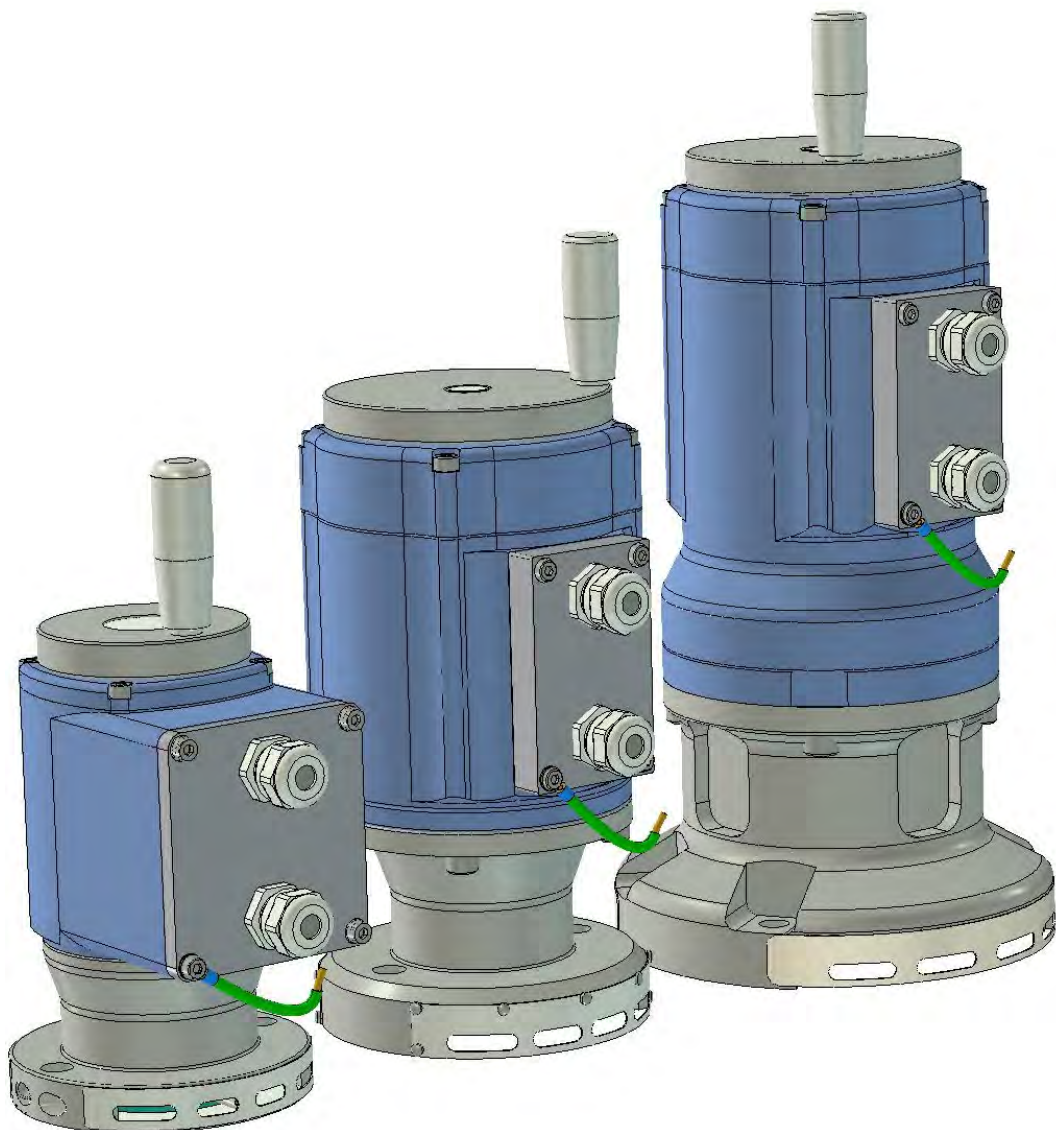


USER'S GUIDE INSTALLATION AND MAINTENANCE MANUAL

ODEN P50, P220, P500



1 CONTENT

- 1. Content..... 1
- 2. General information..... 2
- 3. Technical description..... 4
- 4. Mechanical installation..... 7
- 5. Electric connection 9
- 6. The calibration system..... 11
- 7. OVP – Oden Valve Program 13
- 8. Maintenance..... 15
- 9. Trouble shooting..... 16
- 10. Tips 18

- Appendix:
- Technical specifications
- Drawings
- Electrical connection

2 GENERAL INFORMATION

2.1 The Oden family of electric actuators

The Oden® family of electric actuators are made specifically for the process industry. The family consists of turning and linear actuators designed for the most demanding industry environments. The standard product line of electric actuators consists of five basic units in different sizes. These basic units, combined with turning or linear modules, or added gears can be used for regulation of most types of valves on the market.

Oden actuator characteristic:	Oden actuator features:
- High accuracy	- 24 V DC
- High gear efficiency	- Programmable by Oden Valve Program
- High reliability	- Automatic calibration
- Low weight	- Analogue or digital control
- Quick and easy to install	- Fits most valves on the market
- No maintenance required	

All the Oden electric actuators are programmable by the OVP (Oden Valve Program) software. The actuator is pre-programmed with default data, unless set to the specific customer demand prior to shipment.

2.2 Summary of Oden product range

2.2.1 Turning actuators

Turning actuators	P30R	P30EXR (ATEX)	P50R	P220R	P500R	P30G
Torque (Nm)	5-30	5-30	5-50	10-190	10-400	400-4500*)
Min. closing time 90° (s)	0,4	0,4	6,0	6,0	6,0	18-155*)
Precision (°)	± 0.5	± 0.5	± 0.1	± 0.1	± 0.1	- *)

*) *Dependant on gear size. Please contact Oden Control AB for more information.*

2.2.2 Linear actuators

Linear actuators	P30L	P30EXL (ATEX)	P50L	P220L
Force (kN)	3-12	3-12	4-16	6-40
Standard screw pitch (mm)	10	10	10	25
Speed (mm/min)	400	400	25	62

2.3 Terms concerning safety

It is of utmost importance that all users follow instructions on how to install, maintain and use this series of electric actuators. The safety terms DANGER, WARNING, CAUTION and NOTE are used in these instructions to point out particular dangers and/or providing additional information on aspects which are not readily apparent.

- DANGER: Indicates that death, severe personal injury and/or substantial property damage will occur if proper precautions are not taken.
- WARNING: Indicates that death, severe personal injury and/or substantial property may occur if proper precautions are not taken.
- CAUTION: Indicates that minor personal injury and/or property damage can occur if proper precautions are not taken.
- NOTE: Indicates and provides additional information, which may not be very obvious even to qualified personnel. Compliance with other, not particularly emphasized information, with regard to transport, assembly, operation and maintenance and with regard to technical documentation such as operating instructions, product documentation or on the product itself is essential, in order to prevent faults, which may directly, or indirectly cause severe personal injury or property damage.

2.4 Operation and safety instructions

In English:

Read carefully this manual before installation and operation as well as before maintenance. The actuator must only be used for controlling valves and similar applications. Incorrect use may harm the actuator. Hence, functions cannot be guaranteed. Local regulations concerning technical equipments must be observed at installing or maintenance. Warning texts must be followed and necessary steps to prevent accidents must be taken. This manual deals with the following types of Oden actuators: P50R/L, P220R/L and P500R.

In Swedish:

Läs noggrant denna manual före installation och idrifttagande liksom vid service av ställdonet. Detta ställdon får endast användas till att styra ventiler och liknande objekt. Felaktig användning kan skada ställdonet och därmed kan inte funktionen garanteras. Lokala bestämmelser beträffande teknisk utrustning måste följas vid installation och/eller underhåll. Varningstexter måste följas och nödvändiga åtgärder måste tas för att undvika olyckshändelser. Denna manual behandlar följande typer av Oden ställdon: P50R/L, P220R/L och P500R.

In German:

Bitte lesen Sie diese Manual genau bevor der Installation und in Betriebnahme. Gleichweise bevor Service von dem Antrieb. Dieser Antrieb darf nur benutzt werden für Steuerung von Ventilen und Gleichartigen Objekte. Falsche Verwendungen können dem Antrieb schaden und damit kann die Funktion nicht garantiert werden. Lokale Vorschriften betreffend die technische Ausrüstung muss bei Installation und/oder Unterhaltarbeiten beachtet werden. Warnungstexte müssen beachtet werden und notwendige Maßnahmen durchgeführt werden um Unglücke zu vermeiden. Dieses Manual behandelt folgende Type von Oden Antriebe: P50R/L, P220R/L und P500R.

In Finnish

Lue tarkkaan käyttöohje ennen asennusta, käyttöönottoa tai huoltoa. Tätä toimilaitetta saa käyttää ainoastaan venttiilien ja vastaavien kohteiden ohjaamiseen. Väärä käyttö voi vahingoittaa laitetta. Tällaisessa tapauksessa emme takaa virheetöntä toimintaa ja turvallisuutta. Toimilaitetta asennettaessa tai huollettaessa pitää noudattaa paikallisia säännöksiä jotka koskevat teknistä laitteistoa. Turvallisuus ja varoitustekstejä pitää noudattaa tarkasti jotta välttyttäisiin henkilövahingoilta ja toimilaitteen toiminta häiriöiltä: P50R/L, P220R/L ja P500R.

3 TECHNICAL DESCRIPTION

3.1 General

The Oden P50/P220/P500 module system consists of:

- Basic Unit
- Turning or linear module
- Valve adapter
- Connection board

Product	Basic Unit	Module	Remarks
P50R	P50BU	50R	Turning actuator
P50L	P50BU	50L	Linear actuator
P220R	P220BU	220R	Turning actuator
P220L	P220BU	220L	Linear actuator
P500R	P500BU	500R	Turning actuator

3.2 Basic unit

The basic unit has a sealed aluminium housing which includes a step-motor, a reduction gearbox, electronics and a connection board with a terminal block. The reduction gearbox is based on the patented Oden-principle and has a reduction ratio of 100:1. The hand-wheel at the top of the unit is engaged by pulling it out. Observe the warning sign and only use hand wheel in case of emergency when power is off.

The electronics with all its power and logical components are placed inside the unit, close to the motor. No batteries, potentiometers, limit switches or other sensitive electro-mechanical components are used. The step-motor is fed by 24 V DC. The control signal may either be analogue (4 – 20 mA) or digital (optional).

The actuator should not be placed in a control system with a feedback loop, i.e. the position signal (return signal) must not be reconnected to the control signal.

Cables for power and control signal should be connected through the cable inlets on the removable lid, which hold the connection board. The cables are not included in delivery. When selecting cables, choose one or two cables with shielding. The diameter of the cable/cables must be 4-10 mm. For more information and examples of suitable cables, see section 5.

All parameters such as torque, speed and working range are set by the OVP-software (Oden Valve Program). Features, such as automatic power calibration, automatic time calibration and the shut off function can be adjusted or disabled in OVP. The parameter settings in the software are stored in a permanent memory and cannot be lost even during an extended power failure. The current position will be automatically saved in a permanent memory during a power break. If the power break does not exceed 8 hours, any movement of the actuator will be detected and added to the position memory. This means that the hand wheel can be used without the risk of losing the calibration point at closed position. However, if the power break lasts more than 8 hours, the actuator will perform an automatic calibration when power returns. Go to section 6 for more information about calibration methods.

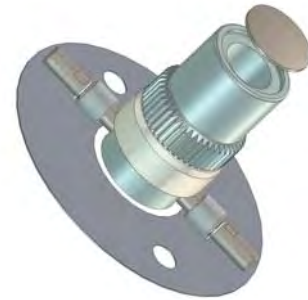
For specific product data, go to Appendix.

3.3 Turning module

The turning module consists of a gear wheel, working as an inner part of a gear coupling, and two indicator pins firmly fitted and locked by Loctite. The indicator pins function as rough visual valve position indicators as well as internal mechanical stops. A protection plate is placed on the valve flange adapter to reduce the risk of personal injury.

The turning module has to be machined to fit to the actual valve spindle. Normally it should have a round hole with a keyway, but also square or splined holes are common.

A sometimes better option is to use a tapered clamping sleeve. These make the installations quicker and easier.



3.4 Turning adapter kit

The valve adapter will vary depending on valve type. For the types P50R and P220R, the most common adapter consoles are just two long M12 screws going through the flange of the actuator, and through two round bars with holes. The screws are fitted to the threads on the valve flange.

3.5 Linear module

The unit consists of aluminium housing with a nut and a ball screw, a thrust bearing and a protective rubber bellows. The ball screw of the linear module has very little backlash and has a preloaded double row angle contact ball bearing which will take the high thrust forces.

The outer end of the screw, which is not rotating and just making a linear movement, has a clamping device which connects the valve spindle to the screw. This device has to be machined with the same thread as the actual valve spindle.

The clamping device is sliding along one of the two bars which have a flange fitted at their outer ends. The flange will vary depending on valve type.



3.6 Linear adapter kit

The linear adapter kit consists of:

- Two spindle adapters
- Flange adapter
- Two or three rods
- Screws
- Plastic bag with a written valve type name, for example "Masoneilan type XXX"

The flange adapter is machined to fit the actual valve flange and the rods have a specific length for the actual valve. The two spindle adapters have the same thread as the actual valve spindle.



3.7 Connection boards

Connection board A1 with analogue control is standard and included in delivery. There are other types of connection boards available for the P50, P220 and P500 units. Contact Oden Control for more information.

Standard connection board

The connection board is placed on the inside of the terminal lid, on the side of the actuator. The board has a terminal block with 6 inlets marked with text for 24 V DC and control signals. Next to the terminal block is a cable connector for the computer cable (see next section). A diode on the connection board protects the electronics from a polarity switch on the power inlets (24 V DC). However, the control signal inlets are not protected; make sure to follow the wiring instructions.

WARNING: 24 V DC at the control signal inlet will result in irrevocable damage to the electronics.

Optional connection boards

- Connection board A2: For analogue control with potential free connections
- Connection board B: For digital control
- Connection board C: For on/off control

3.8 OVP (Oden Valve Program) and Computer cable

At delivery the actuator is programmed with default values of torque, speed, and working range etc. These settings can be changed by using the OVP software (Oden Valve Program). The software can be installed from the CD delivered with the actuator or it can be downloaded from our website; www.odencontrol.se

To connect your computer to the RS-232 connector on the connection board you need a computer cable. The computer cable is optional and not included in delivery, if not separately ordered. Please contact your Oden dealer if you wish to order.

If your computer lacks a serial interface then you need an USB-Serial converter. This is a standard product and can be found with most computer accessory dealers.

For further information about OVP, go to section 7.

4 MECHANICAL INSTALLATION

The examples in this chapter should be regarded as guidance only. Actual installations may vary depending on the type of valve used. Some adapter consoles and screws might differ from those described below.

NOTE: *The manufacturers warranty will be void if the cover is dismantled.*

WARNING: *If the 24 V DC is connected during assembly or function control, the valve may move.*

4.1 Confirmation of delivered items

Please check that the delivery is complete according to the delivery specification:

- Basic Unit (P50, P220 or P500)
- Turning or linear module (50R/L, 220R/L, 500R)
- Product certificate
- User's guide
- CD including software OVP (Oden Valve Program)
- Computer cable RS232 (option)

4.2 Tools

- Allen keys (metric)
- Spanners (metric)
- Blade screwdriver
- Loctite blue 243

4.3 Installation of turning actuators

The following installation instruction refers to the standard turning module described in section 3. When using the tapered clamping sleeve leave out the section about machining the turning module. Contact Oden Control for more information.

Fitting of the turning module

1. Machine the turning module with the pins attached to a close fit to the valve spindle shaft and key. The keyway in the turning module must be machined in the correct position in relation to the indicator pins.
The figure show a 220R turning module machined to fit a valve spindle with a diameter of 25 mm and a keyway. Note the position of the keyway at 45° to the pins. For most valves the position of the key at the valve spindle is placed in 90° to the flow direction in the valve when the valve is closed.



NOTE: *When the valve is in closed position the indicator pins must be in 45° to the valve.*

2. After machining the keyway, clean the top surface of the turning module, put Loctite to the inside edge and place the washer with the convex surface turned outwards. Use a vice or a hand press to seal the turning module by deforming the washer.

NOTE: *The washer must be mounted in accordance to this instruction to meet IP67 regulations (warranty condition).*

3. Fit the valve flange adapter to the valve flange.



4. Check that the spindle length above the valve flange adapter is within A max and A min, see table on the right.
5. Move the valve to closed position.

NOTE: Some valve shafts change the axial position in the closed valve position.

6. Attach the protection plate to the valve flange adapter and then fit the turning module. Use a hand press or a similar tool to push it in position. The indicator pins should now be in 45° to the valve.

Type	A max (mm)	A min (mm)
P50R	52	20
P200R	79	30
P500R	114	50

The correct axial position of the turning module is important. The bottom surface of the turning module must be at the same level as the top surface of the protection plate when it is placed at the valve flange adapter. The tolerance should be 0 - +1.5 mm (above the protection plate surface).

NOTE: It is important to have a tight fit to the spindle and keyway in order to benefit from the accuracy of the actuator. Do not use a hammer, this can damage the valve spindle.

Fitting of the actuator

This instruction is written for the type of valve flange adapter shown above (two cylindrical bars with holes).

1. Remove the protection tape around the gear teeth of the turning module. Put the two long screws in the flange of the actuator, through the protection plate and the bars.
2. Put the actuator carefully in position by slightly turning it in both directions to get the gears in the spindle coupling in correct position to each other. An air cushion effect might prevent the mounting, but the air disappears after a while.
3. Use the hand-wheel smoothly to turn the actuator to the right position for the screws in relation to the valve flange threads.
4. When the valve is closed, check that there is a clearance of minimum 2 mm between the indicator pins and the mechanical stops in the Oden actuator. For ball valves with no mechanical stops in the valve, the closed position will of course be when the indicator pins hit the mechanical stops in the actuator.

Some models have threads in the mechanical stops in the actuator. If necessary, stop screws can be used as adjustable stops. It is important that these stop screws will hit the indicator pins at the same time. One stop pin cannot take the full load and a dangerous tilting load can harm the reduction gear in the actuator.

If you are using stop screws you will reduce the free working angle. There is a risk that the pins will hit the mechanical stops before the actuator has reached the maximum opened position (normally 20 mA). This must be avoided by reducing the programmed working range in OVP.

Mechanical control

The hand-wheel is engaged by pulling it out. Notice the warning label at the hand-wheel. Careless handling will damage the valve or the actuator. The hand-wheel must not be used when the power is on.

NOTE: The hand-wheel moves in the opposite direction to the valve.

Please, check that the actuator can be operated easily by hand within the whole working range. The valve must be closing completely. It should be running smoothly. If not: loose the adapter screws and let the unit centre itself, then tighten alternately the screws. If the actuator is horizontal, relieve the weight of the actuator manually during alternately tightening of the screws.

It is not necessary to align the Oden actuators to the valve by using shims. For other types of actuators this alignment process is difficult and you easily get an uncontrolled loading to the valve spindle bushings and the gland sealing. Hence the Oden actuator significantly improves the lifetime of the valve.

4.4 Installation of linear actuators

1. Check that the spindle adapter has the same thread as the valve spindle.
2. Fit the linear module with its rods and adapter flange to the valve flange.

3. Put the valve spindle in maximum opened position. Fit the valve spindle to the ball-screw by the spindle adapter.
4. Check by rotating the gear coupling in the linear unit that it runs smoothly in whole working range and that there is a small guiding play between the spindle adapter and the rod.
5. Fit the Basic Unit to the linear unit by the enclosed screws and washers.

NOTE: Check that the set working range in OVP is within the mechanical working range of the linear module.

5 ELECTRIC CONNECTION

5.1 Cable connection

1. Remove carefully the terminal plate and disconnect the ribbon cable.
2. Put the shielded cables through the cable inlets and connect the wires to the terminal block at the connection board.
3. The cable shield should be connected to the cable inlets which are grounded to the actuator housing. Note that the cable shield should only be fitted to the grounded cable inlets. Not in the free end of the cable.
4. Connect the ribbon cable to the connector. Do not force it in the wrong way.
5. Check that the voltage is 24 V DC, and that the wires are correctly connected to the terminal block.
6. Connect the ground cable from the terminal plate to a suitable ground point on the valve or equivalent.
7. For more information about electric wiring, go to Appendix.

DANGER: The cable between the actuator and your connection terminals must be clamped (fixed installation).

DANGER: Check that the voltage is 24 V DC, and that the wires are correctly connected to the terminal block.

NOTE: Do not connect the cable shield(s) to ground in the free end of the cable(s).

NOTE: Do not twist the cable(s) in the cable inlet(s).

NOTE: If only one cable inlet is used, the other one must be plugged by the enclosed rubber washer (warranty condition).

5.2 Voltage drop

If a long cable is used between the power source and the actuator you need to calculate the voltage drop. You may use either:

- One shielded cable with six conductors (wires) or
- One cable for the power with two conductors and one shielded signal cable with four conductors.

The maximum power peak current:

- P50: 3 A
- P220: 4 A
- P500: 6 A

Use a cable which gives a voltage drop of max 2V. A bigger drop will reduce performance and may affect the function of the electronics. When calculating the drop - do not forget that the calculating length is twice the length of the cable.

It is possible to compensate for the drop by raising the voltage at the power source. However, be careful not to exceed 28 V at the terminals on the connection board

The return (position) signal circuit should be loaded by about 250 ohm (max 350 ohm).

5.3 Choice of cable

Some tips concerning choice of cable:

- Helukabel TRONIC-CY is a shielded cable of good quality for fixed installation in the temperature range -20° - $+60^{\circ}$.
- Helukabel No. 16479 has 6 conductors with each 1 mm² cross-sec.

A 10 m cable of that type gives a voltage drop for Oden P220 (4 A) of about 1,5V.

- Helukabel No. 16504 has 6 conductors with each 1,5 mm² cross-sec.

A 10 m cable of that type gives a voltage drop for Oden P220 (4 A) of about 1V.

For very long distance (more than 20 m) we suggest using two cables, one for power and one for signals.

- For the power Helukabel No. 16502 has 4 conductors with each 1,5 mm² cross-sec. Using two conductors in parallel will reduce the drop.

Use reduction pins for wire with cross-sec > 1 mm² to fit to the inlets of the terminal block.

The cables recommended above can be used in dry, moist and wet rooms but not suitable for open air. For extreme outdoor environments use a protective hose or choose a cable with UV protection.

6 THE CALIBRATION SYSTEM

To calibrate the actuator/valve-system means to find the closed valve position which corresponds to the closed position of the control signal, normally 4 mA. The Oden calibration system PC/PC means Power Calibration / Position Calibration. Which type of the two calibration methods you will use depends on the application.

The position value will be automatically saved to a permanent memory during a power failure, see 6.3 Summary of calibration methods. The position value will never be lost even during a long period of a power failure. If the valve position has been changed during a power failure, the motion will be detected and added to the saved value. This detection occurs during max. 8 hours after a power failure. When the power returns, an automatic calibration will be performed (only if the last calibration was a Power Calibration).

6.1 Power calibration

Automatic Power Calibration

An automatic Power Calibration is carried out every time the valve reaches its closed position. If the valve remains in closed position, this sequence will be repeated every 20 minutes. The electronics will remember the calibration position even after more than 8 hours power failure. When the 24 V DC power has returned, a new automatic calibration (Power Calibration) will be carried out automatically. This function as well as the 20-minutes calibration routine can be disabled (Oden Valve Program)

The reason for this routine is to make sure that the valve is in its closed position and reducing the risk of jamming. Valves may jam depending on a change in the ambient temperature distribution in the valve. This automatic 20-minutes calibration will avoid such problem.

If more than eight hours of power down has elapsed an automatic calibration will be carried out when the power returns. The calibration will last about 5 seconds. After calibration the actuator will respond to a control signal if present. The maximum opening angle, starting from this closed position, is either set by default or by the customer in the OVP software. The Power Calibration will be carried out with 80 percent of the programmed control torque.

Manual Power Calibration

If you for some reason want to perform a calibration within 8 hours after a power failure or for any other reason, please do as follows:

1. Disconnect the power, 24 V DC.
2. Short-circuit the pins TD and RD at the RS 232-connector.
3. Put on the power 24 V DC. The actuator will now make a calibration. When ready, the actuator is moving to the control signal position.
4. Remove the short-circuit of TD and RD.

Similar to Automatic Power Calibration, the maximum opening angle, starting from this position, is either the default-value or a new setting from OVP. Note that a manual Power Calibration can also be done from the OVP.

6.2 Position calibration

We recommend using Position Calibration if you require programmed control force/torque, but the valve has no mechanical stop or is too sensitive to stand the torque/force of the Power Calibration. You are manually setting the calibration position and the maximum opened position with the Position Calibration.

Please do as follows:

1. Disconnect the power, 24 V DC.
2. Check that there is no computer connection to the RS232 connector.
3. Move the valve manually to closed position.

4. Remove any connections to the terminal block inlet number 3 and 5 (+IN and +OUT) on the connection board.
5. Short-circuit terminal number 3 and 5 (+IN and +OUT).
6. Put the 24 V DC power on.
7. The actuator will now remember this position as the calibration position and starts opening the valve.
8. When the valve has reached the requested maximum opened angle position, quickly remove the terminal short-circuit.
9. The actuator will immediately stop and remember this position as the maximum opened angle value.
10. Reconnect the control and position signal conductors (+IN and +OUT).

The calibration values are stored in permanent memory in the electronics. No automatic new calibration will be performed after more than 8 hours power break. As a result, the actuator will not react to any control signal until a new Position Calibration (or a Power Calibration) is carried out. No automatic calibration or 20-minutes calibration will occur in closed position. Note that it is possible to make adjustments of the working range in the OVP software after a Position Calibration.

6.3 Summary of calibration methods

Type of calibration	Automatic/Manual	Description
Power Calibration	Automatic	Automatic start of Power Calibration: <ul style="list-style-type: none"> - When power return after >8 hours - Every 20 minutes in closed position.
Power Calibration	Manual	Manual start of Power Calibration: <ul style="list-style-type: none"> - By short circuit TD and RD in the RS232-connector - In OVP
Position Calibration	Manual	Manual setting of the calibration position and the maximum opened position.

The maximum range for the automatic permanent saving of the position value at a power break is 12,000 degrees (33 turns) for turning actuators and 330 mm (with a screw pitch of 10 mm) for linear actuators.

If any of these ranges have been extended by making a change in the password protected Supervisor menu in OVP no saving occurs. Then you have to maintain the calibration point by continuously power the actuator for example by an UPS (Uninterrupted Power Supply) Please contact Oden Control AB for more information.

7 OVP – ODEN VALVE PROGRAM

The Oden Valve Program, OVP, can be used to change the default settings of torque, speed, working range etc. However, it is not required for operating the actuator. If the default values are adequate for your application, it is not necessary to use the software. A list of default values can be downloaded from our website.

The actuator parameters can easily be changed by any of these two methods:

- making the changes interactively in the program with the actuator connected to the PC
- remotely on a separate PC by saving the changes in a data file and later loading them to the actuator when it is connected to the PC

The software communicates with all Oden[®] actuators, using the RS-232 interface. The available languages are Swedish, Danish, English and German. The OVP runs on any PC with Windows 98 and later versions. If your computer is lacking a serial port, you need a converter from RS232 to USB. This is a standard product and can be found with most computer accessory dealers. Latest version of OVP is available on our website: www.odencontrol.se

7.1 Main menu

The main menu of OVP contains check buttons for actuator type and language. Real-time information about any connection to the actuator is shown in the top of the window. A connection is established when dots flash in red (otherwise in green). At the bottom of the window, information about the installed program version can be found. Check that you have the latest version.

7.2 Parameter settings

To change settings in real-time the computer cable has to be connected to the computer/connection board. Check that OVP can detect connection with the actuator (red flashing dots).

It is possible to program a new set of parameters and submit the values later. In that case, check that the computer cable is removed from the computer/connection board and that the dots flash in green in the OVP window. To save new settings, use the “Save data” button. The data is saved in a file which can be opened later when the actuator is connected.

If you wish to restore the parameter values to default, there is a “Default” button on the bottom of the window in OVP.

WARNING: *When the actuator is connected, a change of a parameter in OVP will be carried out instantly.*

A list of the changeable parameters and OVP functions follows;

- **Valve closing direction**
Sets closing direction. Viewed from the actuator towards the valve. Default - clockwise.
- **Loss of control signal**
Decides what happens when control signal is lost. Actuator will open, close or stand still. Default is "unaffected".
- **Control torque / force**
Sets max. torque/force delivered during regulation.
NB The actuator will only use as much torque as necessary to maintain the regulation.
- **Signal level at closed valve**
Default 4 mA.
- **Power Calibration.**
A process to find the closed valve position.
If the connection to the actuator is lost after power calibration (green flashing light), exit OVP and reload the program.

WARNING When performing a power calibration, the Automatic Power Calibration function is activated. To avoid automatic power calibration, the check box must be changed to “No”

- **New Automatic Power Calibration after > 8 hours power loss**
Two choices: Yes (default) or No.
- **Max. Opening angle /maximum stroke**
Sets of the working range.
- **Spindle type**
Used for linear applications and describes thread direction.
- **Signal level at max. opening**
The highest signal value at fully opened valve, default 20 mA.
- **Speed**
Sets operating speed.
- **Acceleration**
Sets acceleration in a relative value. Reduce acceleration if there is any risk for dangerous pulsation of the flow.
- **Shut-off**
When the valve is near its closed position, cavitations may occur which will damage the valve. When reaching the programmed "shut-off"-% value (% of the working range), the actuator continue to the closed position. Therefore, there will be a delay before reacting to the control signal when opening from closed position. Default is 5%.

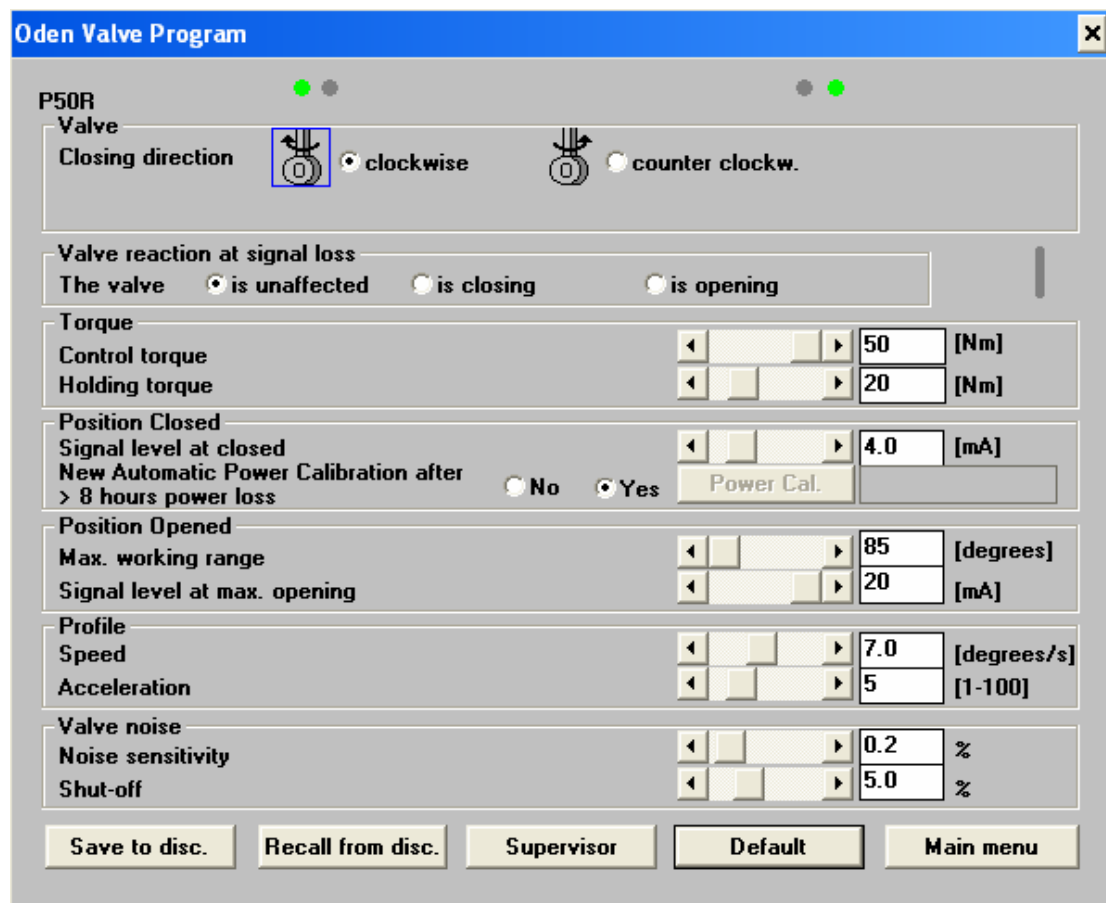


Figure: Example of the OVP interface.

8 MAINTENANCE

Control and function test should be carried out only in every three years. In case of heavy loads of the actuator (and the valve) the intervals should be shorter. The Oden actuator gears and the bearings are lifetime greased and need no service.

8.1 Check points

Electronic contact control

Control and clean the surfaces in the terminal blocks at the connection board.

Torque control

With the OVP software, it is possible to control the condition of the valve by slowly increasing the control torque/force until the actuator starts moving. You can then notice a change in valve bearing condition. The results of these controls can be written down in the notepad in the saved OVP data file.

CAUTION: This test must be done with the gland nuts slightly released, because these will affect the torque.

Calibration control

Perform a new PC/PC-calibration.

Positioning control

Position the valve near the middle of the working range. Increase the control signal very slowly until the valve spindle starts to move. Read the mA-value. Decrease the control signal very slowly until the valve spindle starts to move in the other direction. Read the mA-value. The signal difference is a measure of the “control backlash” of the system (positioning accuracy).

First check that it is no mechanical backlash in the coupling between the valve spindle and actuator. It is possible to measure the valve motion by using an indicator clock against a pin fitted to one of the free M10 threads in the clamp collar (turning valve). A common cause for backlash is that the spindle adapter is not properly fixed to the valve spindle.

Note that in some applications most of the total mechanical backlash in the system is eliminated by the media in the pipe system which will give a torque/force load at the valve spindle always in the same direction. Hence, this test should be performed on a normally pressurised system. Some valves have high internal friction. In such valves the backlash will have a direct influence on the positioning accuracy.

9 TROUBLE SHOOTING

When problems occur, begin with checking that the unit is correctly mounted and that the parameter settings are suitable for the application. If you have trouble with older installations, it is often related to the valve. Check that the valve is not jammed or blocked for some reason.

9.1 Mechanical problem

The interface between the actuator and the valve can cause problems depending on the lack of standards for valve flange and spindle. Oden Control can offer adapters for almost all types of valves. It is important to check that the right adapter is used. Check that the right valve closing direction, torque, speed and working range have been chosen.

If the actuator hits a mechanical stop in max opened position (normally 20 mA) and the return signal is changing to error signal (2 mA or 22 mA), check that the valve is in closed (calibration) position at 4 mA (normally setting). Verify that the working range setting in OVP is correct. It is important that this working range is smaller than the maximum mechanical moving range in the valve.

9.2 Control problem

If the actuator does not react on a control signal, please do as follows:

1. Check power, 24 V DC \pm 15%.
2. Check that there is a control signal reaching the actuator.
3. Note that the shut off function closes the valve if the control signal is lower than 5% of the working range. This means that the actuator will not react on a control signal within this range.
4. Remove the terminal lid carefully without disconnecting the ribbon cable.
5. Check the LEDs (light diodes).
 - If no LED is activated, check the power, 24 V DC.
 - If the red LED is activated, break the power and wait a few seconds before restoring power (24 V DC).
 - If the green LED is activated, perform a manual power calibration. If there still is no reaction to the control signal, the valve might be blocked or jammed. If the valve is blocked, the position signal (return) will go to 2 mA (default).
6. If the green LED is activated and measures made as described above, but still nothing happens, connect the computer to the RS 232 connector. Start the OVP software and do the following:
 - Check that the OVP Software is in contact with the actuator (red flashing warning).
 - Check that the right type of actuator is chosen.
 - Open the sub menu and check the parameter settings.
 - Calibrate by activating Power Calibration (a warning pops up if the last calibration was a Position Calibration).
 - Press default button to restore the actuators default settings.
7. Still nothing happens. → The actuator may be in a Power Calibration routine which has been interrupted. Perform a short range Position Calibration to break the ongoing Power Calibration. Then perform a new Manual Power Calibration. NB You need a mechanical stop.

9.3 Blocked valve

If the return signal is 2 mA (default) and the actuator does not react on a control signal the valve is probably blocked. Some common reasons for blockage;

1. The necessary torque/force for the valve is not provided by the actuator. Check the setting in OVP. NB For a certain speed, use the maximum torque/force acceptable according to the valve specification. This gives margin to handle increased torque/force valve demands in the future. See point 3 below.
2. The working range is set to a higher value than the actual possible working range. Check the setting in OVP.
3. The valve has a too hard preloading of the valve gland sealing, bad valve bushings or corroded valve spindle.

To find out if the valve is blocked, one method is to give the actuator a control signal of 10 mA. Then decrease the control signal to 7 mA and thereafter increase to 13 mA. If the actuator starts vibrating for a few seconds and then stops, this indicates a blocked valve.

Another method is to break the power and manually operate the valve to find out if runs smoothly within the working range. If not, the actuator needs to be removed and the necessary torque for moving the valve should be measured and compared to the setting in OVP.

9.4 Calibration problem

If the valve is not closing properly after a Power Calibration the reason may be that the calibration torque/force is not high enough. By default the calibration torque/force is about 80 % of the control torque/force value set in OVP. If possible increase the control/force setting in OVP. If this is not possible, please contact your Oden representative.

9.5 OVP problem

OVP can not connect to the actuator:

1. Check that you have the data cable connected to the connection board and computer port and that the port is logical opened. If you are using an USB-serial adapter, try to direct it to USB port number 3.
2. Check that you have 24 V DC to the actuator.

Note that when performing a Power Calibration from OVP the connection to the actuator may be lost. If so, exit OVP and enter again. This is a normal behaviour.

10 TIPS

- If you have any control problem, please go to chapter Trouble shooting. If you still have problem please contact Oden Control AB.
- When using OVP always check that you are using the latest version. which can easily be downloaded from our website: www.odencontrol.se
- All parameter settings in OVP are stored in a permanent memory in the electronics. That means that your settings will not be affected if the electronics is upgraded with latest software version at service. Note that maximum range for the automatic permanent saving of the position value at a power break is 12,000 degrees (33 turns) for turning actuators and 330 mm (with a screw pitch of 10 mm) for linear actuators.
If the limit of the working range has been exceeded, by entering the password protected Supervisor menu in OVP, no saving occurs. To maintain the calibration point for an extended working range, you will need to continuously power the actuator, for example by an UPS (Uninterrupted Power Supply). Please contact Oden Control AB for more information.
- Concerning your choice of cable, check that the voltage at the actuator is within 24 V DC +/- 15% when the actuator is running. Too low voltage will reduce the output torque of the actuator and may affect the electronic function.
- There are options concerning other types of spindle adapters. Tapered clamping sleeves are alternatives to the traditional method. These sleeves make the installations quicker and easier. Please ask for more specific information.
- If you want to control the actuator locally, close to the actuator, please ask for more specific information.
- There are options concerning different types of turning and linear units which are not mentioned in this manual. Please ask for more specific information.
- Visit our website: www.odencontrol.se for more information. The latest versions of manuals and drawings can be downloaded from this website.

Oden Control AB

Herserudsvägen 5

181 34 Lidingö

Sweden

Phone: (+46) 8 767 76 57

Fax: (+46) 8 767 04 17

E-mail: oden@odencontrol.se

Web: www.odencontrol.se

Electric turning actuators

Parameters	P30R	P30EXR	P50R	P220R	P500R	P30G
Type of actuator	Turning high speed	Turning high speed ATEX	Turning	Turning	Turning	Turning with added gear
Torque [Nm]	5-30	5-30	5-50	10-190	10-400	400-4500
Min. closing time 90° [s]	0,4	0,4	6 ¹⁾	6 ¹⁾	6 ¹⁾	- ³⁾
Working range [turns]	33 (160 ²⁾)	33 (160 ²⁾)	33 (160 ²⁾)	33 (160 ²⁾)	33 (160 ²⁾)	- ³⁾
Precision [degrees]	± 0.5	± 0.5	± 0.1	± 0.1	± 0.1	- ³⁾
Sealing	IP68	IP68	IP67	IP67	IP67	IP68/65
Surrounding temp. [°C]	-20+60	-20+60	-20+60	-20+60	-20+60	-20+60
Installation in all directions	Yes	Yes	Yes	Yes	Yes	Yes
ATEX-certified	No	Yes	No	No	No	No/Yes
Weight [kg]	3	3	5	8	13	9-94

Electrical data	P30R	P30EXR	P50R	P220R	P500R	P30G
Type of motor	Brushless	Brushless	Step	Step	Step	Brushless
Voltage [VDC]	24 ± 15%	24 ± 15%	24 ± 15%	24 ± 15%	24 ± 15%	24 ± 15%
Max. power [W]	200	200	70	120	160	200
Average power [W]	100	100	35	60	80	100
Max. current [A]	8	8	3	5	7	8
Average current [A]	2	2	1	2	3	2
Analogue control [mA]	4-20	4-20	4-20	4-20	4-20	4-20
Digital control	No	No	Option	Option	Option	No
Return (position) signal [mA]	4-20	4-20	4-20	4-20	4-20	4-20

Material data	
Aluminium servo housing	SS 4212-06, blue anodizing
Aluminium components	SS 4212-06, black anodizing
Steel components	SS 2346, SS 2333

¹⁾ Speed depending on chosen torque.

²⁾ UPS needed.

³⁾ Parameters depending on chosen size of gear.

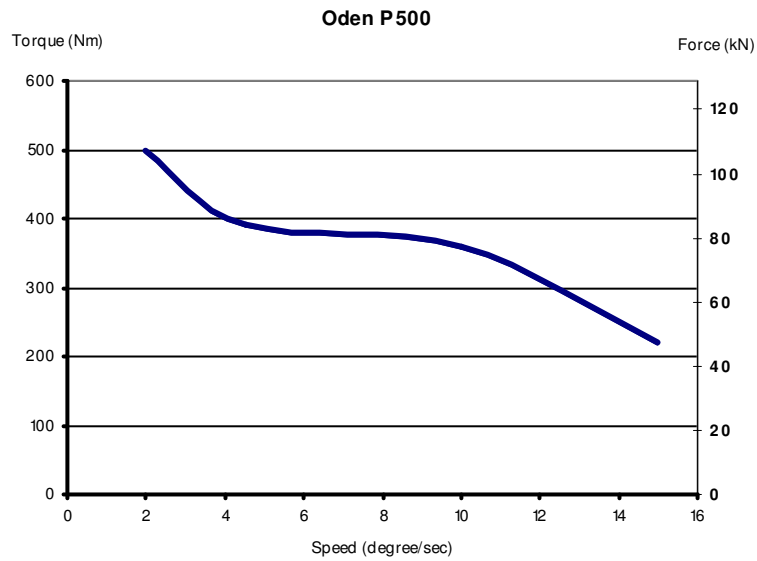
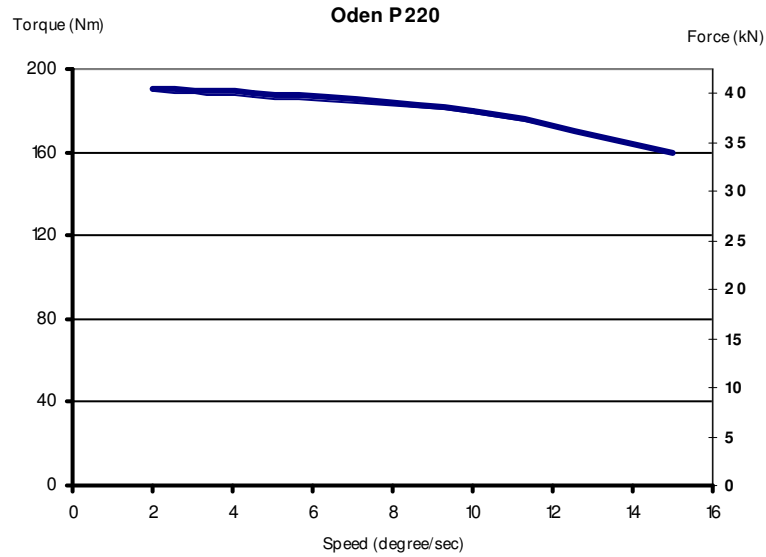
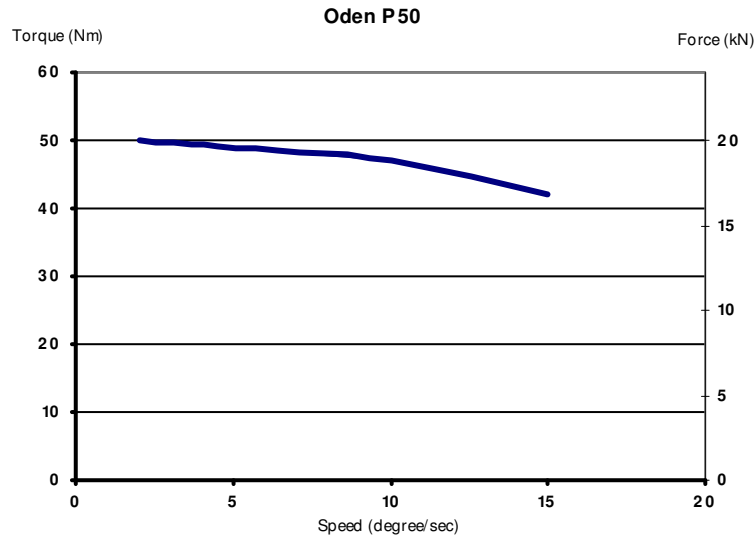
Electric linear actuators

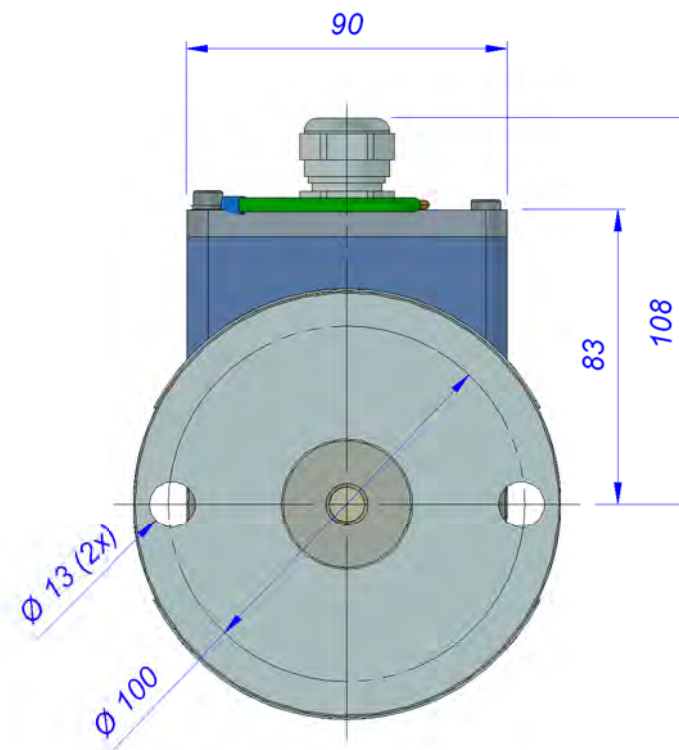
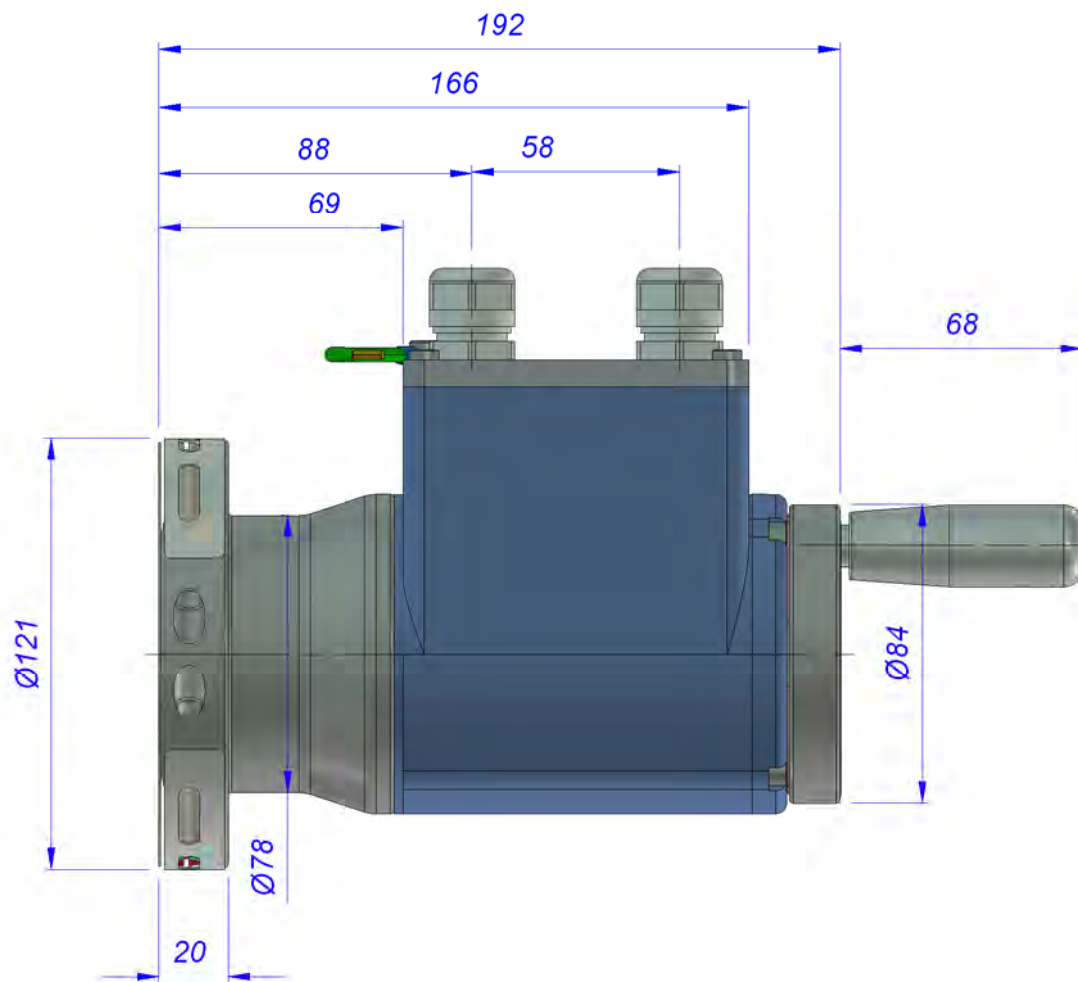
Parameters	P30L	P30EXL	P50L	P220L
Type of actuator	Linear high speed	Linear high speed ATEX	Linear	Linear
Force [kN]	3-12	3-12	4-16	6-40
Standard screw pitch [mm]	10	10	10	25
Speed [mm/min]	400	400	25 ¹⁾	60 ¹⁾
Working range [mm]	330 (1600 ²⁾)	330 (1600 ²⁾)	330 (1600 ²⁾)	330 (1600 ²⁾)
Precision [mm]	± 0.10	± 0.10	± 0.15	± 0.20
Sealing	IP67	IP67	IP67	IP67
Surrounding temp [°C]	-20 – +60	-20 – +60	-20 – +60	-20 – +60
Max standard stroke [mm]	40/100	40/100	40/100	100
Installation in all directions	Yes	Yes	Yes	Yes
ATEX-certified	No	Yes	No	No
Weight (kg)	7	7	9	14

Electrical data	P30L	P30EXL	P50L	P220L
Type of motor	Brushless	Brushless	Step	Step
Voltage [VDC]	24 ± 15%	24 ± 15%	24 ± 15%	24 ± 15%
Max. power [W]	200	200	70	120
Average power [W]	100	100	35	60
Max. current [A]	8	8	3	5
Average current [A]	2	2	1	2
Analogue control [mA]	4-20	4-20	4-20	4-20
Digital control	No	No	Option	Option
Return (position) signal [mA]	4-20	4-20	4-20	4-20

Material data	
Aluminium servo housing	SS 4212-06, blue anodizing
Aluminium components	SS 4212-06, black anodizing
Steel components	SS 2346, SS 2333

1) Speed depending on chosen force.
2) UPS needed.





Oden Control AB

Nilstorpsvägen 53 181 47 Lidingö, Sweden
 Phone +46-8-767 76 57 Fax +46-8-767 47 18
 E-mail oden@odencontrol.se www.odencontrol.se

Title

P50R
 turning actuator
 (ID1-drawing)

Dat./rev.nr

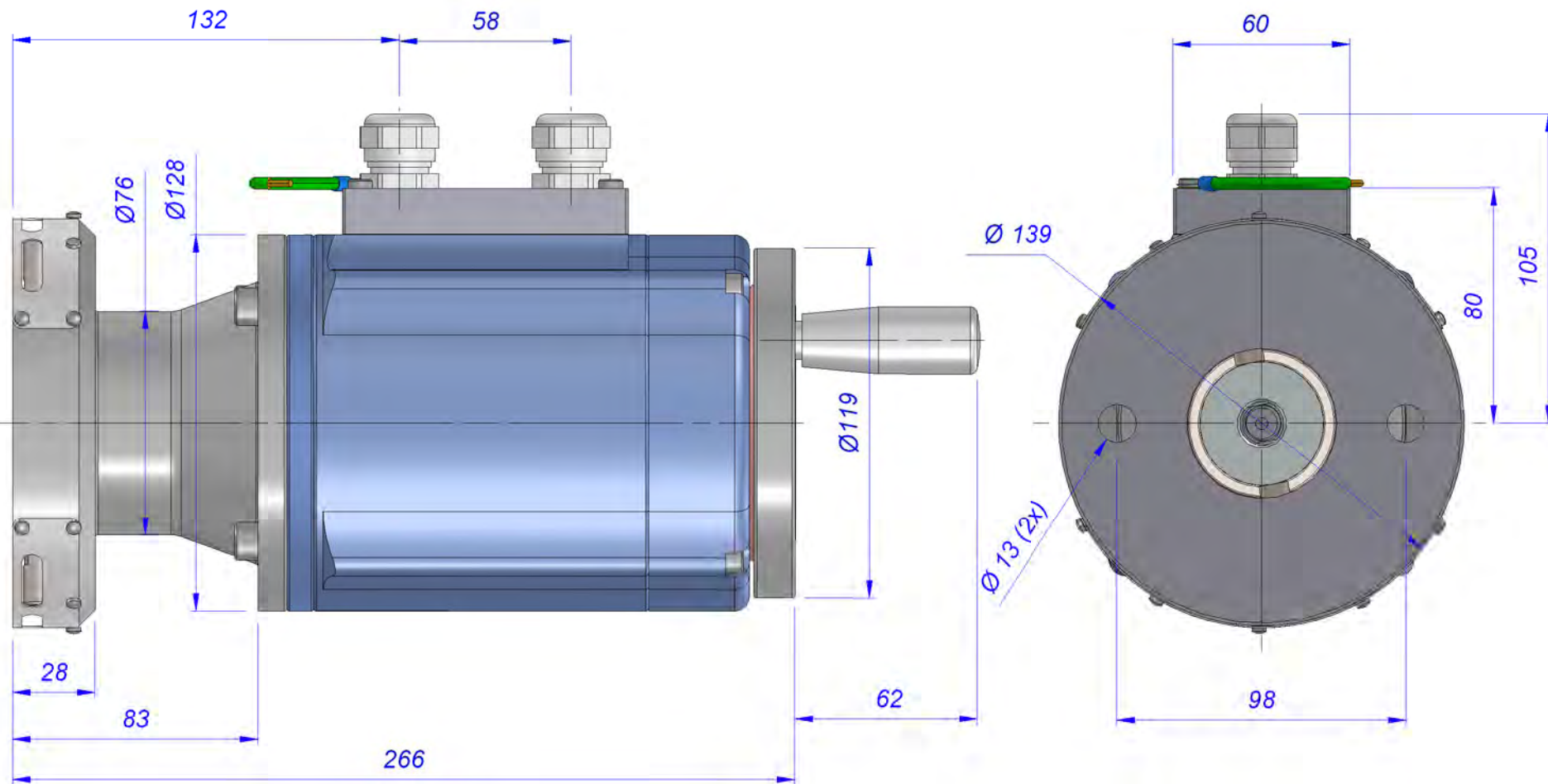
2006.06.12

Sheet

1

Doc.Nr

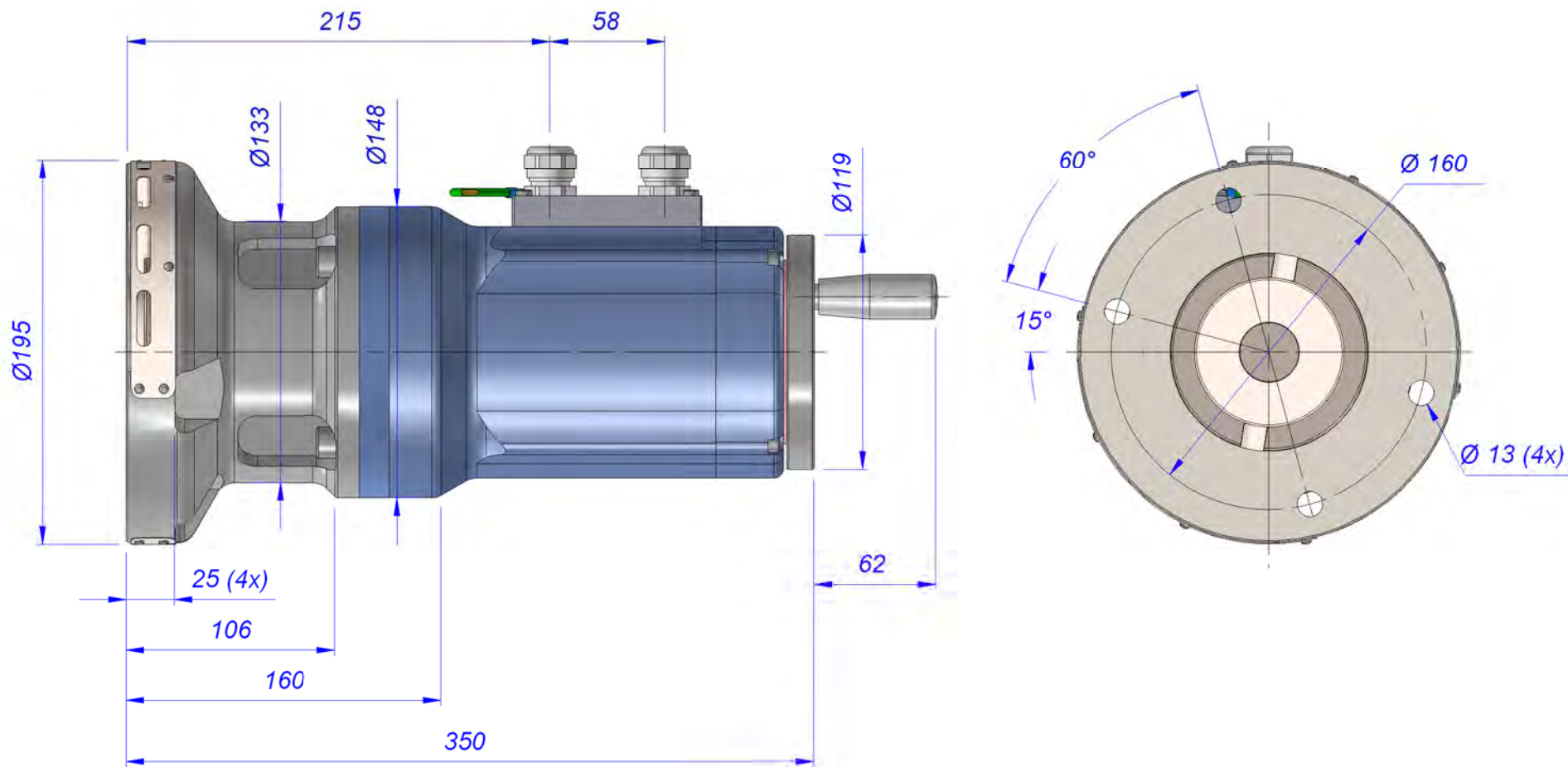
P50.011



Oden Control AB
 Nilstorpsvägen 53 181 47 Lidingö, Sweden
 Phone +46-8-767 76 57 Fax +46-8-767 47 18
 E-mail oden@odencontrol.se www.odencontrol.se

Title
P220R
 turning actuator
 (ID1-drawing)

Dat./rev.nr	2006.06.12
Sheet	1
Doc.Nr	P220.021



Oden Control AB

Nilstorpsvägen 53 181 47 Lidingö, Sweden
 Phone +46-8-767 76 57 Fax +46-8-767 47 18
 E-mail oden@odencontrol.se www.odencontrol.se

Title

P500R
turning actuator
 (ID1-drawing)

Dat./rev.nr

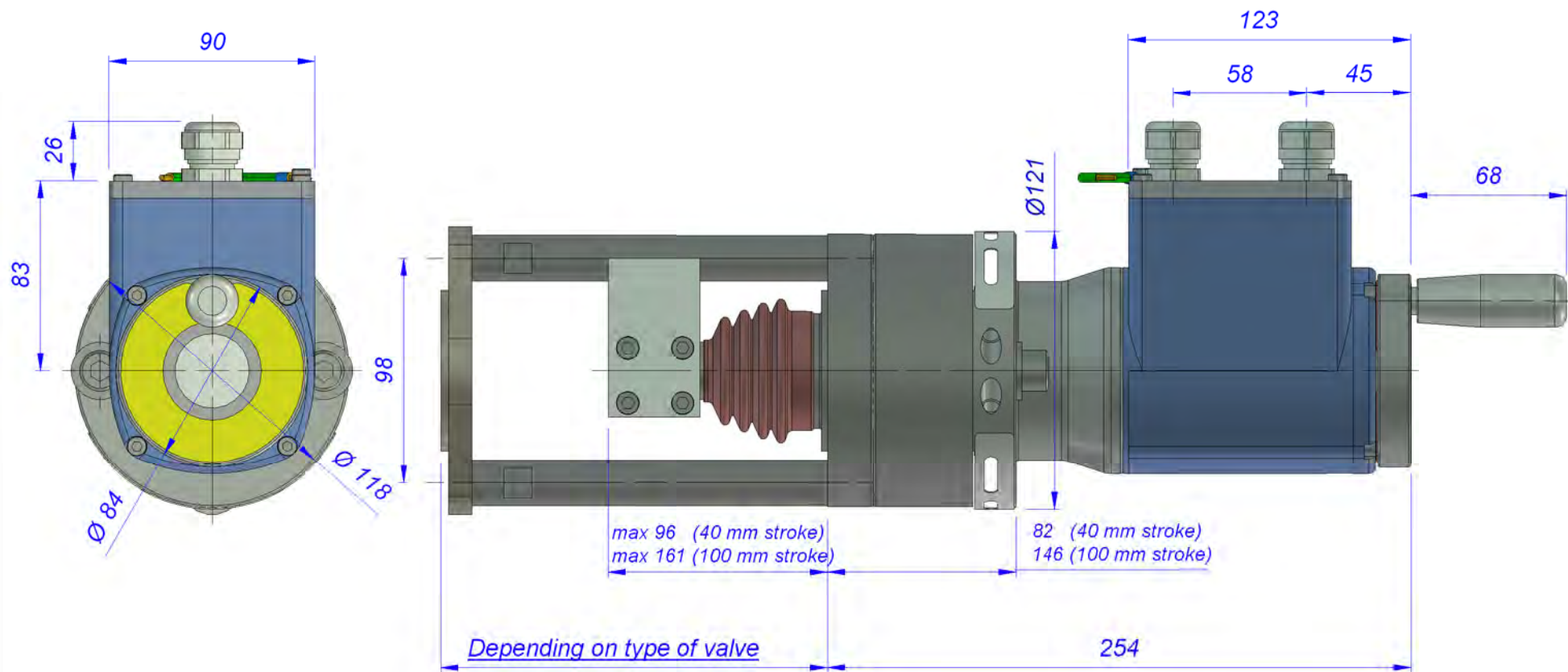
2006.06.12

Sheet

1

Doc.Nr

P500.021



Oden Control AB

Nilstorpsvägen 53 181 47 Lidingö, Sweden
 Phone +46-8-767 76 57 Fax +46-8-767 47 18
 E-mail oden@odencontrol.se www.odencontrol.se

Title

P50L
linear actuator
(ID1-drawing)

Dat./rev.nr

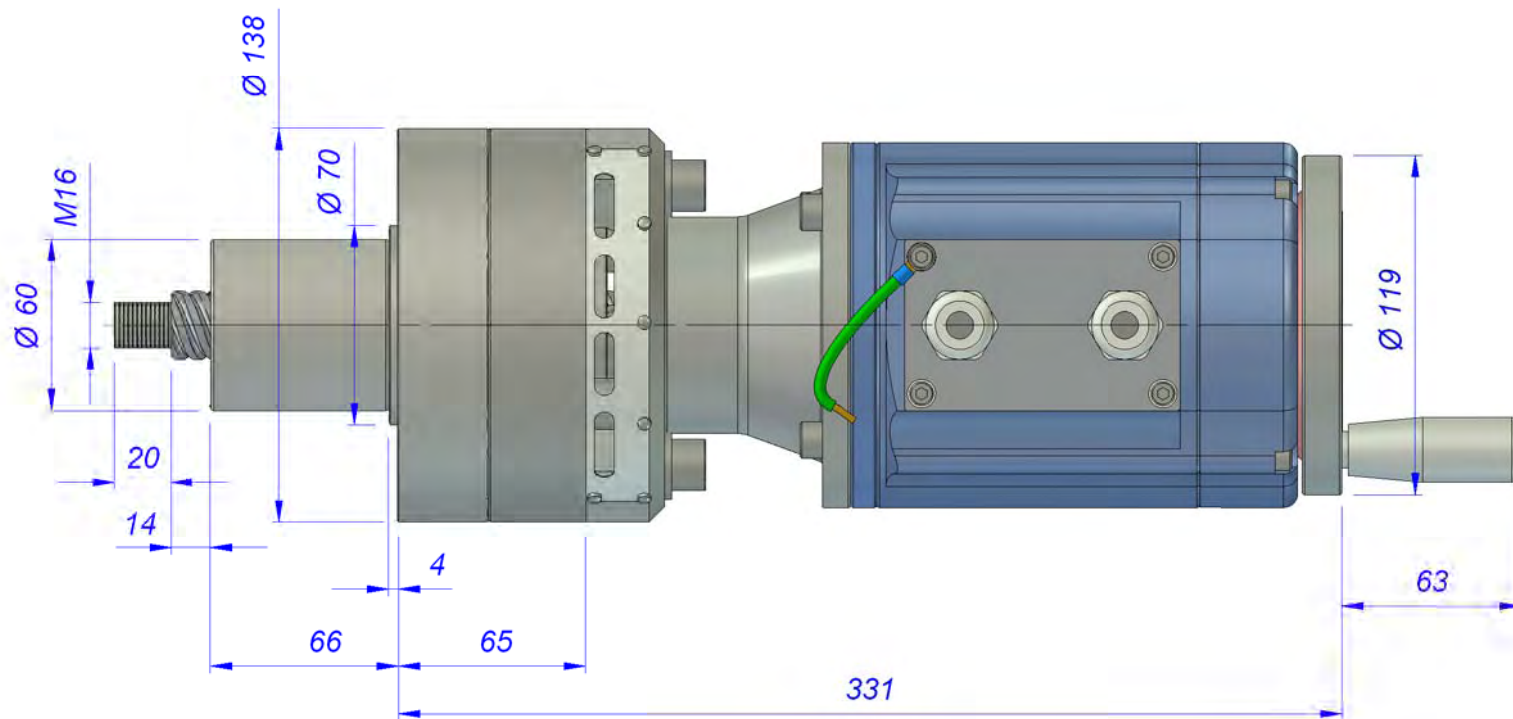
2006.06.15

Sheet

1

Doc.Nr

P50.021



Oden Control AB

Nilstorpsvägen 53 181 47 Lidingö, Sweden
 Phone +46-8-767 76 57 Fax +46-8-767 47 18
 E-mail oden@odencontrol.se www.odencontrol.se

Title

P220L
linear actuator
(ID1-drawing)

Dat./rev.nr

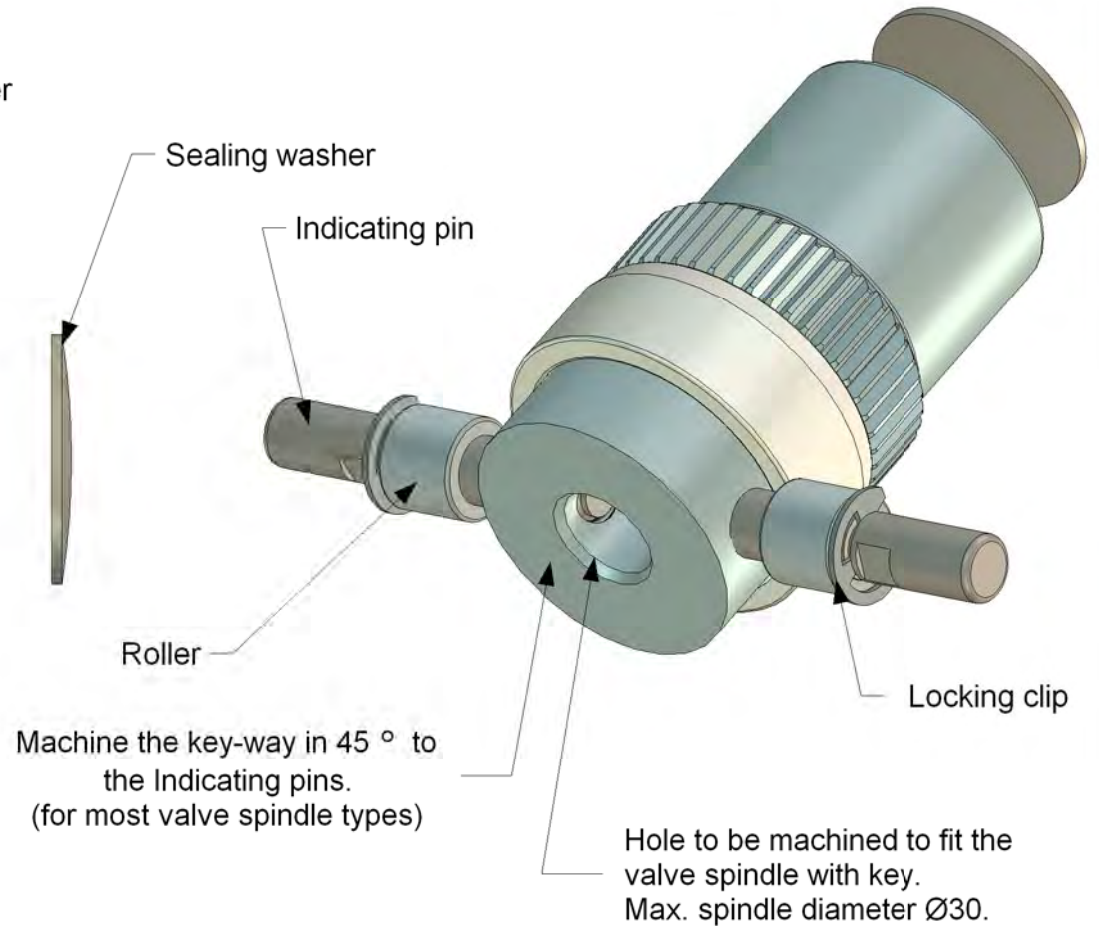
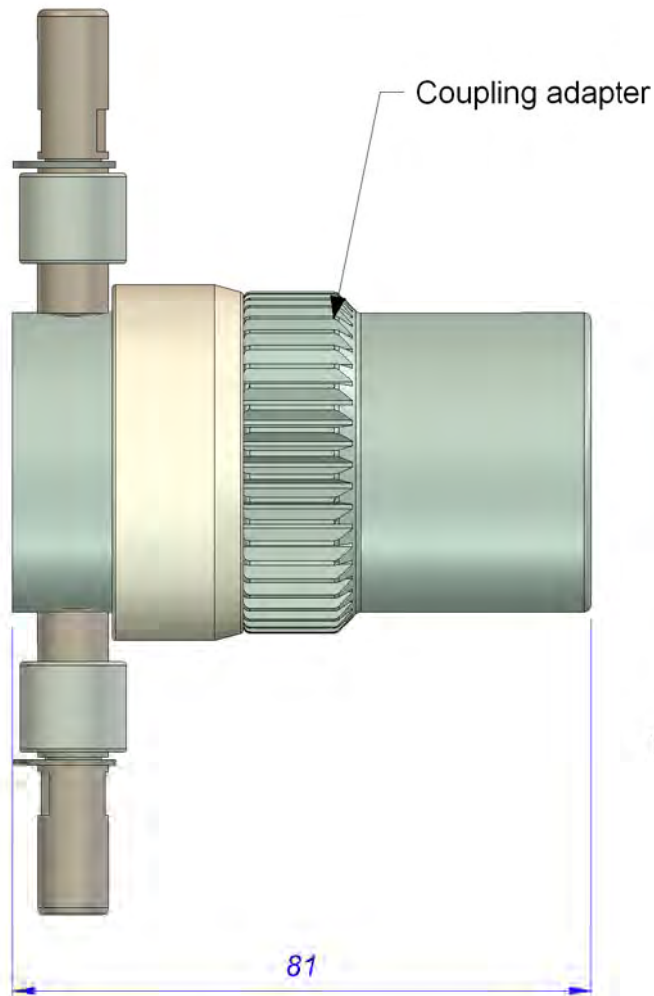
2006.06.13

Sheet

1

Doc.Nr

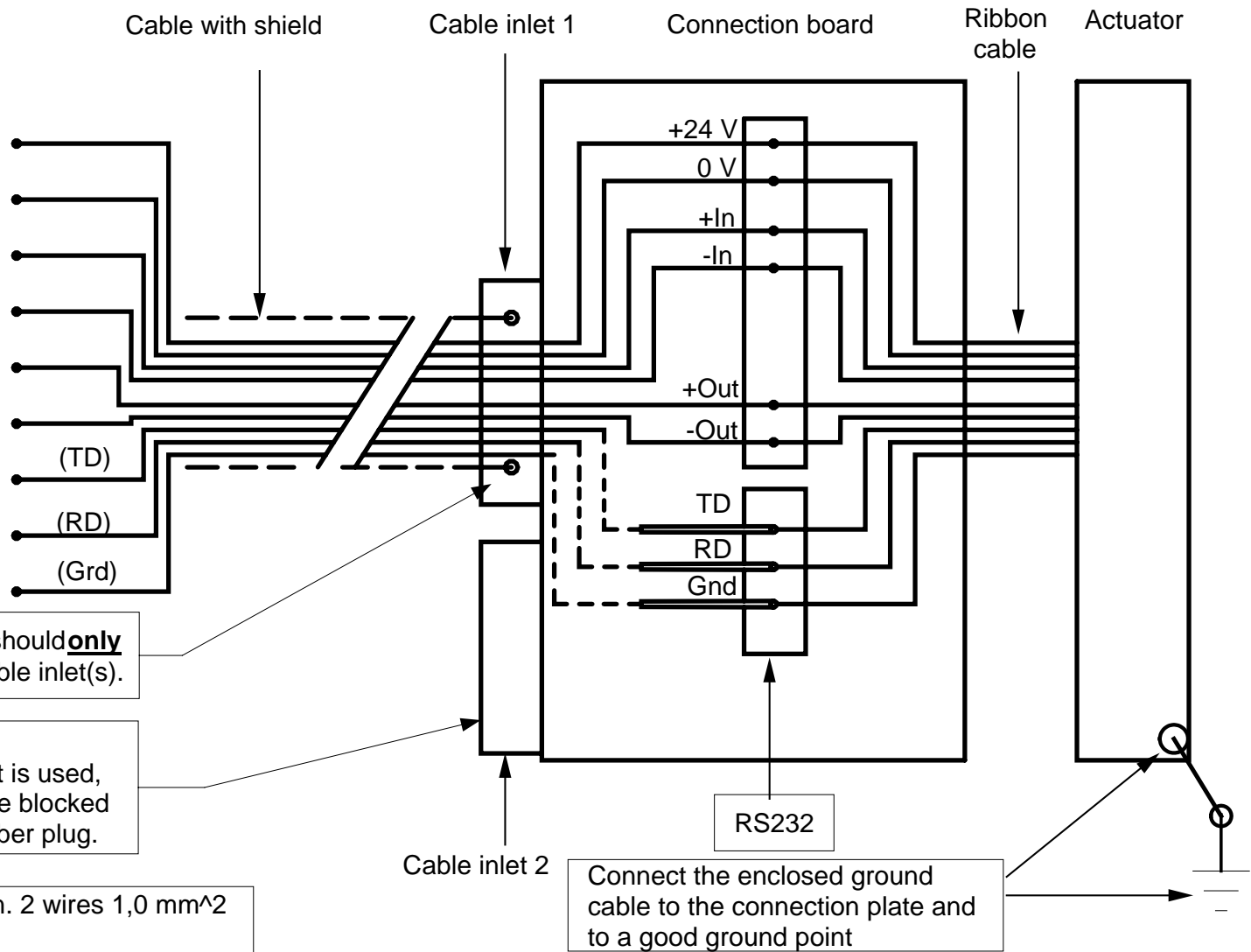
P220.041



A Protecting plate, not shown at this drawing, belongs also to this Turning module.

- 1) Machine the hole to a tight fitting to the valve spindle. NB Do not remove the Indicating pins during this machining.
- 2) Machine the key-way. (Apart from the pin threads)
- 3) Fit the Sealing washer by Loctite and high pressure at the convex surface (plastic deformation).

E	A4	General Tolerances in acc. to : ISO 2768-1 medium	Drawn		Dat./rev.nr
	Scale 1:1		GR	2006.10.18	
Oden Control AB Nilstorpsvägen 53 181 47 Lidingö, Sweden Phone +46-8-767 76 57 Fax +46-8-767 47 18 E-mail oden@odencontrol.se www.odencontrol.se			Title Machining turning module		Sheet 1
					Doc.Nr P220.051



NOTE: The shield(s) should **only** be grounded in the cable inlet(s).

NOTE:
If just one cable inlet is used, the unused should be blocked by the enclosed rubber plug.

Use one shielded cable with min. 2 wires 1,0 mm² and min. 4 wires for signals
OR
two cables, one for power and one shielded for signals.
Control that it is 24 V DC +/- 15 % at the Connection board.

Connect the enclosed ground cable to the connection plate and to a good ground point

Designer GR		Dat./rev.nr 2006.02.14
Title Connection diagram for P50, P220 and P500		Sheet 1
Oden Control AB Nilstorpsvägen 53 181 47 Lidingö, Sweden Phone +46-8-767 76 57 Fax +46-8-767 47 18 E-mail oden@odencontrol.se www.odencontrol.se		Doc.Nr P50.90

Oden P50-P220-P500 Block Diagram

