



DEZURIK P30A INTELLIGENT DIGITAL POSITIONER



Instruction **D10509**

July 2017

DeZURIK

P30A_ Intelligent Digital Positioner

Instructions

These instructions provide information about the P30A_ Intelligent Digital Positioner. They are for use by personnel who are responsible for installation, operation and maintenance of the P30A_ Intelligent Digital Positioner.

Safety Messages

All safety messages in the instructions are flagged with an exclamation symbol and the word Caution, Warning or Danger. These messages indicate procedures that must be followed exactly to avoid equipment damage, personal injury or death. Safety label(s) on the product indicate hazards that can cause equipment damage, personal injury or death.

Safety label(s) on the product indicate hazards that can cause equipment damage, personal 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).



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.

Inspection

Your positioner has been packaged to provide protection during shipment; however, it 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

Recommended spare parts are listed on the assembly drawing. These parts should be stocked to minimize downtime.

Order parts from your DeZURIK sales representative, or directly from DeZURIK. When ordering parts, please include the part number and the serial number if available, located on the data plate attached to the P30A_ assembly. Also include the Part No and Description of the parts found on page 38.

DeZURIK Service

DeZURIK service personnel are available to install, 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 www.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.**
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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.

Installation

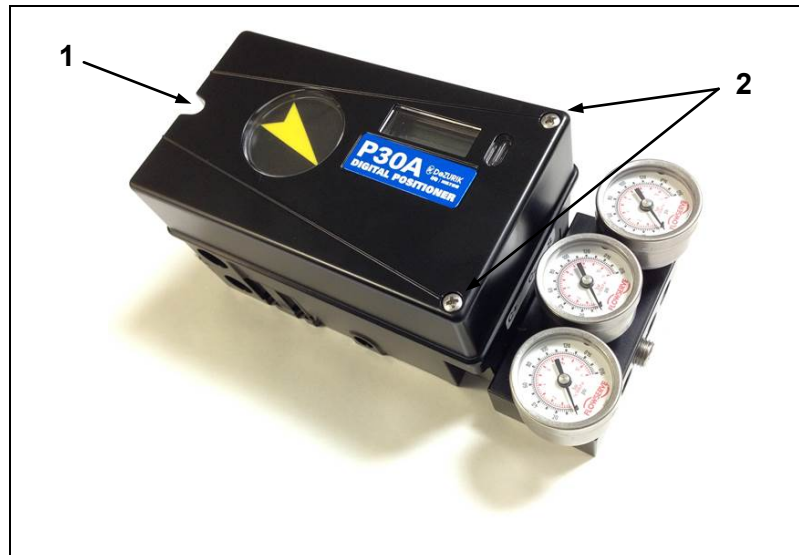
Removal of Cover

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°F (10°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.

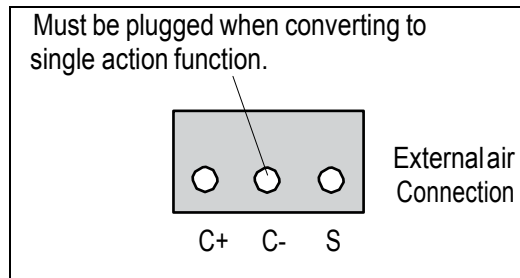
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Connections

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 8.

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 36.

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.



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Electrical connections

Terminal block diagram for the P30A_.

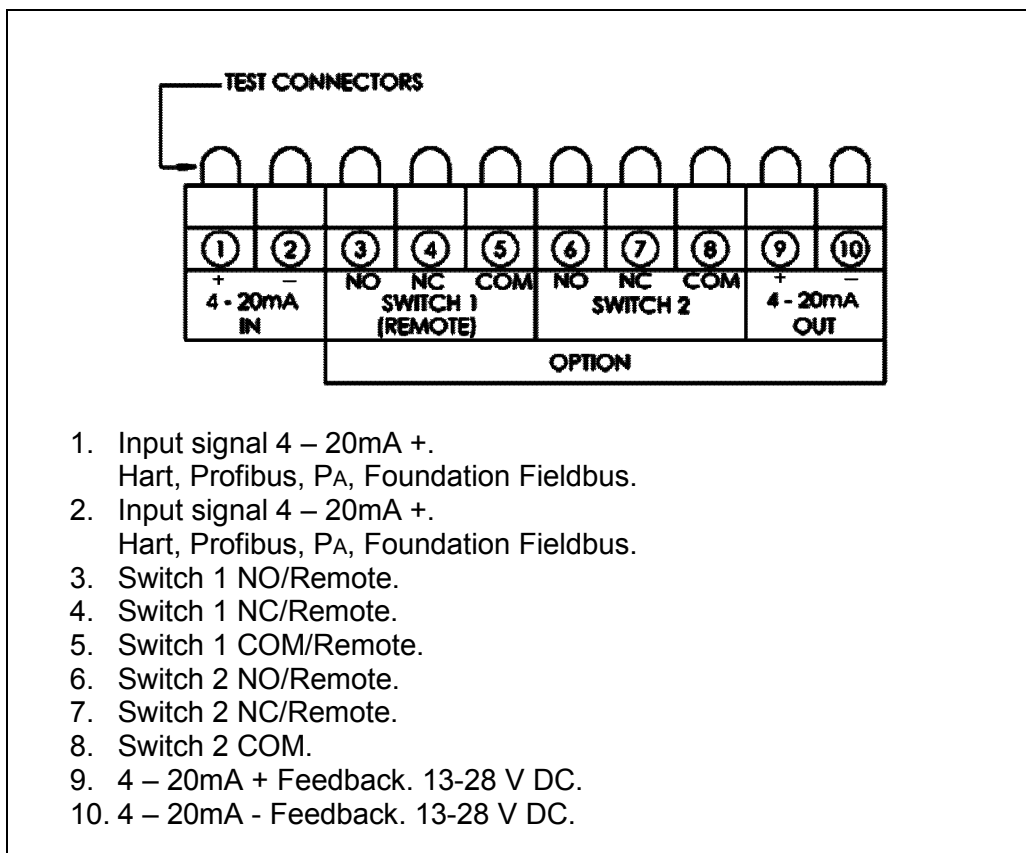
The terminal block (below) for the positioner is accessible when the aluminum cover is removed.

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.

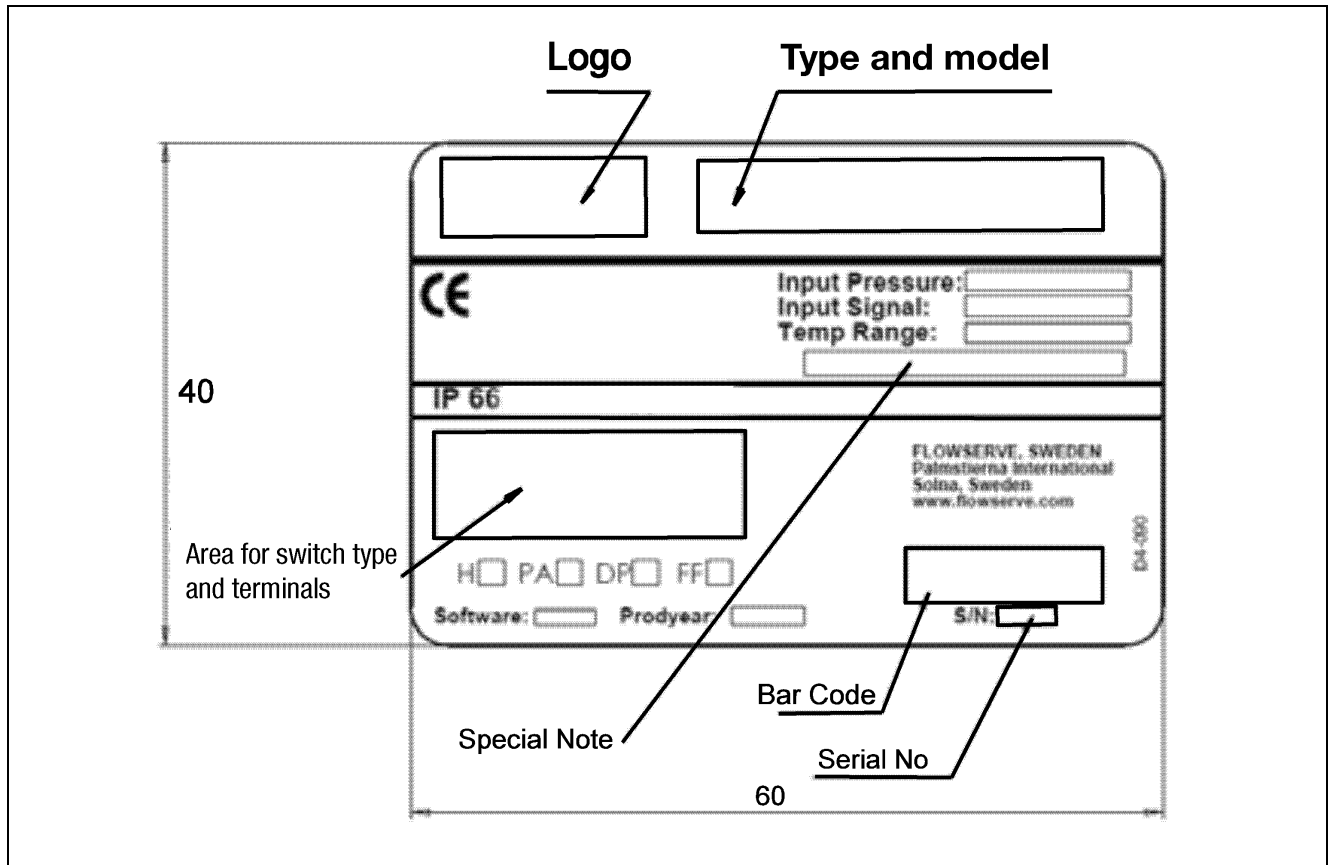


P30A_, 10 Terminals



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 14.

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.

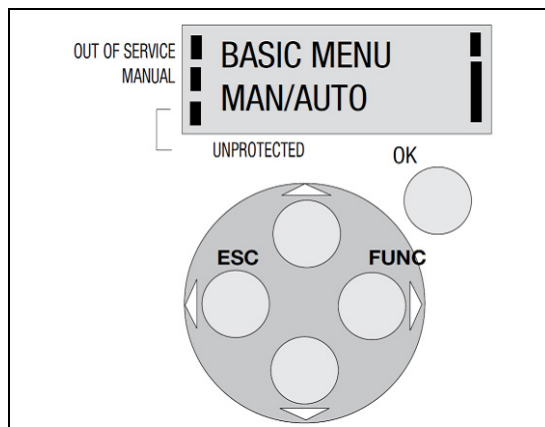
IN SERVICE

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 22.

UNPROTECTED

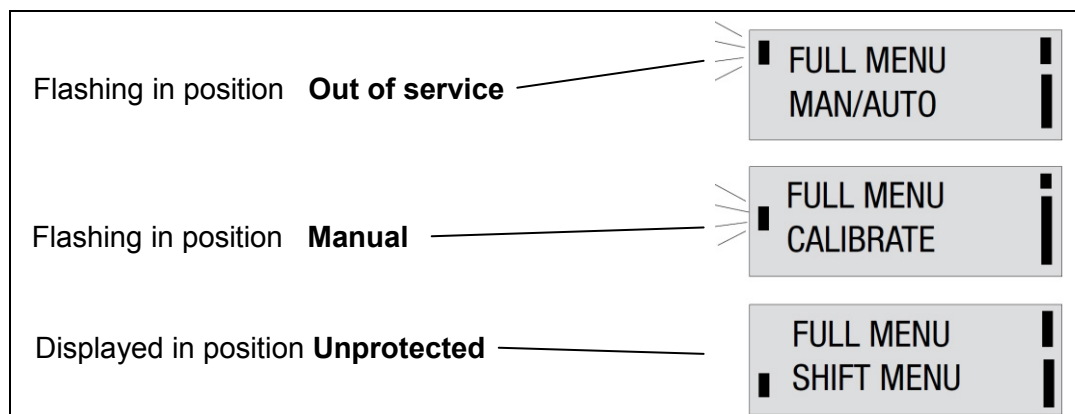
Most of the parameters can be changed when the positioner is in the “Unprotected” position. However, critical parameters are locked when the positioner is in the “In service” position.

LED BLINK CODES

LED color (R=red, Y=yellow, G=green)			
Codes during In Service:			
		R	Actual valve position deviates from requested/set position.
	G	Y	Fully open/closed valve using Cut Off (=OK)
		G	Controlling valve position (=OK)
Calibration alarms:			
	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.

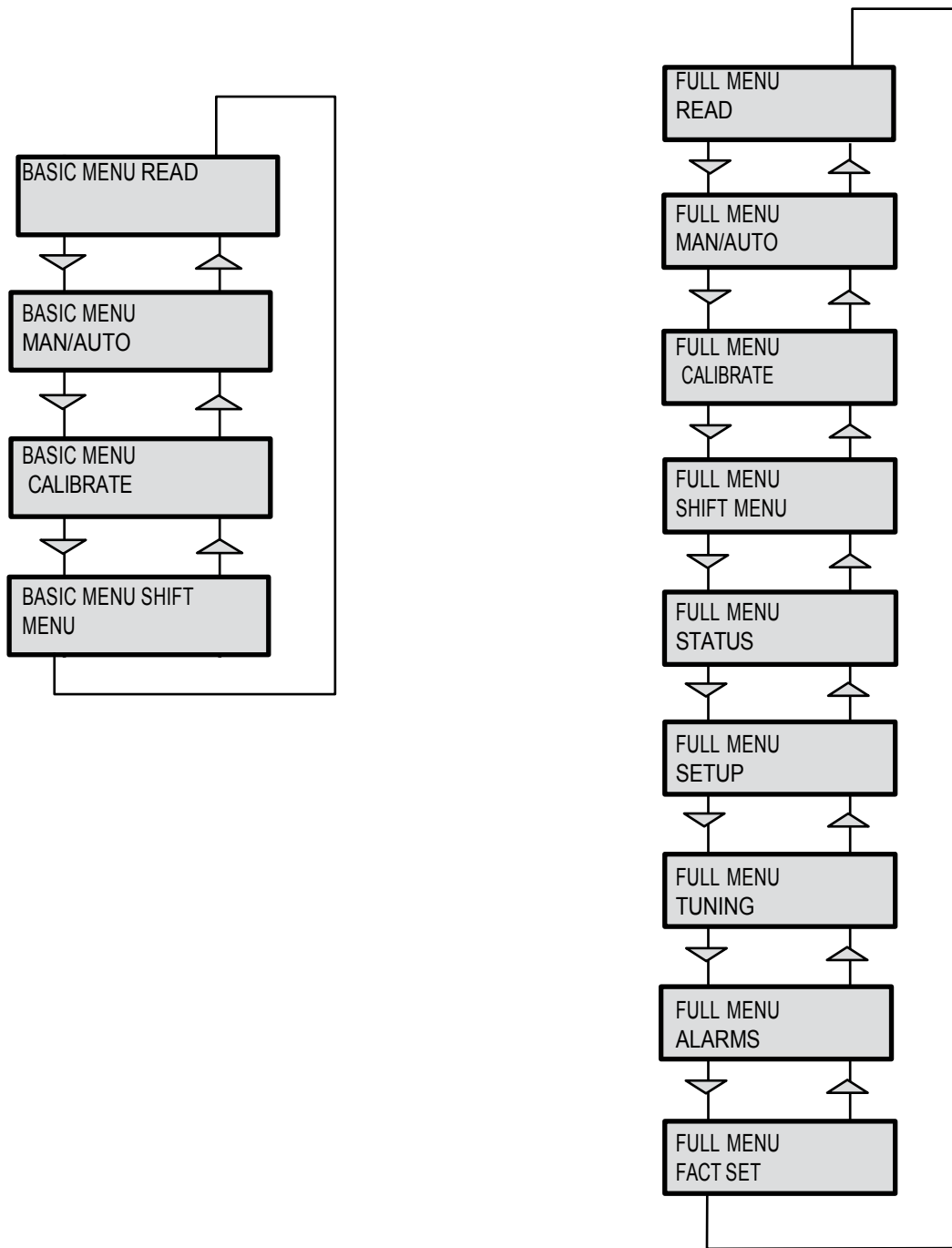
Changing parameter values

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

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.

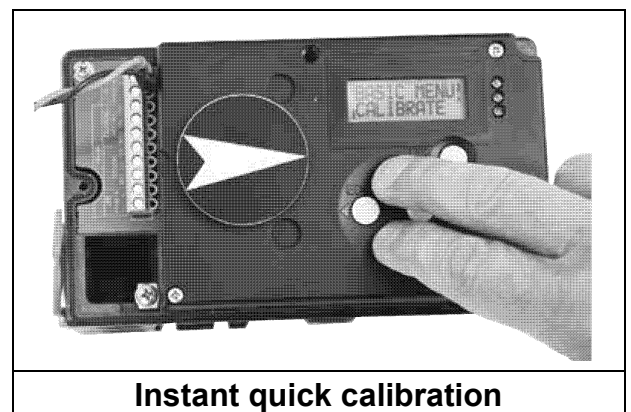
GSD files are available on the manufacturer’s D30 web-page www.pmv.nu

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 28

For further information on calibrating the pot - see page 34



Instant quick calibration

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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 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.

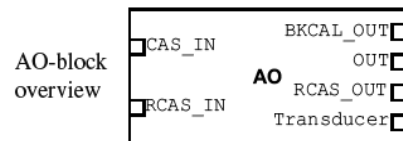
(RB) Resource Block

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.

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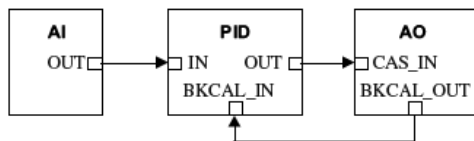
P30A_ Intelligent Digital Positioner

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.



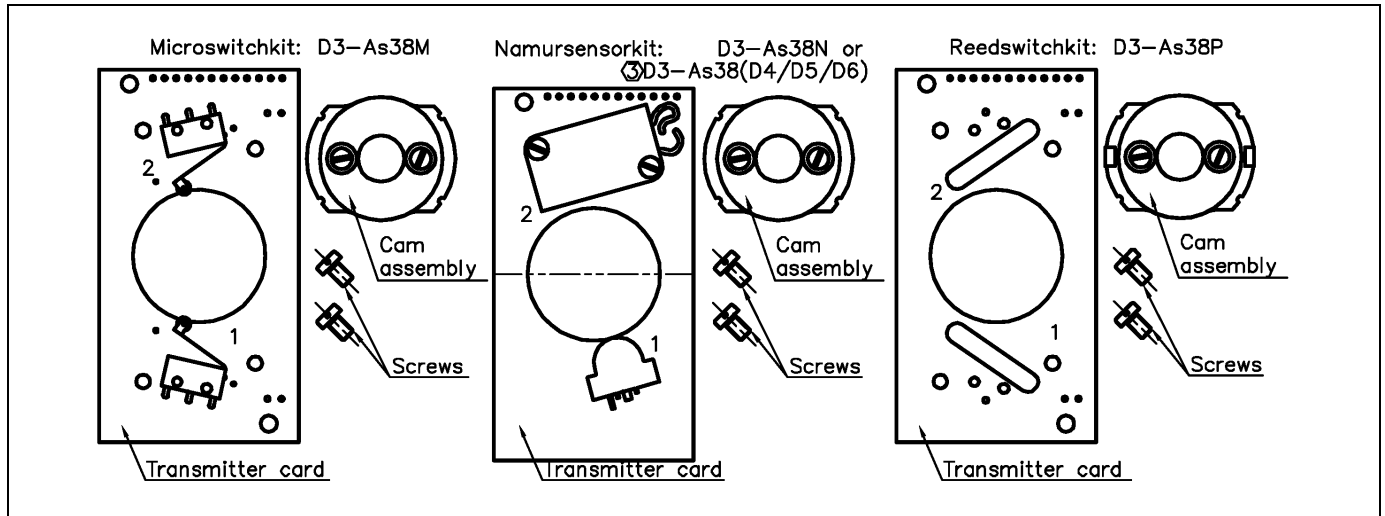
Auto-Cal



The various menu texts are described below.

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

Feedback option



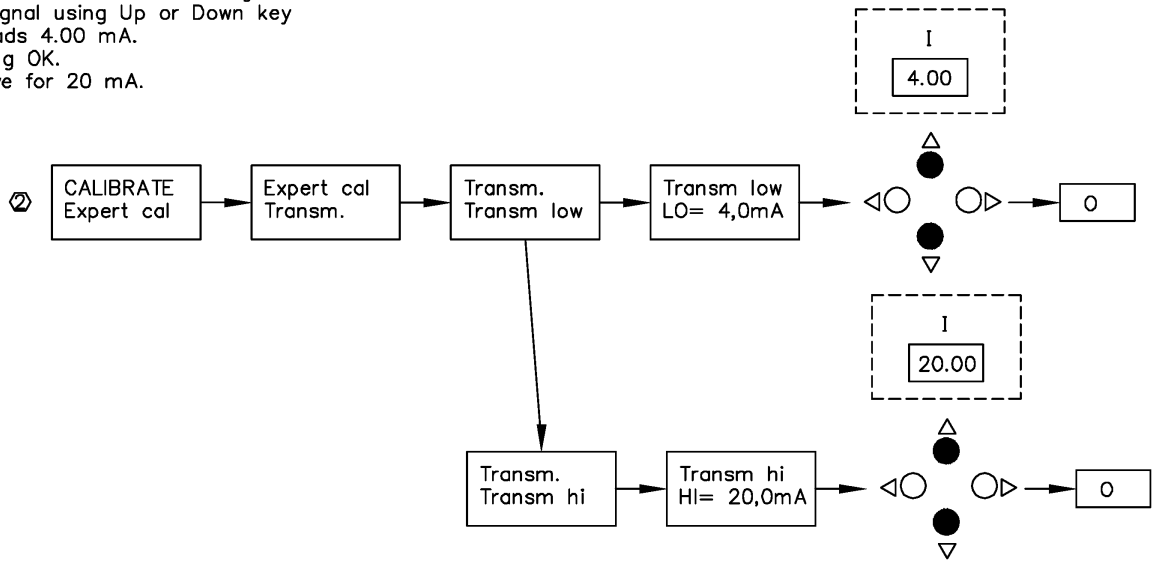
When installing the transmitter/switch card, make sure it is placed correctly over the connector pins before gently pushing it down until it rests on the supports. Secure the PC board with the two screws. Make sure the holes are centered before tightening the screws.

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.

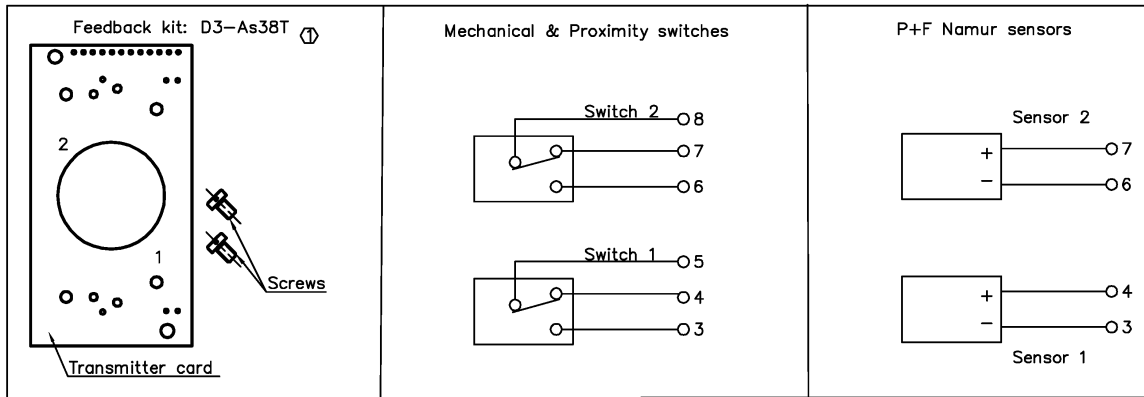
Feedback option (cont.)

Calibration of the 4-20 mA transmitter

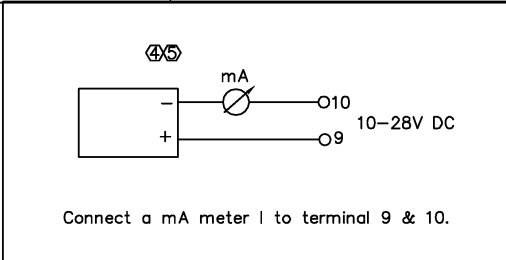
Go to menu shown in diagram.
 Connect mA meter I and check reading.
 Adjust output signal using Up or Down key
 until meter I reads 4.00 mA.
 Finish by pressing OK.
 Repeat the above for 20 mA.



Connecting the switches/sensors



Note: Technical data of switches and transmitter – please see page 36



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.

Pos	Shows current position	
Set&pos	Set point and position	
Set&dev	Set point and deviation	
Pos graph	Shows position graph	
Temp	Shows current temperature	
Statistics		
n cycles	Shows number of cycles. 1 cycle = [move of valve +change direction+move opposite direction] regardless of size of each move/stroke.	
Acc travel	Travel = [accumulated % valve has moved/100]. Example: move 60% up + move 40% down => Acc travel = 1	
Mean dev	Shows accumulated deviation in %	
m.abs dev	Shows accumulated absolute deviation in %.	
# of resets	Shows # of resets	
Runtime	Shows accumulated runtime since last resets	
Extr temp	Shows extreme min and max temperature	
Histogram	Shows position and time for position value	
Alarms	Displays tripped alarms	

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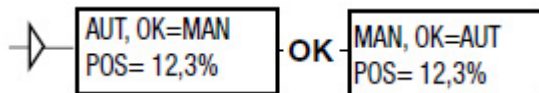
P30A_ Intelligent Digital Positioner

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:



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 ∇ . 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 13.

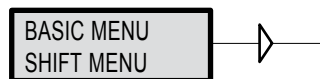
Other functions

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

C- can be fully opened by pressing ∇ and **OK** simultaneously.

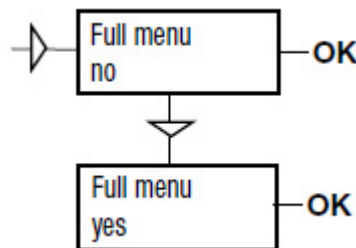
C+ and C- can be fully opened for blowing clean by pressing \triangle ∇ and **OK** simultaneously.

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.

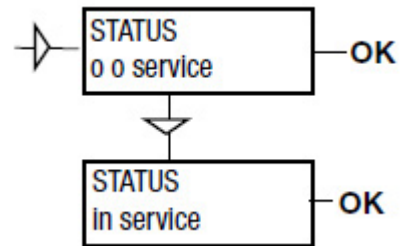
Full Menu Status

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.

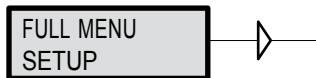


Note: When changing between **In service** and **Out of service**, the **OK** button must be pressed for 3 seconds.

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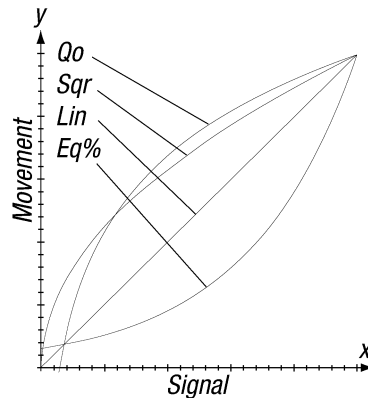
Full Menu Setup



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

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



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

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

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

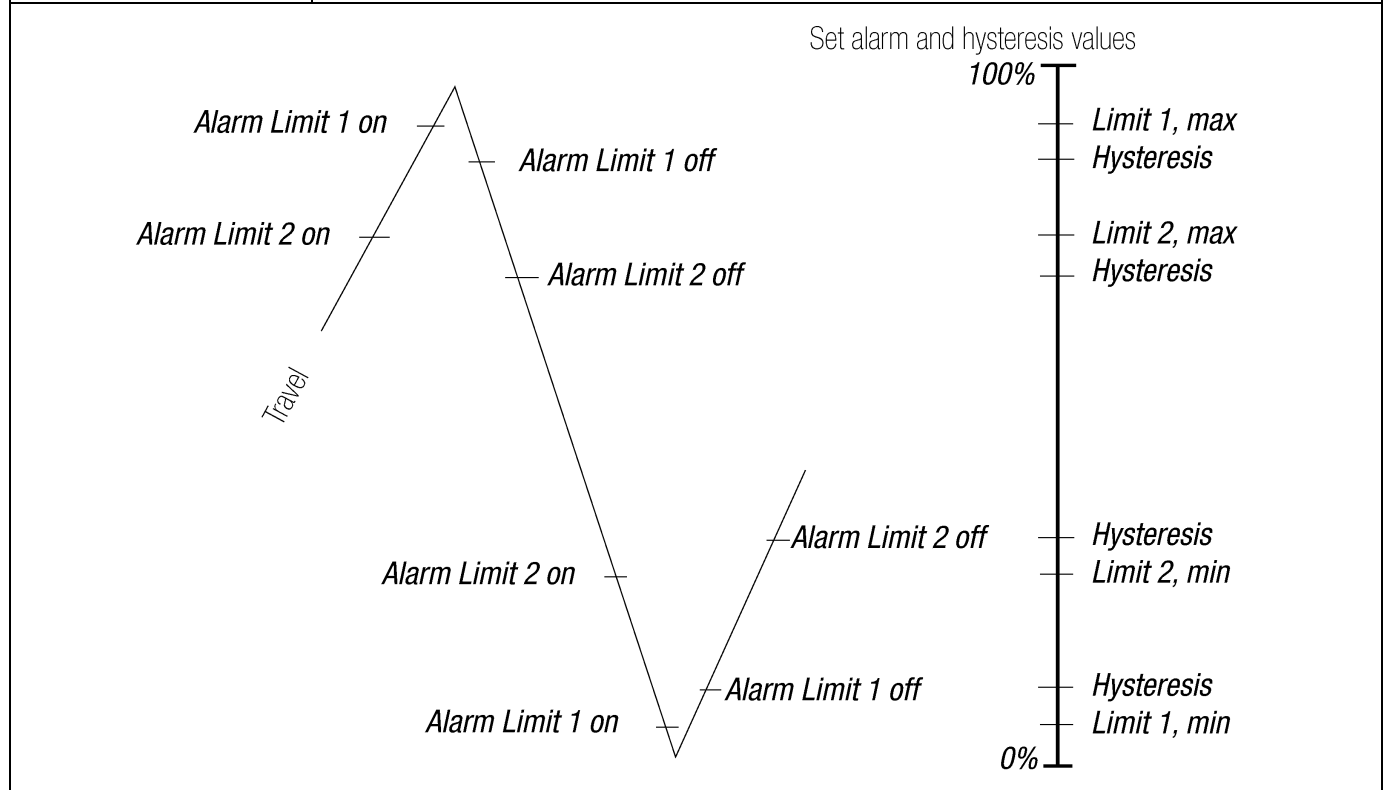
The spring adjust function compensates the air flow linearly with the actuator C+ chamber volume (for a constant position error), so that low volumes get less flow.

Full Menu Alarms



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

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



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

Valve act	
No action	Alarm generated only. Operations not affected.
Goto open	Valve moves to 100%. Positioner changes to position Manual.
Goto close	Valve moves to 0%. Positioner changes to position Manual.
Manual	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.

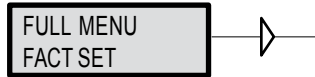
Transmitter: Connect 10-28 VDC. Connect an external mA meter in the loop. Read low value on mA meter and adjust with up/down key. Press **OK** to set low value. Repeat procedure to set High value.

Pot: Potentiometer setting, see page 34.

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

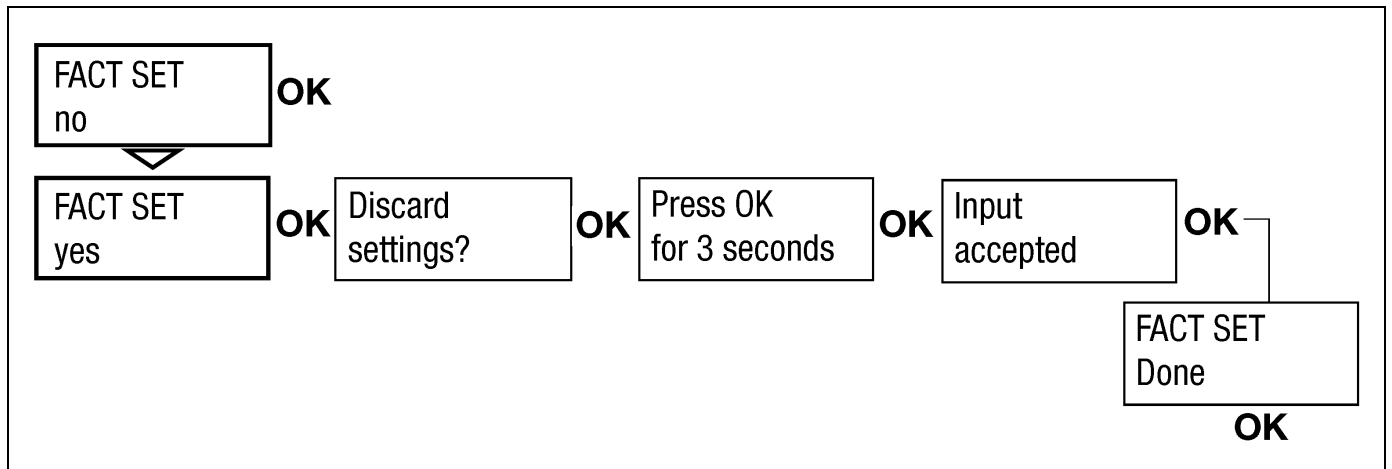
To reset the values only, use FACT SET in main menu, see below.

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.



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READ					pos	
MAN/AUTO	AUT,OK=MAN	MAN,OK=AUT			set&pos	n cycles
CALIBRATE	AutoCal		normal	preset G Max	set&dev	acc travel
	TravelCal			preset F	Pos Graph	mean dev
	Balance			preset E	Pressure**	m. abs dev
	Perform			preset D Default	C+ & C-**	runtime
	Expert cal			preset C	temp	# of reset
SHIFT MENU				preset B	statistics	extr temp
	Basic menu	Setpoint		preset A Min	alarms	histogram
	Full menu	Pressure**				reset stat
		Transm.				
		Pot				
		Full reset				
STATUS	O O SERVICE		rotating			
	IN SERVICE		linear			
		Type		double act	small	
		Function		single act	medium	
		Size			large	
SETUP	Actuator				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	Direction	direct
		Values	limited	Limit Low		reverse
	Transm.			Limit Hi	Position	
	Passcode	Old	New 0=Off		pos/set	Set point
					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	cm	
			Position	degrees	inch	bar
			Pressure**	degrees	degrees	psi
			Temp			kPa
		Def. Displ				Grad C
		Start menu				Grad F
		Start Logo	On/off	last value	pos	
		Orient.	normal	basic	set&pos	
			flipped	full	set&dev	
					menu	
	Devicedata			HW rev	Message	
				SW rev	Tag	
				Capability	Descriptor	
				Hart	Date	
TUNING	Close time	Control (x)	P.I.D		Device ID	
	Open time	Togglestep	K,Ti,Td		Poll adr	
	Deadband	Self test	Spring Adj	run time	Assemblyno	
	Expert	leakage	Friction	cycle time	Univ cmd	
		Undo		size	Spec cmd	
				start	Burst	Pos (PV)
				Abort step	On/off	Set (SV)
					Burst Mode	4 Dynamic
ALARMS	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
FACT SET	yes					

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

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 5 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.

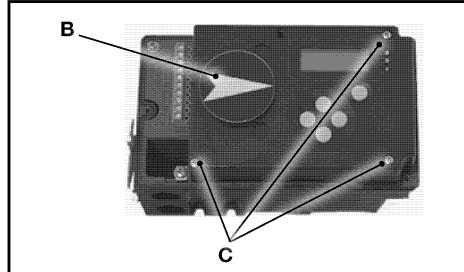
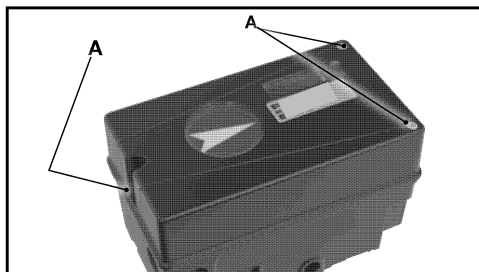
Always turn off the air and electrical supplies before starting any work.

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 7.
- Pull off the arrow pointer, B.
- Unscrew the screws C and remove the inner cover.



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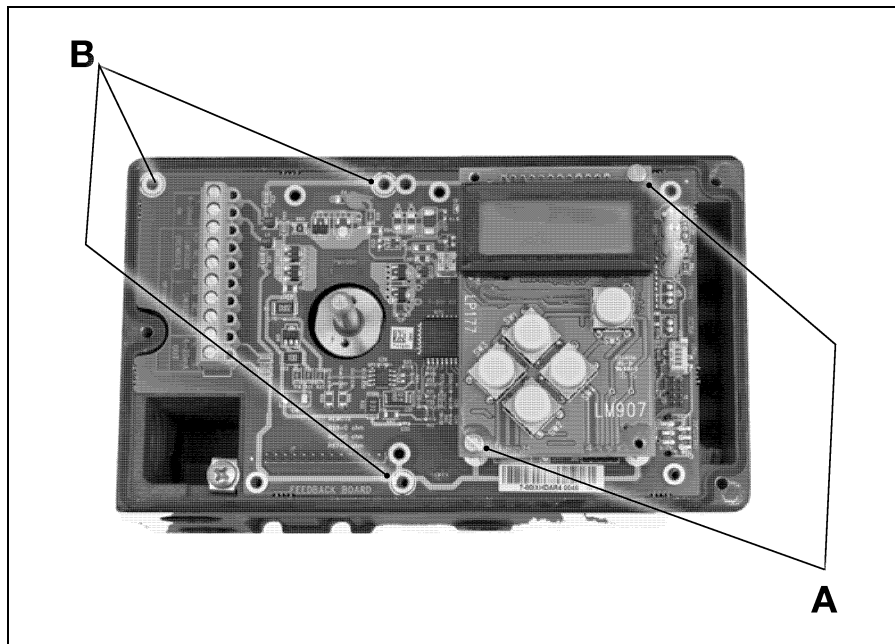
Circuit boards (PCB)



WARNING!

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

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.



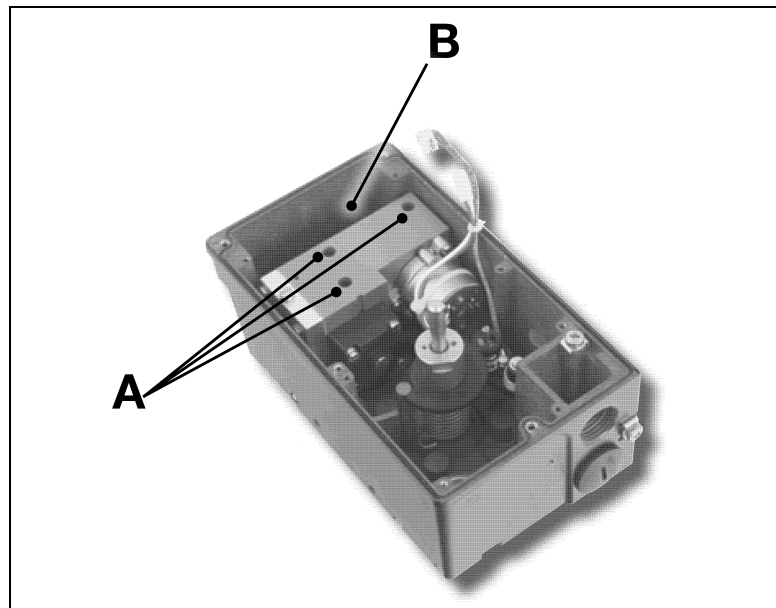
Valve block**WARNING!**

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

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

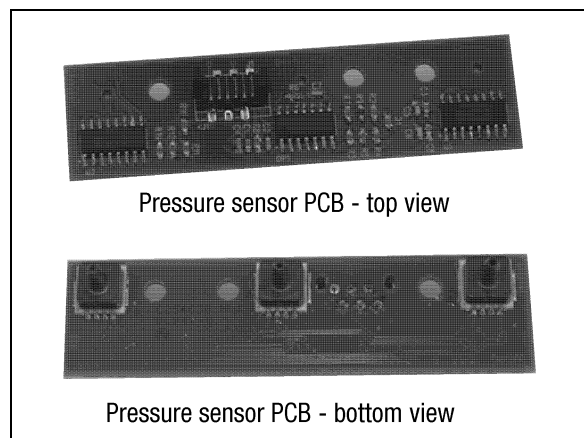
Note: Do not disassemble the valve block

- 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.



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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.

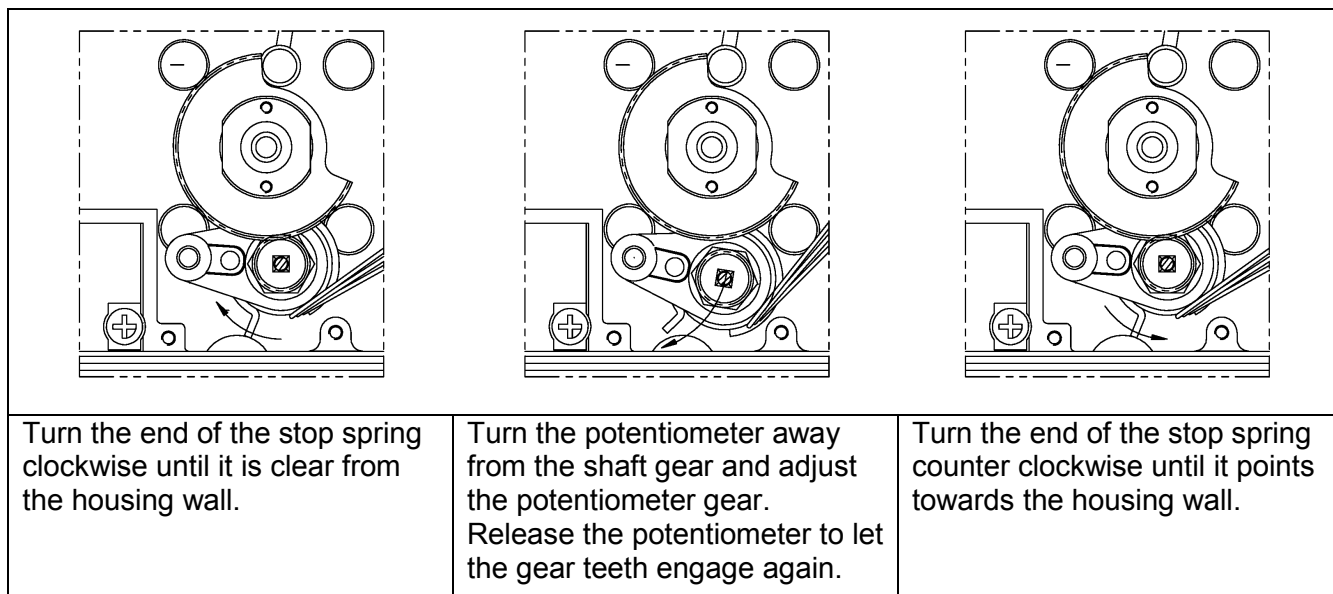
- Select the menu Calibrate - Expert - Cal pot. The display shows Set gear.
- Turn the spindle shaft clockwise to end position and press **OK**. Either turn manually or use the up/down arrows (with supply air) to stroke the positioner to turn the shaft clockwise (see Manual mode page 22).
- Un-mesh the 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



Trouble shooting

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

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Technical data

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

Mechanical switches	
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)

NAMUR sensors	
(NJ2-V3-N)	
Type	Proximity DIN EN 60947-5-6:2000
Load current	$1 \text{ mA} \leq I \leq 3 \text{ mA}$
Voltage range	8 VDC
Hysteresis	0.2%
Temperature range	-13°F to 185°F (-25°C to 85°C)

Proximity switches	
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)

Slot NAMUR switches	
(SJ2-S1N, SJ2-SN, SJ2-N)	
Type	Proximity DIN EN 60947-5-6:2000
Load current	$1 \text{ mA} \leq I \leq 3 \text{ mA}$
Voltage	8 VDC
Hysteresis	0.2%
Temperature range	-13°F to 185°F (-25°C to 85°C)

4-20 mA transmitter	
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.

Guarantee

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Sales and Service

For information about our worldwide locations, approvals, certifications and local representative:

Web site: www.dezurik.com E-Mail: info@dezurik.com



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