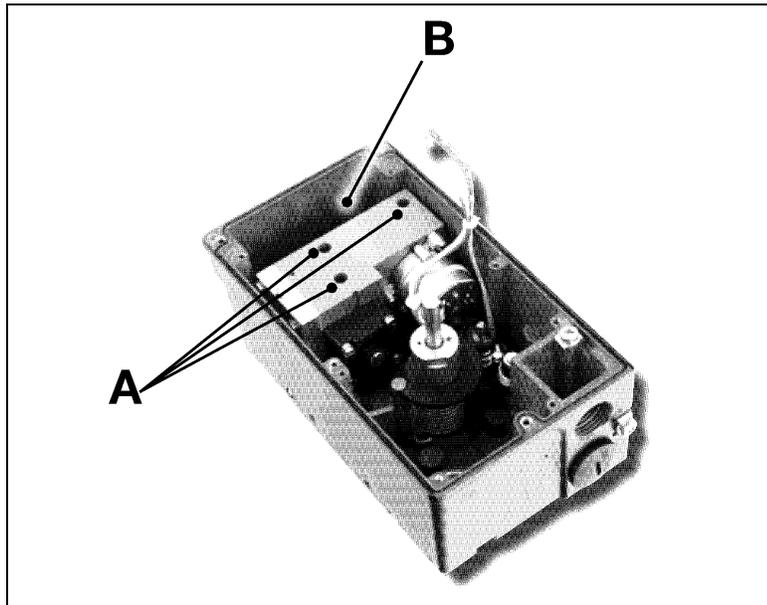
Turn off the air and electric power supply before starting any work.

---

- Remove the three screws A and lift out the valve block

**Note: Do not disassemble the valve block**

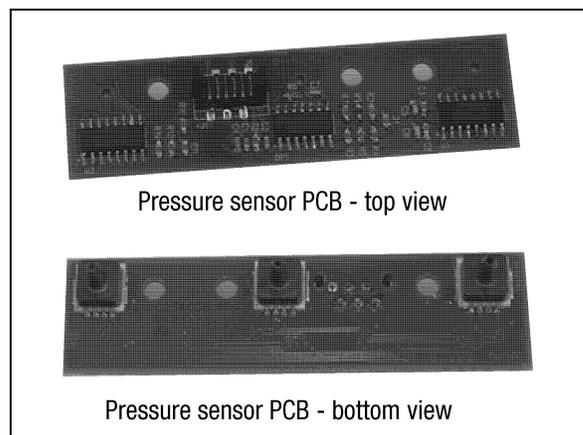
- When installing the valve block — torque the three screws to 3.5 in lbs (0.4 Nm) and seal with Loctite® 222.



### Pressure sensors

Three pressure sensors are available as an option. They indicate pressure for supply, C- and C+ air, and can be used by ValveSight™ to enable advanced valve diagnostics.

The sensors are mounted on a circuit board which mounts next to the air relay on the floor of the housing at B using three screws.



**Potentiometer**

**90° spring loaded potentiometer**

The spring-loaded potentiometer can be removed from the gearwheel for calibration or replacement. If the potentiometer is replaced or the setting is changed, it must be calibrated.

- Select the menu Calibrate - Expert - Cal pot. The display shows Set gear.
- Turn the spindle shaft clockwise to end position and press **OK**. Either turn manually or use the up/down arrows (with supply air) to stroke the positioner to turn the shaft clockwise (see Manual mode page 21).
- Un-mesh the potentiometer and turn it according to display until **OK** is shown. Press **OK**. See diagrams below.
- Re-align spring on potentiometer to secure it. See diagrams below.

**Transmitter boards**

The equipment for transmitter feedback consists of a circuit board, cam assembly and screws.

General PCB versions:

- with mechanical switches, SPDT
- with NAMUR sensors, DIN 19234
- with proximity switches
- with feedback transmitter and/or remote only

<p>Turn the end of the stop spring clockwise until it is clear from the housing wall.</p>	<p>Turn the potentiometer away from the shaft gear and adjust the potentiometer gear. Release the potentiometer to let the gear teeth engage again.</p>	<p>Turn the end of the stop spring counter clockwise until it points towards the housing wall.</p>

**Trouble shooting**

<b>Symptom</b>	<b>Action</b>
Change in input signal to positioner does not affect actuator position.	<ul style="list-style-type: none"><li>• Check air supply pressure, air cleanliness, and connection between positioner and actuator.</li><li>• Out of service, in manual mode.</li><li>• Check input signal to positioner.</li><li>• Check mounting and connections of positioner and actuator.</li></ul>
Change in input signal to positioner makes actuator move to its end position.	<ul style="list-style-type: none"><li>• Check input signal.</li><li>• Check mounting and connections of positioner and actuator.</li></ul>
Inaccurate control.	<ul style="list-style-type: none"><li>• Perform Auto-calibration and check for any leaks.</li><li>• Uneven air supply pressure.</li><li>• Uneven input signal.</li><li>• Wrong size of actuator being used.</li><li>• High friction in actuator/valve package.</li><li>• Excess play in actuator/valve package.</li><li>• Excess play in mounting of positioner on actuator.</li><li>• Dirty/humid supply air.</li></ul>
Slow movements, unstable regulation.	<ul style="list-style-type: none"><li>• Implement auto-tuning.</li><li>• Increase the deadband (Tuning menu).</li><li>• Adjust Performance (Calibrate menu).</li></ul>

## Technical data

<b>Rotation angle</b>	min 2.5° max 100°
<b>Input signal</b>	4-20 mA DC
<b>Air supply</b>	20-115 psi (1.4-8 bar) DIN/ISO 8573-1 3.2.3 Free from oil, water and moisture.
<b>Air delivery</b>	Up to 29.3 scfm @ 87 psi (760 nl/min @ 6 bar)
<b>Air consumption</b>	0.31 scfm @ 87 psi (8 nl/min @ 6 bar)
<b>Air connections</b>	¼" NPT
<b>Cable entry</b>	½" NPT
<b>Electrical connections</b>	Screw terminals 2.5 mm <sup>2</sup> /AWG14
<b>Linearity</b>	<0.4%
<b>Repeatability</b>	<0.5%
<b>Hysteresis</b>	<0.3%
<b>Dead band</b>	0.1-10% adjustable
<b>Display</b>	Graphic, view area 0.6 x 1.6" (15 x 41 mm)
<b>UI</b>	5 push buttons
<b>CE directives</b>	93/68EEC, 89/336/EEC, 92 /31/EEC
<b>Voltage drop, w/o HART</b>	8 V
<b>Voltage drop, with HART</b>	9.4 V
<b>Vibrations</b>	< 0.25% FS 10-500 Hz 2g max
<b>Enclosure</b>	IP66
<b>Material</b>	Die-cast Aluminum
<b>Surface treatment</b>	Powder epoxy
<b>Temperature range</b>	-40°F to 176°F (-40°C to +80°C)
<b>Weight</b>	4 lbs (1.8 kg)
<b>Mounting position</b>	Any
<b>Communication protocols</b>	Hart Profibus PA Foundation Fieldbus

<b>Mechanical switches</b>	
Type	SPDT
Size	Sub miniature
Rating	3 A/125 VAC / 2 A/30 VDC
Temperature range	-22°F to 180°F (-30°C to 80°C)

<b>NAMUR sensors</b>	
<b>(NJ2-V3-N)</b>	
Type	Proximity DIN EN 60947-5-6:2000
Load current	1 mA ≤ I ≤ 3 mA
Voltage range	8 VDC
Hysteresis	0.2%
Temperature range	-13°F to 185°F (-25°C to 85°C)

<b>Proximity switches</b>	
Type	SPDT
Rating	0.4 A @ 24 VDC, Max 10 W
Operating time	Max 1.0 ms
Max voltage	200 VDC
Contact resistance	0.2 Ω
Temperature range	-22°F to 180°F (-30°C to 80°C)

<b>Slot NAMUR switches</b>	
<b>(SJ2-S1N, SJ2-SN, SJ2-N)</b>	
Type	Proximity DIN EN 60947-5-6:2000
Load current	1 mA ≤ I ≤ 3 mA
Voltage	8 VDC
Hysteresis	0.2%
Temperature range	-13°F to 185°F (-25°C to 85°C)

<b>4-20 mA transmitter</b>	
Supply	11-28 VDC
Output	4-20 mA
Resolution	0.1%
Linearity full span	+/-0.5%
Output current limit	30 mA DC
Load impedance	800 Ω @ 24 VDC

## Spare parts

No	Part no	Description
1	D4-SP37PVA	Black cover incl. screws and flat indicator
1	D4-SP37PVD	Black cover incl. screws and dome indicator
1	D4-SP37FWA	White cover incl. screws and flat indicator
1	D4-SP37FWD	White cover incl. screws and dome indicator
2	D4-SP40	Internal cover incl. screws
3	D4-SP1516	External covers SST, 2, incl screws
4	3-SXX	Spindle adaptor (XX=01, 02, 06, 26, 30, 36)
5	D4-SP05-09	S09 shaft compl. incl. gear wheel, friction clutch, spring
5	D4-SP05-21	S21 shaft compl. incl. gear wheel, friction clutch, spring
5	D4-SP05-23	S23 shaft compl. incl. gear wheel, friction clutch, spring
5	D4-SP05-39	S39 shaft compl. incl. gear wheel, friction clutch, spring
6	D4-SP400	Air relay complete, incl. cable, seal, screws
7	D4-SP08	Potentiometer compl. incl. spring, bracket, cable
8	3-SP37HR	PCB LCD assembly
9	D4-SP7-80H	PCB mother board 4-20 mA / HART
9	D4-SP7-80P	PCB mother board Profibus PA
9	D4-SP7-80F	PCB mother board Fieldbus
10	D4-SP84-3	Pressure sensor assembly complete
11	D4-SPGB	Bag with screws, O-rings, seals, pair of sintered brass silencers, cable gland
12	D4-SP940M	Gauge block G, complete incl. screws, seals, 3 gauges / SST, Brass
12	D4-SP940N	Gauge block G, complete incl. screws, seals, 3 gauges / SST, Brass
13	D4-SP45S	Limit switches Mechanical SPDT compl.
13	D4-SP45N	Limit switches Namur V3 P&F NJ2-V3-N compl.
13	D4-SP45P	Limit switches Proximity SPDT compl.
13	D4-SP454	Limit switches Namur slotted P&F SJ2-S1N compl.
13	D4-SP455	Limit switches Namur slotted P&F SJ2-SN compl.
13	D4-SP456	Limit switches Namur slotted P&F SJ2-N compl.

## Limited Warranty

DeZURIK, Inc. ("Seller") manufactured products, auxiliaries and parts thereof that we manufacture for a period of twenty-four (24) months from date of shipment from Seller's factory, are warranted to the original purchaser only against defective workmanship and material, but only if properly stored, installed, operated, and serviced in accordance with Seller's recommendations and instructions.

For items proven to be defective within the warranty period, your exclusive remedy under this limited warranty is repair or replacement of the defective item, at Seller's option, FCA Incoterms 2020 Seller's facility with removal, transportation, and installation at your cost.

Products or parts manufactured by others but furnished by Seller are not covered by this limited warranty. Seller may provide repair or replacement for other's products or parts only to the extent provided in and honored by the original manufacturer's warranty to Seller, in each case subject to the limitations contained in the original manufacturer's warranty.

No claim for transportation, labor, or special or consequential damages or any other loss, cost or damage is being provided in this limited warranty. You shall be solely responsible for determining suitability for use and in no event shall Seller be liable in this respect.

This limited warranty does not warrant that any Seller product or part is resistant to corrosion, erosion, abrasion or other sources of failure, nor does Seller warrant a minimum length of service.

Your failure to give written notice to us of any alleged defect under this warranty within twenty (20) days of its discovery, or attempts by someone other than Seller or its authorized representatives to remedy the alleged defects therein, or failure to return product or parts for repair or replacement as herein provided, or failure to store, install, or operate said products and parts according to the recommendations and instructions furnished by Seller shall be a waiver by you of all rights under this limited warranty.

This limited warranty is voided by any misuse, modification, abuse or alteration of Seller's product or part, accident, fire, flood or other Act of God, or your failure to pay entire contract price when due.

The foregoing limited warranty shall be null and void if, after shipment from our factory, the item is modified in any way or a component of another manufacturer, such as but not limited to; an actuator is attached to the item by anyone other than a Seller factory authorized service personnel.

All orders accepted shall be deemed accepted subject to this limited warranty, which shall be exclusive of any other or previous warranty, and this shall be the only effective guarantee or warranty binding on Seller, despite anything to the contrary contained in the purchase order or represented by any agent or employee of Seller in writing or otherwise, notwithstanding, including but not limited to implied warranties.

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