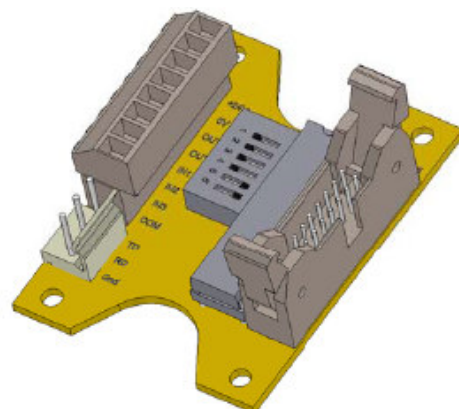




**Digital Connection Board**  
**for**  
**Oden Actuators**  
**P50, P220 and P500**



# Quick Start

## Digital control for Oden actuators



### Functions

- MODE 1** For every puls input, actuator moves one step. The length of the step is adjustable.
- MODE 2** At constant voltage, actuator will take one step. If voltage is still on after a certain time, it will take another step, etc
- MODE 3** At constant voltage input, actuator will move till the voltage is terminated. The magnitude of the movement depends on the speed setting.

### Equipment

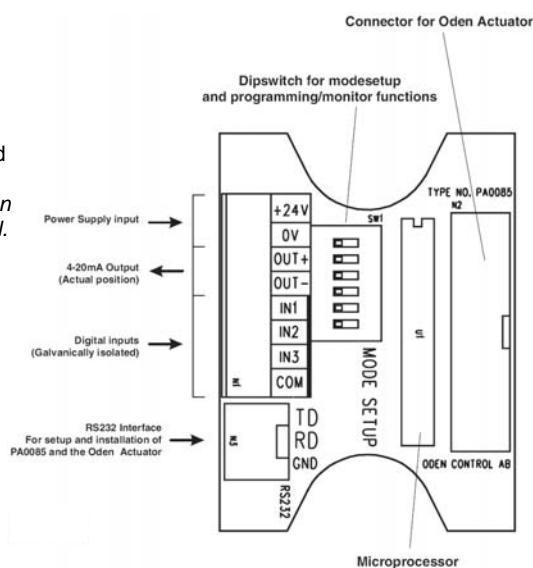
- Program: Motoware or other software communication tool (Hyper Terminal)  
OVP 3.8
- Products: Oden actuator P50, P220 eller P500. Software version 6.5 (IP0026-65)  
Digital Connection Board PA0085. Software version 2.0 (IP0047-20)  
User's Manual PA0085

**VARNING**

**!!! VALVE MAY MOVE  
WHEN INSTALLED TO  
VOLTAGE 24 V DC!!!**

### Installation

- Open the black cover on the side of the actuator. Open with caution!!!  
Regard the flat cable.
- Connect the flat cable contact to the driver unit from the black cover.
- Disconnect the connection board that is currently on the black cover and mount and screw on the digital connection board PA0085 to the cover.  
*PS! If there is 24V input it should be isolated from ground, Read more on grounding in the actuator manual (Users guide) or contact Oden Control.*
- Connect the flat cable from driver unit.
- Connect cable for 24 V DC to digital connection board, +24V, 0V
- Connect cable for return signal, OUT+, OUT-
- Connect cable for digital output.  
Puls on IN1 → movement forward  
Puls on IN2 → movement backward  
(Puls on IN3 → reset position to 0, closed state (puls >10V) )
- Set the dip switch 5 and 6 on OFF.
- Connect the computer cable (RS232).
- Turn the power / voltage, 24 V DC on.
- Open OVP, and set the settings (torque, working range, speed, etc.)
- Follow the instructions below to use the different control modes.



#### MODE 1

- Turn the power supply off.
- Set D1, D2, D3, D4, D5 to **OFF**.
- Set D6 to **ON**.
- Turn the power on.
- Open Motoware, On-line editor.
- Check the settings NL (0), PL (1700) and VH (3)
- To set PS, type PS= desired quantity (1-1700)
- After changes set D5 to **ON**.
- Ready for digital control!

#### MODE 2

- Turn the power supply off.
- Set D2, D3, D4, D5 to **OFF**.
- Set D1 and D6 to **ON**.
- Turn the power on.
- Open Motoware, On-line editor.
- Check the settings NL (0), PL (1700) and VH (3)
- To set PS, type PS= desired quantity (1-1700)
- Set Time Constant TC, type TC= desired quantity [ms]
- After changes set D5 to **ON**.
- Ready for digital control!

#### MODE 3

- Turn the power supply off.
- Set D1, D3, D4, D5 to **OFF**.
- Set D2 and D6 to **ON**.
- Turn the power on.
- Open Motoware, On-line editor.
- Check the settings NL (0), PL (1700) and VH (3)
- After changes set D5 to **ON**.
- Ready for digital control!

#### REFERENCE

- PS** Pulses per step. The total number of steps possible per digital puls. Normal possible steps are 1700 (PL-NL=1700-0). Default: PS=1 (1 step/puls)  
*Example: if working range is 90° and actuator shall move 45° for one puls, then PS shall be set to 850 (halv of 1700).*
- TC** Time constant that decides sampling time for IN1 and IN2. Default: TC=1 ms
- VE** Version edition. Software version.
- PL** Positive limit. Maximum value of working range. (1700)
- NL** Negative limit. Minimum value of working range. (0)
- VH** Hysteres. Sensitivity (3)

For more detailed instructions see manual — User's Manual PA0085 – Digital Connection Board



## User's Manual PA0085 – Digital Connection Board for Oden Actuators. – Valid from software version 1.6

NB use only:

- Oden Valve Program (OVP) version 2.55 or later.
- Digital adapter PA0085 version  $\geq 1.6$
- Actuator software version  $\geq 5.7$

### Description:

PA0085 is a digital connection board that can be used together with Oden Actuators type P30 (option), P50, P220 and P500, both for turning or linear applications.

The basic function is to translate a digital pulse signal to the standard Oden Actuators. The digital board has a dip switch array which makes it possible to run different modes, **Mode 1**, **Mode 2** or **Mode 3**, depending on which type of control signal you have.

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### A short description of the Mode settings:

For more instructions see **Mode description**.

For connection instruction see **Terminal description**.

#### Mode 1

Dipswitch 5, 6 in position ON.

Dipswitch 1, 2, 3, 4 in position OFF.

*Every time a pulse (no matter how long it is) is applied, the actuator will move a certain distance forwards (input IN1) or backwards (input IN2).*

(see description later on)

#### Mode 2

Dipswitch 1, 5, 6 in position ON.

Dipswitch 2, 3, 4 in position OFF.

*When a voltage is applied, the actuator will move a certain distance forwards (input IN1) or backwards (input IN2). If the voltage is still present after a certain time another move is done. This sequence is repeated until the voltage is removed from the input.*

(see description later on)

**Mode 3**

Dipswitch 2, 5, 6 in position ON.

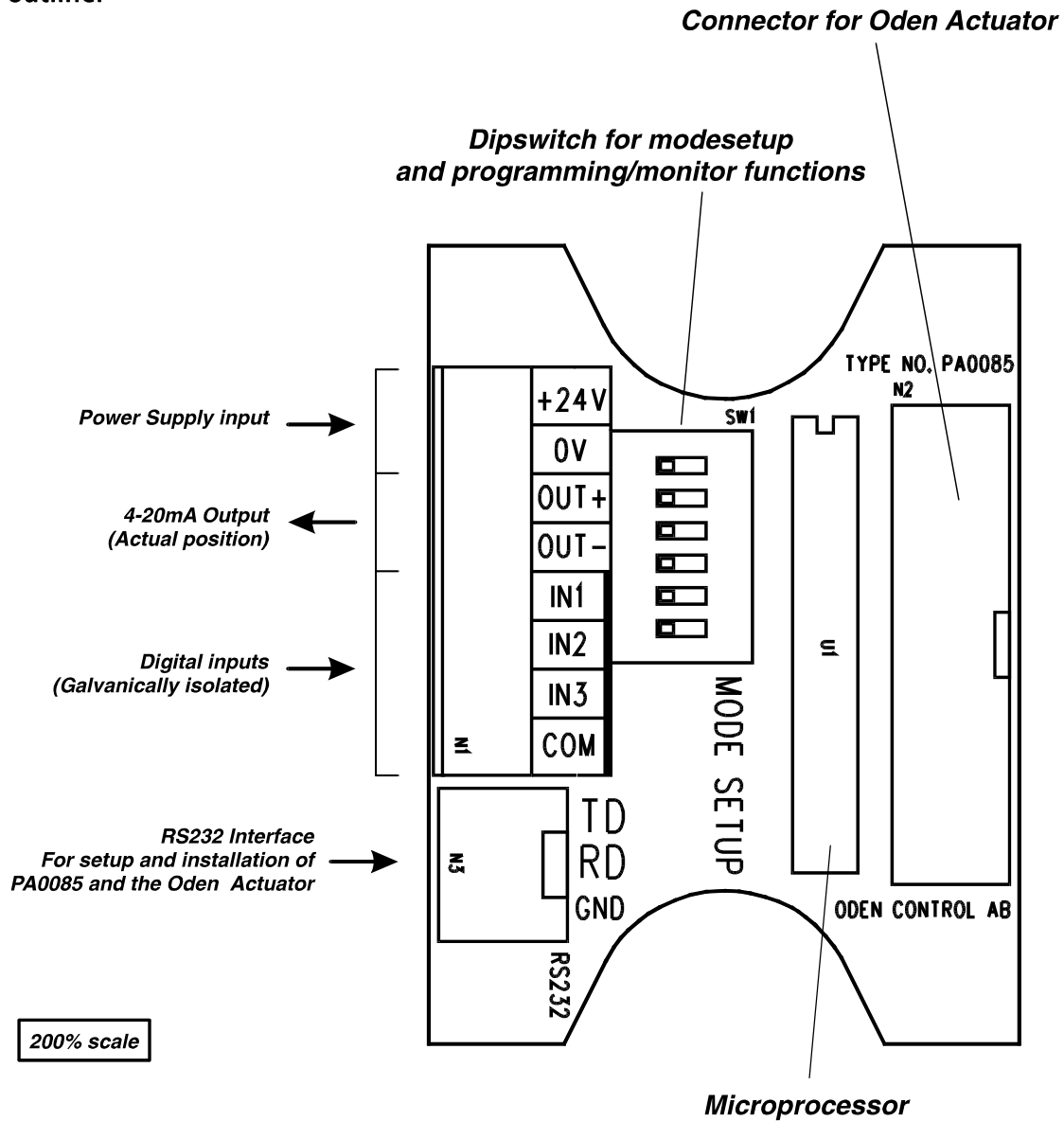
Dipswitch 1, 3, 4 in position OFF.

*When a voltage is applied, the actuator will move a certain distance forwards (input IN1) or backwards (input IN2). The distance is only depending on the speed setting in the OVP program.*

*The movement is continuing until the voltage is removed from the input.*

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The Digital Connection Board PA0085  
outline:



## Terminal description

### **+24V**

Power supply for the PA0085 and the connected actuator. This terminal must be connected to a +24VDC voltage.

### **0V**

Ground terminal for the system. Must be used together with “+24V” terminal. The terminal is internally connected to the housing of the actuator.

### **OUT+ / OUT-**

These terminals are the 4–20mA output representing the actual position. This output is coming directly from the motor controller board inside the actuator and is behaving in the same manner as a standard unit.

### **IN1, IN2, IN3, COM**

These terminals are all digital inputs, which can be setup in different function modes. All these 4 terminals are galvanically isolated from any other terminal/connector in the system.

When applied with a signal from a **NPN** output the COM terminal must be permanent supplied with a voltage greater than 10V (range 10–30VDC). The signal is then connected to the actual input (I.e. IN1).

When applied with a signal from a **PNP** output the COM terminal must be permanent connected to the same ground as the supplying output is using. The signal is then connected to the actual input (I.e. IN1).

All 3 inputs are passing a noise filter. The filter only accepts the input level when it has been stable in 1 msec.

This will limit the upper counting rate to approximately 500 Hz / 500 steps/second.

### **Dipswitch description**

At PA0085 exist 6 dipswitches. Dipswitch 1, 2, 3, and 4 is used for setting the operation mode in PA0085.

Dipswitch no. 5 and 6 is used to setup the communication. This need to be done since only one RS232 is connected from outside and the data send from the PC must either be directed to the Pxxx or PA0085 while the system is installed.

After the installation is done, no communication finds place except between PA0085 and the Pxxx actuator.

The dipswitch 1 to 4 is used for mode setting and have following functions:

D4	D3	D2	D1	Mode	Function
OFF	OFF	OFF	OFF	Mode 1	Pulses at IN1 will increase position Pulses at IN2 will decrease position A single pulse at IN3 will reset position to 0.
OFF	OFF	OFF	ON	Mode 2	A permanent voltage at IN1 will increase the position in steps with a time constant in between. A permanent voltage at IN2 will decrease the position in steps with a time constant in between. A single pulse at IN3 will reset position to 0.
OFF	OFF	ON	OFF	Mode 3	A voltage applied to IN1 will make the motor moves forward until the voltage is removed. Similar a voltage applied to IN2 will make the motor moves backwards. TC and PS are disabled and have no function.
OFF	OFF	ON	ON	Mode 4	Not used (future use)

The dipswitch 5 and 6 has following functions.

D6	D5	Function
OFF	OFF	PC communication with Pxxx. Line to PA0085 is passive.
OFF	ON	PA0085 communication with Pxxx. Line to PC is passive.
ON	OFF	PC communication with PA0085. Line to Pxxx is passive.
ON	ON	PA0085 communication with Pxxx. PC can se data sends from PA0085. Default

Pxxx means actuator type P50, P220 or P500.

Notice that dipswitch 1 to 4 (mode select) must be set before power is applied to the system.

Dipswitch 5 and 6 can be changed during normal operation. Changing dip-switch 5 and 6 during operation will have instant effect.

## Mode description

### Mode 1

The terminals have following function in mode 1 (Dipswitch 1, 2, 3, 4 must be in position OFF)

- IN1 Forward pulse input.  
Every time when a pulse is applied to this input the actuator will move a certain distance forward. The distance is specified by the PS register (see description on next pages).
- IN2 Backward pulse input.  
Every time when a pulse is applied to this input the actuator will move a certain distance backward. The distance is specified by the PS register (see description on next pages).
- IN3 Reset input  
When this input is activated (a voltage  $> 10V$  is applied with reference to COM) the actuator is moving to closed (position 0). If the input is kept activated the position will keep being 0 regardless of incoming pulses at IN1 and IN2. By activated means a voltage  $> \pm 6$  volt between IN3 and the COM terminal.  
If the input is not used it can be left unconnected.

### Mode 2

The terminals have following function in mode 2 (Dipswitch 1 must be in position ON – 2, 3, and 4 OFF).

- IN1 Forward signal input.  
When a voltage is applied to this input the actuator will move a certain distance forward. The distance is specified by the PS register (see description on next pages). If the voltage is still present after a certain time constant specified by the TC register (see description on next pages) another move is done. This sequence is repeated until the voltage is removed from the input.
- IN2 Backward signal input.  
When a voltage is applied to this input the actuator will move a certain distance backward. The distance is specified by the PS register. If the voltage is still present after a certain time constant specified by the TC register another move is done. This sequence is repeated until the voltage is removed from the input.
- IN3 Reset input  
When this input is activated (a voltage  $> 10V$  is applied with reference to COM) the actuator is moving to closed (position 0). If the input is kept activated the position will keep being 0 regardless of incoming pulses at IN1 and IN2. By activated means a voltage  $> \pm 6$  volt between IN3 and the COM terminal.



If the input is not used it can be left unconnected.

### **Mode 3**

The terminals have following function in mode 3 (Dipswitch 2 must be in position ON – 1, 3, and 4 OFF).

- IN1** Forward signal input.  
When a voltage is applied to this input the actuator will move a certain distance forward. The distance is only dependant of the speed setting in the Pxxx actuator and must be set in the OVP program. The movement is continuing until the voltage is removed from the input. The sample time (TC) and positioning length (PS) are disabled in this mode.
- IN2** Backward signal input.  
When a voltage is applied to this input the actuator will move a certain distance backward. The distance is only dependant of the speed setting in the Pxxx actuator and must be set in the OVP program. The movement is continuing until the voltage is removed from the input. The sample time (TC) and positioning length (PS) are disabled in this mode.
- IN3** Reset input  
When this input is activated (a voltage  $>10V$  is applied with reference to COM) the actuator is moving to closed (position 0). If the input is kept activated the position will keep being 0 regardless of incoming pulses at IN1 and IN2. By activated means a voltage  $> \pm 6$  volt between IN3 and the COM terminal.  
If the input is not used it can be left unconnected.

### **Communication / setup.**

The dipswitch 5 and 6 is used when installing the system. Follow this procedure.

1. Set dip 5 and 6 in position OFF. Connect the PC to the RS232 connector at PA0085 and turn on power. Now the actuator can be setup with all the relevant parameters from the OVP program.
2. If the default setting is acceptable for the PA0085 (see below) both dipswitch 5 and 6 must now be set in position ON. Thereby the system is in normal operation and ready to positioning in accordance with the incoming signals at the inputs.

### **Changing default in PA0085 (optional).**

Follow this instruction if the PA0085 default must be changed.

- 1 Set dip 6 in position ON (dip 5 is kept in OFF pos.). Now the PC has connection to the microprocessor in the digital converter PA0085. The internal parameters can

be adjusted or monitored. Use the MotoWare program (the online editor) to adjust/monitor these parameters.

**PS: Pulses pr. step.**

Default: PS=1

This register is containing the number of steps the actuator will move each time either a forward or a backward pulse is applied to IN1 or IN2.

The full working range is 1700 steps which means that PS=1 will give totally 1700 steps in the full working range.

Example:

If PS is set to 100 the actuator will move 100 pulses each time either a forward or backward signal is received. The totally number of steps will be 17 (0-1700).

**NL: Negative limit**

Default: NL=0

This register is containing the lower limit in the working range on a scale from 0 to 1700.

Set the register by typing NL=10 (enter) in the MotoWare online editor.

**PL: Positive limit**

Default: PL=1700

This register is containing the upper limit in the working range on a scale from 0 to 1700.

Set the register by typing PL=1600 (enter) in the MotoWare online editor.

If PL is set to 1600 the position range is then reduced to 0-1600. Each step will still be the same physically as before.

**TC: Time constant (only used in mode 2).**

Default: TC=1 (1msec).

Specifies the sample time for input 1 and 2.

**VE: Firmware version**

Get the actual firmware version by typing VE (enter) in the MotoWare online editor. PA0085 will then respond "VE=1.0" (example).

2. When finished by changing parameters in PA0085 follow "communication/setup" from beginning of this description "Communication / setup".