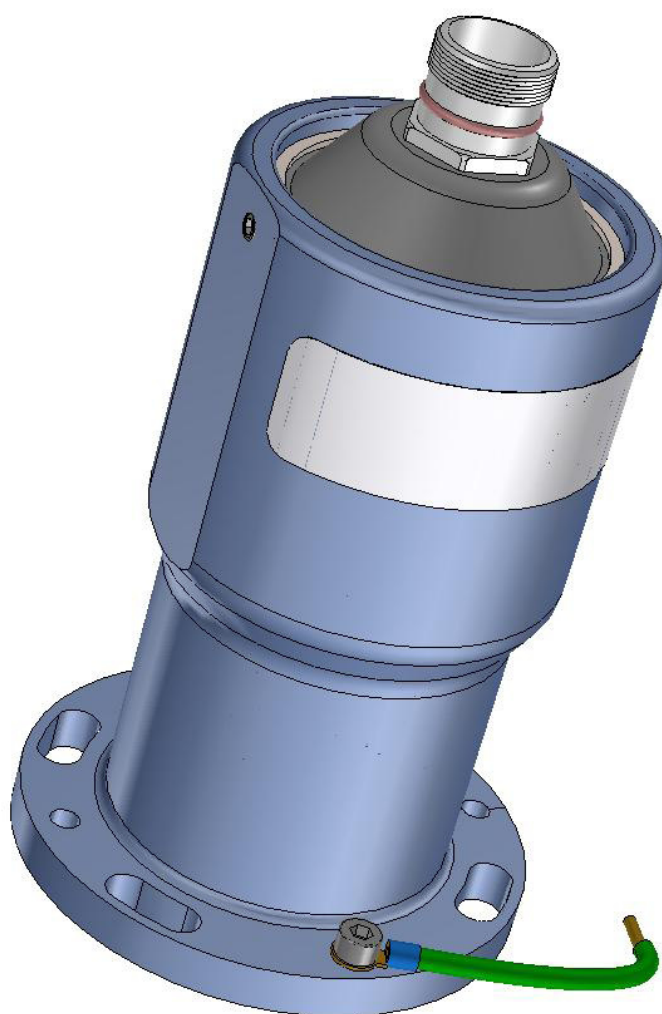


USER'S GUIDE INSTALLATION AND MAINTENANCE MANUAL

ODEN P30



1 CONTENT

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Appendix:

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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 units, 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 reliability | – Analogue control (4 – 20 mA) |
| – Quick and easy to install | – Programmable by Oden Valve Program |
| – Low weight | – Automatic calibration |
| – No maintenance required | – Sealing IP 67/68 |
| – Fits most valves on the market | |

2.2. Summary of the Oden product range

Turning actuators

| Turning actuators | P30R | P30EXR (ATEX) | P50R | P220R | P500R |
|---------------------------|-------|------------------|-------|--------|--------|
| Torque [Nm] | 5-30 | 5-30 | 5-50 | 10-190 | 10-400 |
| Min. closing time 90° [s] | 1,0 | 1,0 | 6,0 | 6,0 | 6,0 |
| Precision [°] | ± 0,5 | ± 0,5 | ± 0,1 | ± 0,1 | ± 0,1 |

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 | 60 |

2.3. Terms concerning safety

It is of outmost importance that all users follow these 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 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: P30R/L

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: P30R/L

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: P30R/L

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: P30R/L

3 TECHNICAL DESCRIPTION

3.1. General

The Oden P30-module system consists of:

- P30BU Basic Unit
- 30R Turning module
- 30L Linear module
- Adapter kit for turning actuator
- Adapter kit for linear actuator

| Product | Type of actuator | Basic Unit | Module | Adapter kit |
|---------|------------------|------------|--------------------|---------------------|
| P30R | Turning | P30BU | 30R Turning module | Turning adapter kit |
| P30L | Linear | P30BU | 30L Linear module | Linear adapter kit |

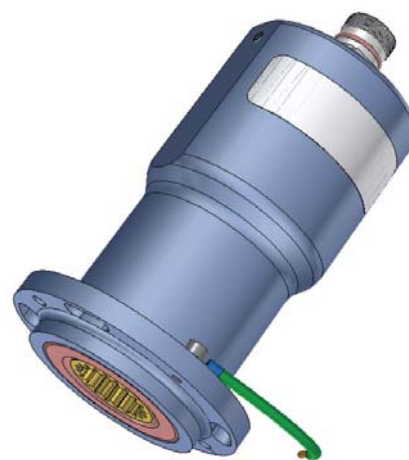
3.2. P30BU Basic Unit

P30BU has a sealed aluminium housing which includes a brushless servo motor, a reduction gearbox, electronics and a cable connector. The reduction gearbox is based on the patented Oden-principle and has a reduction ratio of 63:1.

The electronics with all its power and logical components are placed inside the unit. No batteries, potentiometers, limit switches or other sensitive electro-mechanical components are used. The brushless servomotor is fed by 24 V DC. The control signal and the position signal are analogue (4-20 mA).

All parameters such as torque, speed and working range are set by the OVP-software (Oden Valve Program). The parameter settings in the software are stored in a permanent memory and cannot be lost even during an extended power failure. Features, such as automatic power calibration, automatic time calibration and the shut off function can be adjusted or disabled in OVP.

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.



3.3. 30R Turning module

30R1 is a turning unit normally used for multi turn valve movement. It has a clamping mechanism to get a secure fit to the valve spindle. This unit has no mechanical stop.

30R2 is a turning unit normally used for a 90° valve movement and valve spindle with key. The output shaft of the unit has to be machined to a hole with tight fitting to the spindle shaft and equipped with a keyway. This unit has no mechanical stop.



30R3 is a turning unit normally used for a 90° valve movement and has a tapered clamping sleeve (conical coupling) for easy fitting to the valve spindle. This unit has an internal mechanical stop.



3.4. Adapter kit for turning actuator

The turning adapter kit consists of:

- Slotted bushing ØA
- Flange adapter
- Screws and washers (socket head)

The slotted bushing ØA is machined to fit to the actual valve spindle with diameter ØA. This bushing will also fit into the turning units **30R1** or **30R3**.

The flange adapter will vary depending on valve type. The adapter shown here is made of an aluminium profile and fitted with holes complying with valve flange type F05 and F07.

The screws and washers are used to fit the flange adapter to the turning unit 30R3.



Slotted bushing



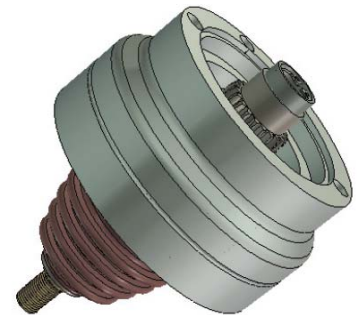
Flange adapter

3.5. 30L Linear module

30L1-40 has a maximum stroke of 40 mm with a screw pitch of 10 mm.

30L1-100 has a maximum stroke of 100 mm with a screw pitch of 10 mm.

The unit consists of aluminium housing with a nut and screw, a thrust bearing and a protective rubber bellows.



3.6. Adapter kit for linear actuator

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.

The rods have a specific length for the actual valve.

The two spindle adapters have the same thread as the actual valve spindle.



Flange adapter

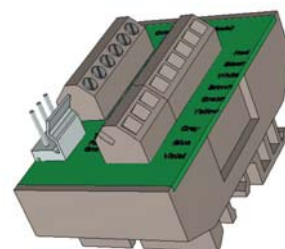
3.7. Cable with connector

The standard 10 m shielded cable has 9 active coloured wires and a cable connector. The cable is designed for fixed installation and if placed in extreme outdoor environment, it should be covered with a protective hose.



3.8. Connection board A

Connection board A is used for analogue control and will fit to a standard DIN-rack system. The board has 9 terminals marked with colour text corresponding to the colour coded wires in the standard cable.



| Grey | Blue | Violet | Red | Black | White | Brown | Green | Yellow |
|-----------|-----------|-----------|---------|--------|---------|---------|----------|----------|
| Com-puter | Com-puter | Com-puter | Power | Power | Control | Control | Position | Position |
| TX (TD) | RX (RD) | GND | 24 V DC | 0 V DC | IN + | IN - | OUT + | OUT - |

3.9. 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.

A RS232 computer cable is needed to connect the computer to the analogue Connection board. The computer cable is optional and not included in delivery, if not separately ordered. If the computer lacks a serial interface a standard USB-Serial converter is needed.

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 may differ from those described below.

NOTE: *The manufacturer's warranty will be void if the cover is dismantled.*

WARNING: *If the 24 V DC is connected during assembling or inspection, the valve may move.*

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

4.1. Confirmation of delivered items

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

- P30 Basic Unit
- 10 m cable with connector
- Analogue connection board
- Product certificate
- User's guide
- CD including software OVP
- Radial seal
- Turning or linear unit (optional)
- Adapter kit (optional)
- Computer cable RS232 (optional)

4.2. Tools

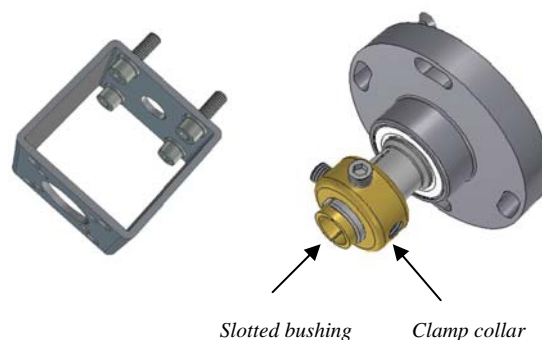
For the mechanical installation, the following tools are necessary:

- M8, M6, M5 Hexagon keys (for socket head cap screws)
- Spanner for M8-nuts
- Screwdriver (width 2,5 mm)
- Loctite blue 243

4.3. Installation

P30R1 Turning actuator

1. Fit the valve flange adapter to the valve. A common valve flange adapter design is a bent steel plate or, as here shown, an aluminium profile with its outer surface provided with four threaded holes for the M8 screws and with interface holes to the valve flange in accordance to ISO standard F05 and F07.
2. The slotted bushing should be machined to actual valve spindle diameter. The clamp collar has two stop screws which create clamping forces to the valve spindle.



3. Press the turning module 30R1 in place until it is resting at the surface of the valve flange adapter. Tighten the clamp collar screws. Check that you can move the valve by hand. Put the valve spindle to closed position. NB Some valve spindles are changing their axial position in closed position.
4. Attach P30BU to 30R1 using two M5 and four M8 with washers (and eventually nuts with washers). The radial seal should not be used with this unit.
5. Check that the valve/actuator is running smoothly by adding a threaded pin to the M10 thread in the clamp collar and then rotate the valve.
6. A pin with a M10 thread could be fitted to the clamp collar and be used as a mechanical stop for ball valves without mechanical stop. At power failure (break) the threaded pin can be used a handle for controlling the valve manually.
7. The ground wire (green/yellow), fitted to the actuators flange, must be connected to a suitable ground point at the valve.
8. All threads should be locked by Loctite 243.
9. Perform a Power Calibration (see section 6) . If the valve does not have a mechanical stop, perform a Position Calibration or turn the valve spindle to closed valve position with a poly grip spanner. Secure the position firmly, and perform a Power Calibration by using OVP. Select "No" for aut. Power Cal after > 8 h power break in OVP.

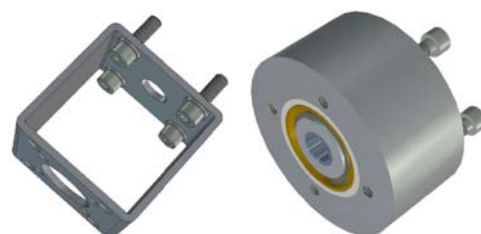
P30R2 Turning actuator

1. Fit the valve flange adapter to the valve.
2. Press 30R2 to the valve spindle. It is important having a close but not hard fitting to the valve spindle and also to its key; otherwise the high positioning accuracy of the Oden Actuator is not used to its full extent. Do not use a hammer; this may damage the valve spindle.
3. Check that you can move the valve by hand. Put the valve spindle to closed position. NB Some valve spindles are changing their axial position in closed position.
4. Attach P30BU to 30R2 using two M5 and four M8 with washers (and eventually nuts with washers). The radial seal should not be used with this unit.
5. The ground wire (green/yellow), fitted to the actuators flange, must be connected to a suitable ground point at the valve.
6. All threads should be locked by Loctite 243.
7. Perform a Power Calibration (see section 6). If the valve does not have a mechanical stop, perform a Position Calibration.



P30R3 Turning actuator

1. Fit the valve flange adapter to the valve.
2. Release the tapered clamping sleeves and put the turning unit 30R3 in place until it is resting at the surface of the valve flange adapter.
3. Turn the valve to closed position.
4. Fit the 30R3 to the valve flange adapter by the screws.
5. Turn the coupling gear shaft with its pin to the internal mechanical stop (closed valve position) if the valve (ball valve) has no own stop and tighten the clamping sleeve. If the valve has its own mechanical stop leave a free distance between the internal stop pin and the mechanical stop of about 2 mm.
6. Check that the valve/actuator is running smoothly within the working range by turning the coupling gear by hand.
NB The internal stop pin at the coupling gear shaft must not hit the other internal mechanical stop when the valve is in max opened position (normally 20 mA position). If so, you have to decrease the working range in OVP.
7. Place the radial seal on the visible gear of P30BU.



8. Attach P30BU to 30R3 using four M8x25 with washers and Loctite 243.
9. The ground wire (green/yellow) which is fitted to the actuators flange should be connected to a suitable ground point at the valve.
10. All threads should be locked by Loctite 243.
11. Perform a Power Calibration (see section 6).

P30L1 Linear actuator

P30L1 consists of:

- P30BU
- 30L1 Linear unit (max. 40 or 100 mm stroke, 10 mm screw pitch)
- Linear adapter kit

1. Turn the coupling gear by hand in 30L1 clockwise to its stop position.
2. Fit the valve flange to the valve.
3. Fit the bars to the 30L1. Then fit the unit to the valve flange.
4. Put the valve spindle in maximum opened position.
5. Turn the coupling gear counter clockwise until the ball screw end part hits the end part of the valve spindle.
6. Put the two spindle adapters in place and use the four clamp screws to secure a good fit in the spindle thread and the ball screw thread and to one of the bars. Adjust the clamp screw setting to get about 0,1 mm clearance to the bar.
7. Check by rotating the gear coupling in the 30L1 that you get a smooth action and that there is a small guiding clearance between the spindle adapter and the rod along its stroke.
NB Check that the working range of the valve is within the working range of the 30L1 Linear module.
8. Place the radial seal on the visible gear of P30BU.
9. Attach P30BU to the 30L1 using the four M8x60 screws, washers and put Loctite 243 in the threads.
10. The ground wire (green/yellow) which is fitted to the actuators flange should be connected to a suitable ground point at the valve.
11. All threads should be locked by using Loctite 243.
12. Perform a Power Calibration (see section 6).



5 ELECTRIC CONNECTION

5.1. Cable connection

P30 is delivered with a standard cable of 10m and the Connection board A. Connect the free end of the cable with the connection board using the colour codes. Note that the cable shield should be grounded at the free end of the cable. Check that the ground wire (green/yellow) at the actuator flange is connected to the valve or equivalent ground potential. If P30 is installed in an extreme outdoor environment the cable should be covered with a protective hose.

For more information about electric wiring, go to Appendix.

DANGER: *The cable between the actuator and the connection board 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 twist the cable at the P30 inlet.*

5.2. Voltage drop

If a long cable is used between the power source and the connection board you need to calculate the voltage drop.

You may use either:

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

The maximum power peak current for P30 is about 8 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 between Connection board A and your power source:

1. Helukabel TRONIC-CY is a shielded UV stabilized cable of good quality for fixed installation in the temperature range -20° - +60°.
Helukabel No.16479 has 6 wires each with 1 mm² cross-sec. Voltage drop about 3 V per 10 m.
Helukabel No.16504 has 6 wires each with 1,5 mm² cross-sec. Voltage drop about 2 V per 10 m.
2. Miltronic /Ölflex Classic 415 CP is a shielded UV stabilized cable of good quality for fixed installation in the temperature range -20° - +60°.
Miltronic No.1314040 has 6 wires each with 1 mm² cross-sec. Voltage drop about 3 V per 10 m.
Miltronic No.1314054 has 6 wires each with 1,5 mm² cross-sec. Voltage drop about 2 V per 10 m.

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

1. For power the Helukabel No. 16502 has 4 wires each with 1,5 mm² cross-sec, UV stabilized and with shield. Using two wires in parallel will reduce the drop. Voltage drops about 2 V per 10 m.
2. For power the Miltronic/ Ölflex Classic 415 CP No. 1314050 has 4 wires each with 1.5 mm² cross-sec, UV stabilized and with shield. Using two wires in parallel will reduce the drop. Voltage drops about 2 V per 10 m.

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

6 THE CALIBRATION SYSTEM

To calibrate the actuator/valve-system means to identify the closed valve position which corresponds to the closed position of the control signal, normally 4 mA. There are two types of calibration methods; Power Calibration (mostly used) and Position Calibration. Which one to use depends on type of application.

6.1. Power Calibration

The Power Calibration is the most common method to make sure the actuator finds the closed position. The calibration can be performed manually or automatically.

Manual Power Calibration using OVP software

To manually perform the calibration press the Power Calibration-button in the main menu. When ready, the actuator will move to the control signal position.

Manual Power Calibration without using OVP software

To manually perform a Power Calibration without using the OVP software:

1. Disconnect the power, 24 V DC.
2. Short-circuit the pins TD and RD at the RS 232-connector.
3. Connect the power, 24 VDC. The actuator will perform a calibration. When ready, the actuator will move to the control signal position.
4. Remove the short-circuit of TD and RD.

Automatic Power Calibration

By enable the Automatic Calibration-function in OVP, an automatic Power Calibration will be performed every time the valve reaches its closed position. If the valve remains in closed position, this sequence will be repeated every 20 minutes. This function can be adjusted and disabled in OVP software. The main reason for this routine is to reduce the risk of valve jamming.

The actuator position is automatically saved to a permanent memory during a power failure. If the valve position has been changed during lack of power, the motion will be detected. This detection occurs during maximum 8 hours after a power failure.

When the power returns, an automatic calibration will be performed. After the 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.

Please note that 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 no saving occurs. It is possible to maintain the calibration point by continuously power the actuator for example by an UPS (Uninterrupted Power Supply).

6.2. Position Calibration

The Position Calibration method is recommended if the valve has no mechanical stop or is too sensitive to stand the torque/force of the Power Calibration. When performing a Position Calibration you are manually setting the calibration position and the maximum opened position.

To perform a Position Calibration:

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) at the connection board.
5. Short-circuit terminal number 3 and 5 (+IN and +OUT).
6. Connect the power, 24 VDC.
7. The actuator will now remember this position as the calibration position and will start 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.

6.3. Summary of calibration methods

| Type of calibration | Automatic/Manual | Description |
|----------------------|------------------|--|
| Power Calibration | Automatic | Automatic start of Power Calibration: When power returns after >8 hours Every 20 minutes in closed position. (This function can be adjusted and disabled in OVP software) |
| Power Calibration | Manual | Manual start of Power Calibration: By short circuit TD and RD in the RS232-connector In OVP by pressing the Power Calibration button |
| Position Calibration | Manual | Manual setting of the calibration position and the maximum opened position. |

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.

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. If your computer is lacking a serial port, you need a standard converter from RS232 to USB. Latest version of OVP is available on our website.

7.1. OVP versions

- | | |
|--|---------------------|
| – P30 with serial number 09xxxx and higher: | Use OVP version 4.1 |
| – P30 with serial number 96xxxx – 99xxxx and 00xxxx to 08xxxx: | Use OVP version 3.8 |

7.2. To start using OVP

To start using the OVP software:

- Install the program from the CD (or download from website)
- Connect the RS232-computer cable between the analogue connection board and computer
- Start the program “Oden Control OVP”
- Select language
- Select the communication port (only on version 4.1)
- Select actuator type and connect actuator. (If the actuator does not respond, try another serial port)

7.3. To change settings

All parameters in the main menu are adjustable. To change settings, make the adjustments and press the button “Apply”. The actuator is now programmed with the new settings. (In older versions of OVP the actuator will respond directly). If you wish to restore the parameter values to default, press the “Default”-button.

To save new settings in an external file, use the “Save data” button. The data is saved in a file which can be opened later when the actuator is connected. Use the “Load” button to read from the saved file and reload the actuator with new settings.

If the actuator does not respond to changes in settings, go back and try another serial port (only in version 4.1). Connect the actuator again. If still no response, exit the program and start over again. If using a RS232/USB-converter, please check the function.

7.4. Error signals (only in version 4.1)

- | | |
|---------------------|------------------------------|
| – Error signal = 0 | No error |
| – Error signal = 10 | Temperature error |
| – Error signal = 20 | To low or high voltage (VDC) |
| – Error signal = 30 | Lack of control signal (mA) |

8 MAINTENANCE

Control and function test should be carried out 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 need no lubrication or 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 will notice a change in valve bearing condition.

Calibration control

Perform a new Power or Position calibration to verify closed position.

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 start checking the following:

- Validate that parameters in OVP software are suitable for the application. Start the OVP program and check important settings such as closing direction, working range and torque/force.
- Validate that the actuator is properly mounted on the valve.
- Validate that the valve is not blocked or jammed within the working range.

A) Nothing happens when changing the control signal value

1. Check power, 24 V DC \pm 15%.
2. Check the control signal, 4-20 mA.
3. If the surface of the actuator gets hot after 5 - 10 minutes, check that the “Shut-off” value in OVP is set to default 5 % of working range.
4. If you are controlling a turning valve, try to move the valve spindle by hand using a treaded M10 -pin in the clamp collar:
 - a. If you cannot move the valve spindle, break the 24 V and try again.
 - b. If you still cannot move the spindle, remove the Basic Unit and try to move the valve by hand.
 - c. If it is still a problem to move, examine the valve.
 - d. If the valve moves easily, check if there is any sticking force between valve and actuator. If not, remove the actuator and run it free. If nothing happens contact Oden.
 - e. If the actuator is running constantly and cannot be controlled, go to 6.
5. Perform a new Manual Power Calibration.
6. Still nothing happens. The actuator may be in a Power Calibration routine which has been interrupted. Turn off power to break the routine. Exit OVP and start the program again. Perform a Manual Power Calibration. (You might need a mechanical stop.)

B) When giving the control signal maximum value the actuator gets hot

1. Check if the position signal is the same as the control signal (20 mA). The normal maximum difference between these two values should be <0.1 mA. If it is larger, then the available mechanical working range is probably smaller than the working range setting in OVP (blocking situation). Reduce the working range in OVP to a value 5 degrees (for linear actuators 3 mm) lower than the available mechanical working range.

There is a built-in safety temperature sensor which will stop the function of the actuator when the temperature exceeds maximum limit.. The power will reset when the actuator has cooled down.
2. Validate that the valve is not blocked or jammed within the mechanical working range.
3. Validate that the necessary torque (force) to move the valve is within what the actuator can deliver.

C) No connection to OVP

1. Exit the OVP program and start again.
2. OVP 3.8: Check that the data cable is connected to the connection board and computer port and that the port is logical opened. If using an USB-serial adapter, try to direct it to port number 3.
OVP 4.1: Try another serial port in the main menu. Connect the actuator and perform a power calibration by pressing the button “Power Calibration”. If the calibration fails, go to main menu and choose another serial port.
3. Check power, 24 V DC \pm 15%
4. Go to A6) above.

10 TIPS

- If you have any control problem, please go to chapter Trouble shooting. If you still have problem contact Oden Control AB or your nearest dealer.
- 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 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).

- 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.
- 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, software and documentation.

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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] | 1,0 | 1,0 | 6,0 ¹⁾ | 6,0 ¹⁾ | 6,0 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 |
| 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.

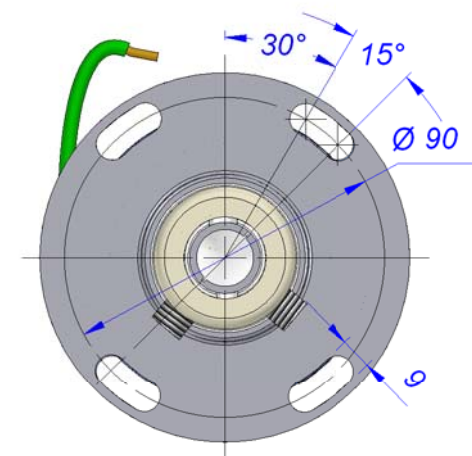
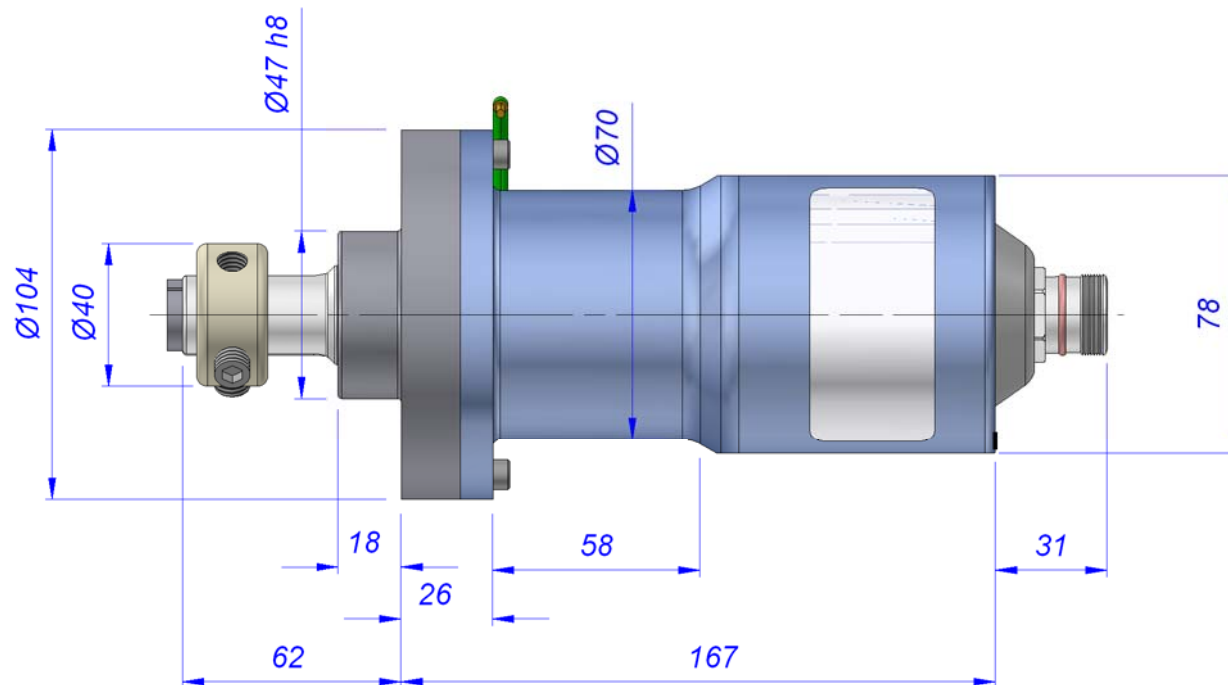
Electric linear actuators

| 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 |
| 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.



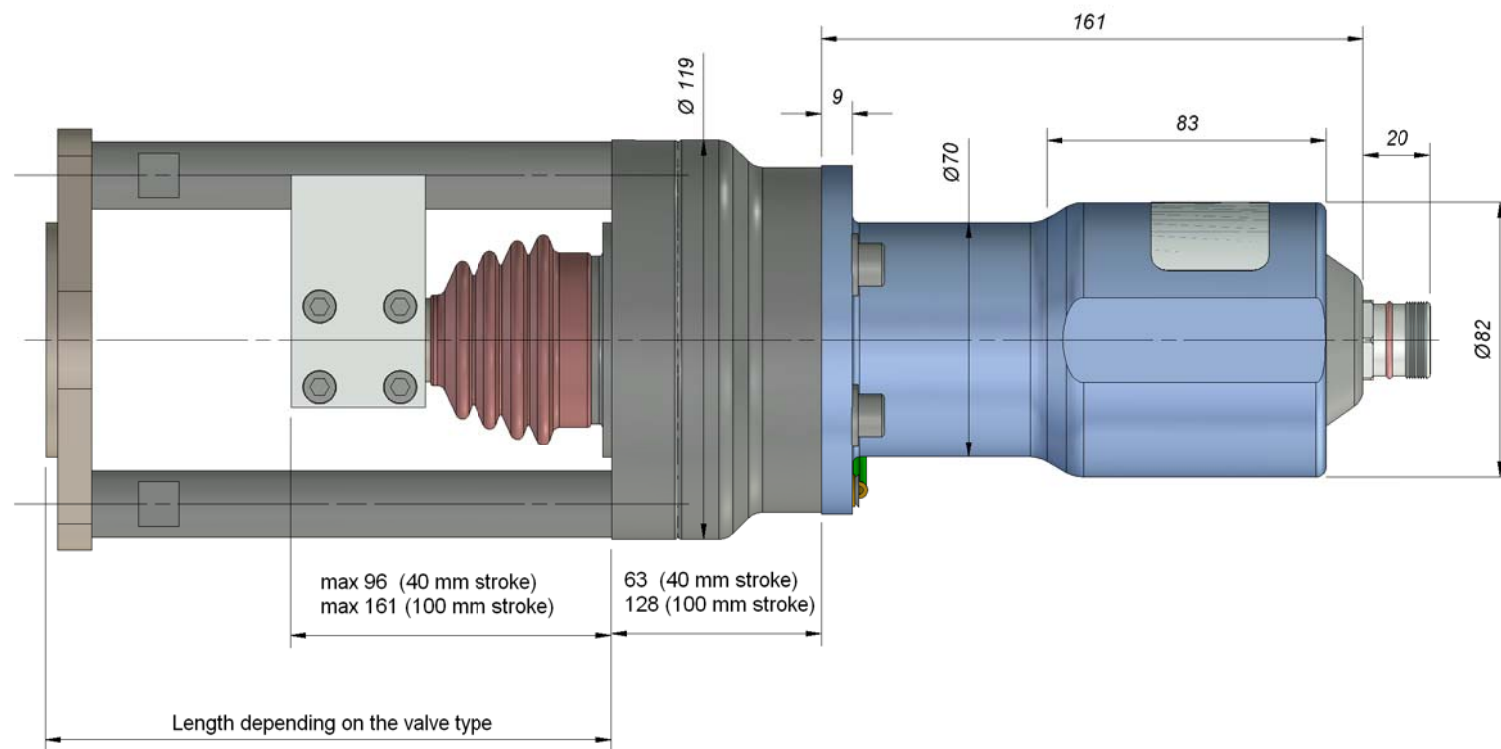
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Title
P30R1
turning actuator
 (ID1-drawing)

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2006.0612

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P30.051



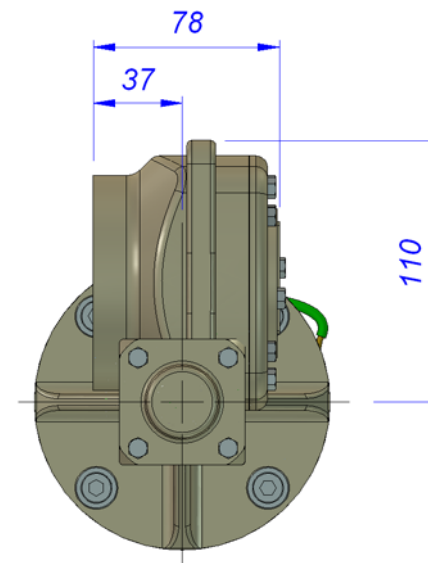
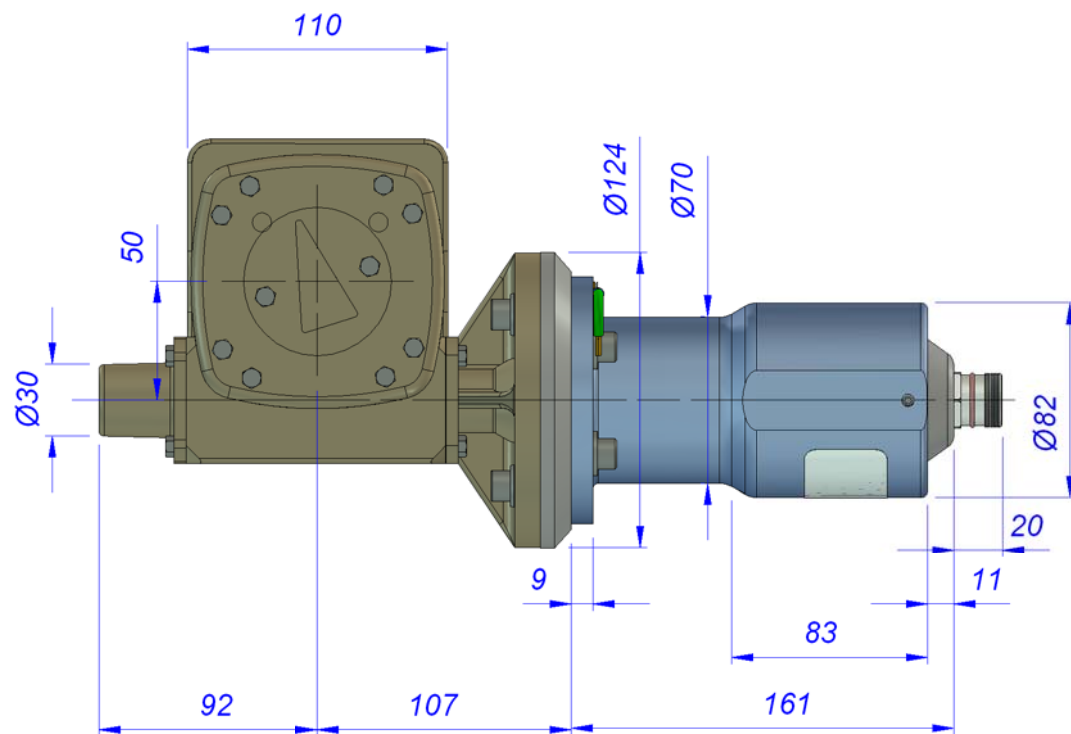
Standard strokes 40 mm and 100 mm

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Title **P30L1 linear
actuator
(ID1-drawing)**

| | |
|-------------|-------------------|
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P30G50
 (ID1-drawing)

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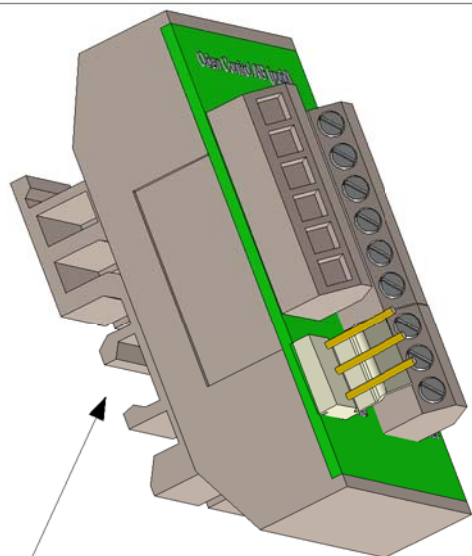
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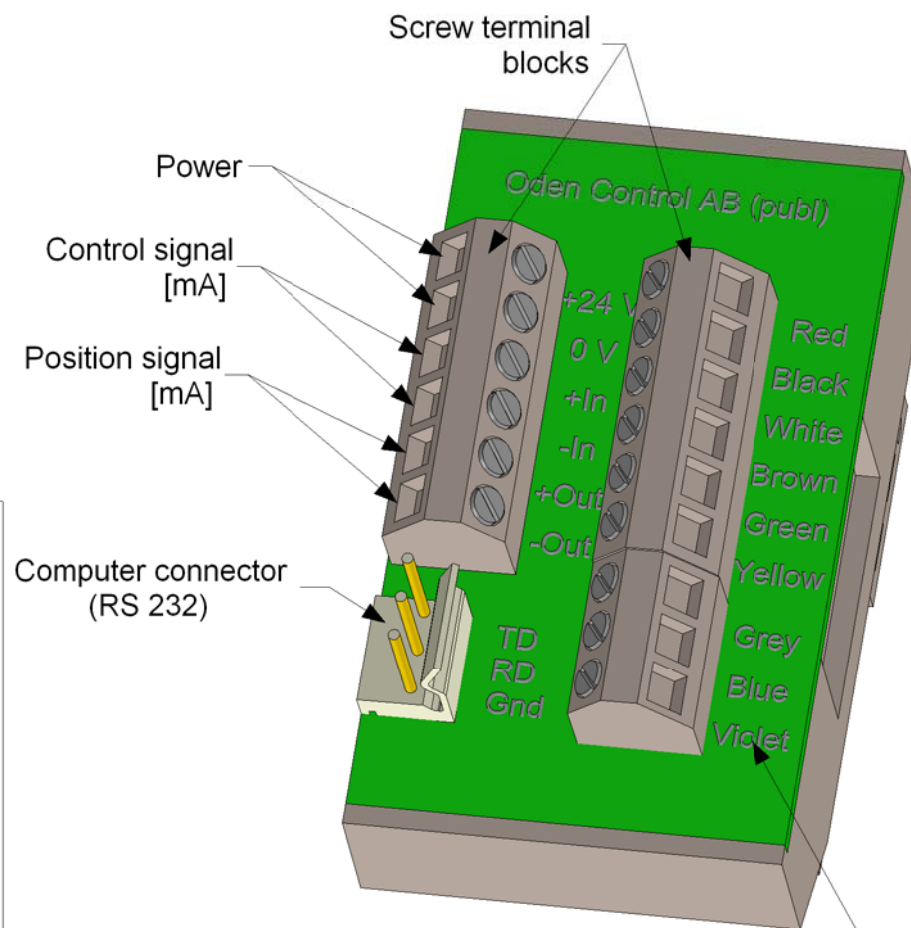
Fits to a DIN rack system

Connections:

| | | |
|----------------------|-------|--------|
| Power [24 V DC] | +24 V | Red |
| Power | 0 V | Black |
| Control signal [mA] | +In | White |
| Control signal | -In | Brown |
| Position signal [mA] | +Out | Green |
| Position signal | -Out | Yellow |
| Computer connector | TD | Grey |
| | RD | Blue |
| | Gnd | Violet |

NB

The cable shield should be grounded in this free end of the cable.
(The actuator should be grounded by the enclosed ground cable)



Text colour for the cable wires

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Title

Connection board A1

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Sheet

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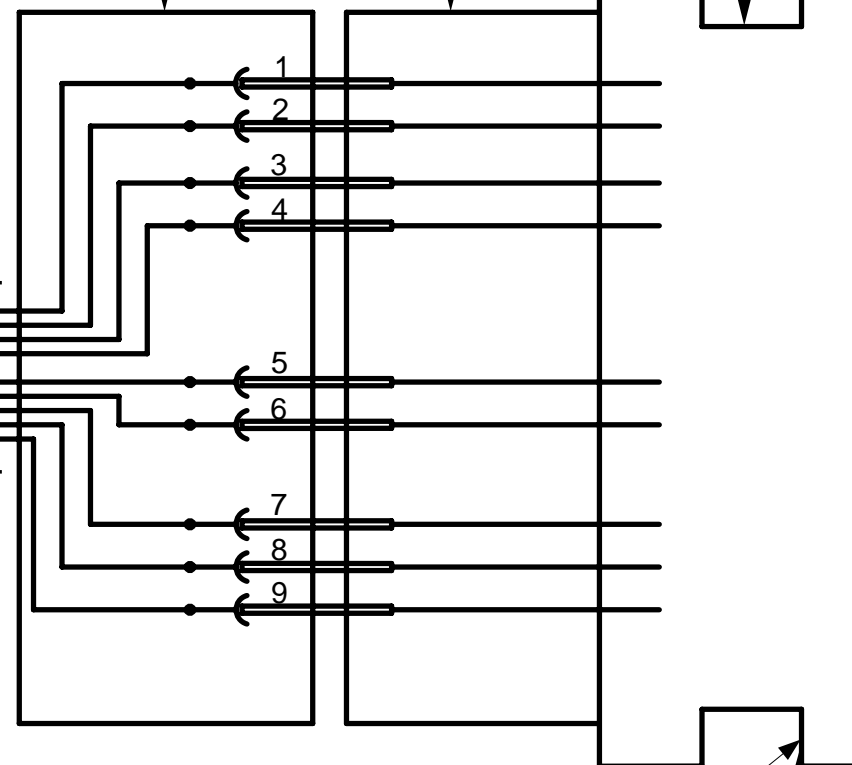
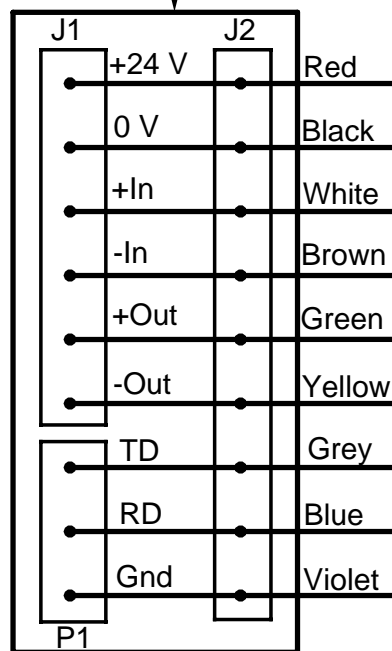
P30.15 Connection board A1

Cable with shield
(max 10 m)

Cable connector

Chassi connector

P30 Basic Unit



J1 and J2 = screw terminals
P1 = RS 232 connector

The flange at P30 Basic Unit
should be grounded with the
enclosed 0,5 m ground wire.

The cable shield should be
grounded in this free end.

The not used rosy cable wire
should be cut and end isolated.

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Title

**P30
Connection drawing**

Sheet

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P30.90

Oden P30 and P30EX Block Diagram

