Pollux

high resolution positioning drive

Manual

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About this documentation

This documentation provides detailed informations on the hardware features of Pollux Drive or Pollux Box.

Software informations about the Venus-2 command language are provided in a additional manual.

Symbols in this documentation

To clarify the content following symbols are used.

Symbol	Description
	Warning. The informations beside this sign must be observed strictly
	Hint
	This function can be released with a release code
Venus-2	Venus-2 command, see handbook

Chapter 1

Introduction

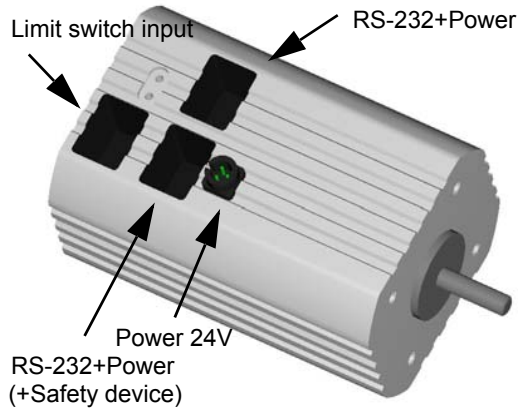
Presentation of the controller

Pollux is a extremely compact combination of a high torque stepper motor and a intelligent positioning controller.

The 1.8° / 0.9°, 42 mm sq. motor is combined with a powerful motor electronic that provides a calculational step resolution of minimum 0.001µm and a maximum speed of 40 rev./s.

Controller programming and configuration is executed via a RS232 interface which allows velocity moves, point-to-point moves and multiple unit control with only one communication port.
Optional a CAN-Bus interface is provided.

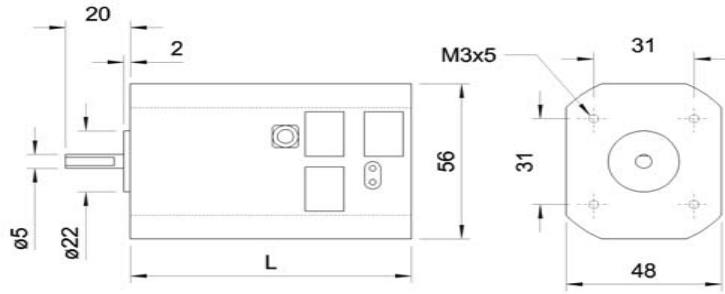
The ASCII programming language is termed Venus-2.
A On-Board flash memory enables non volatile parametrizing and software updates via the serial line.
Your dealer will support you if a firmware update is necessary.
Pollux is available in different variants, which differ from motor speed, holding torque and the motor assembly.



Function survey

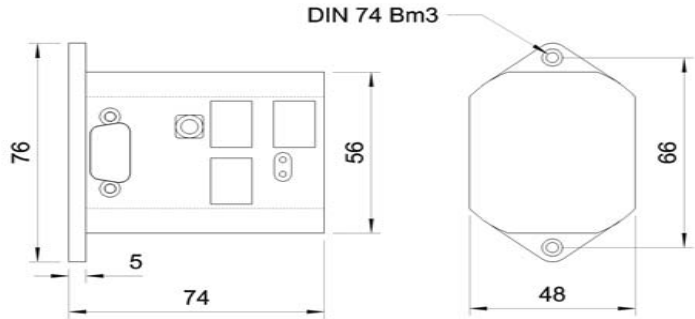
Functions
• Multiple connection, up to 16 devices
• Phase current max 1.2A/Phase
• Velocity: 12.5, 25, 40 rev/s
• Minimum step resolution = 0.001µm
• Limit switch inputs Homing command and range measure
• RS-232 Interface, 19200 Baud
• Command language (Venus-2 for Pollux)
• Positioning modes: Absolute, relative, velocity controlled, synchronous,
• Power Up functions
• Safety device (Motor disable function)
• Firmware update via RS-232 (115000 Baud)
• CAN-Bus Interface (Option)

Dimensions Pollux Drive



Pollux Type 1: L= 87mm
Pollux Type 2: L= 87mm
Pollux Type 3: L= 100mm
Pollux Type HT: L= 112mm

Dimensions Pollux Box



Declaration by the manufacturer

CE

The company

MICOS GmbH
Freiburger Strasse 30
D-79427 Eschbach

declares, that the product:

Pollux

Positioning drive

meets following standards or is compliant:

Safety requirements:
IEC1010-1, EN61010-1

Emission standards:
EMV: IEC 801, EN50081, EN50082-1

Eschbach, März 2003

Lucius Amelung, Director

Chapter 2

Installation

Safety notice

The controller is developed, produced, checked and documented in consideration of the relevant standards.
If it is used according to regulations, there are no dangers for persons and things.
Use according to regulations implies that the device is solely used in the way that is described in here and that the stated safety advices are followed.

Power supply

A stabilized 24V power supply is required. The necessary power depends on the load and speed. Each unit requires a power supply with minimum 24V/10 W.

Important:
Do not plug in the power cable while the power is On

Programming via RS-232 interface

Pollux is controlled via the RS-232 interface, therefore a 9 Pin serial cable with a standard wiring on host side and a 8 pin RJ45 plug on Pollux side is included in the delivery.
For a daisy chain operation additional cables are necessary.
The command language is "Venus-2 for Pollux".

For simple programming a VT100 ASCII Terminal could be used to send Venus-2 commands to the controller.

The Venus-2 command language is described in the second part of this manual.

Important notices about the RS-232 interface

- **Preferably use the delivered RS-232 cable**
- **The RS-232 interface settings of the control unit has to correspond accurately with the settings of Pollux, shown in the following table.**
- **The RS-232 interface of the control unit should not be be occupied by other programs**

RS-232 interface configuration

• Data bits	• 8
• Stop bits	• 1
• Parity	• no
• Handshake	• no
• Baudrate	• 19200

Motor characteristic adjustments

The typical motor parameter are determined from the holding torque, the step angle, the maximum phase current and the motor pole pairs.

Commands to adjust the speed torque and holding torque

The adjustment is accomplished by the following Venus-2 commands.

setumotmin	This command affects the phase current if the motor is in position. As a result the holding torque and power consumption is affected.
setumotgrad	This command affects the phase current and motor torque if the motor is moving.

For the Pollux Box Version:

The adjustment to the different motor types is accomplished with the following Venus-2 commands:

- ***setphases***
- ***setumotmin***
- ***setumotgrad***
- ***setpolepairs***

Speed-Torque characteristic

The following diagramms are representing the order of magnitude of the motor torque.

Pollux-1

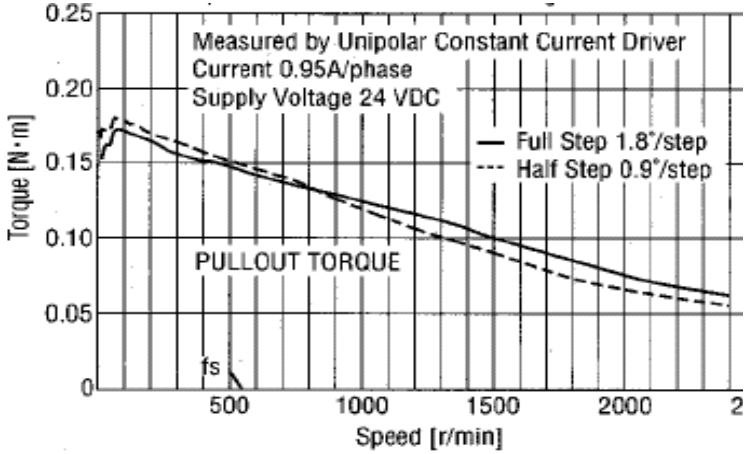


Figure 1: Speed Toque characteristic Pollux-1

Pollux-2

The following diagramms are representing the order of magnitude of the motor torqe.

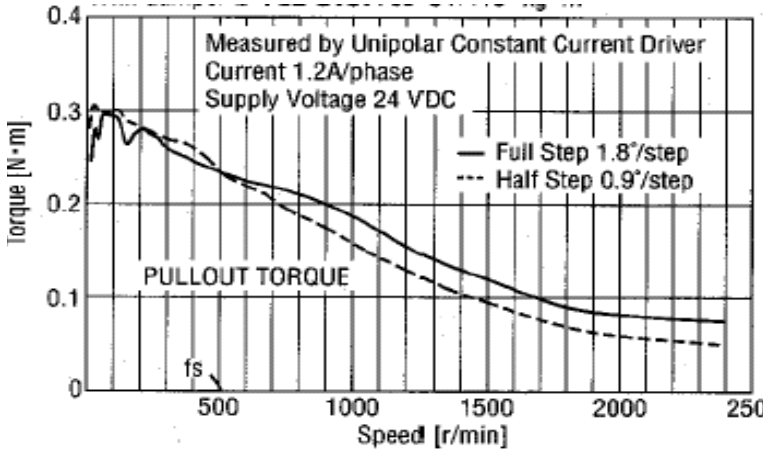


Figure 1: Speed Torque characteristic Pollux-2

Pollux Box with seperated motor

The following diagramms are representing the order of magnitude of the motor torqe.

Motor example.

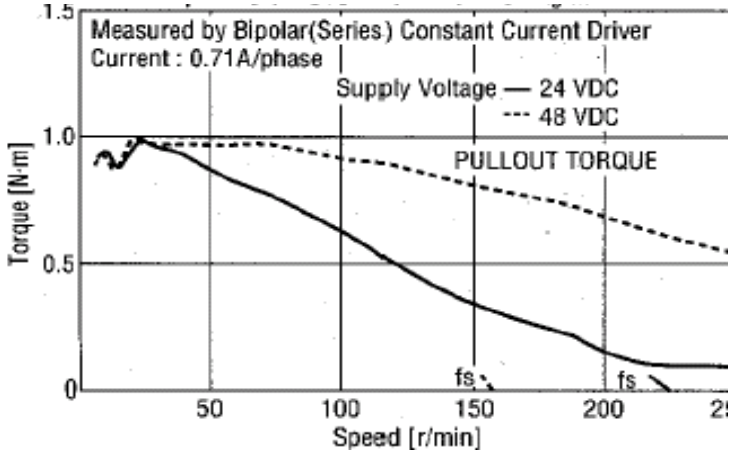


Figure 2: Example Speed-Torque characteristic Pollux-Box

Limit switches

Limit switch inputs

Pollux provides two endswitch inputs within the 10pin RJ45 connectors or the "D" Type connector of Pollux-Box. The switch inputs are termed cal-Input and rm-Input.
Herewith also the function of these inputs is described.
The limit switch functions supported by Pollux are linked to these inputs; no other function can be assigned to them.

Limit switch functions

Following limit switch functions are provided.

- **move to the cal-switch (Venus-2 command *ncal*)**

The controller moves in negative position until the cal-endswitch is pressed and released.

- **move to the rm-switch (Venus-2 command *nrm*)**

The controller moves in positive position until the rm-switch is pressed and released again.

Switch types

Pollux supports the following endswitch types:

- **mechanical switches (*opener* / *closer*)**
- **inductive proximity switches NPN**
- **photo sensors**

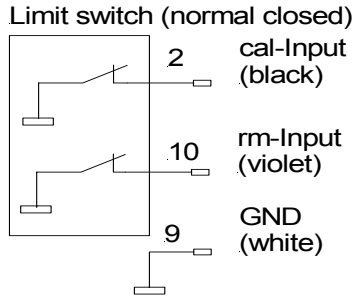
The function *opener* or *closer* is determined with the Venus-2 command ***setsw*** and is saved with ***nsave***.

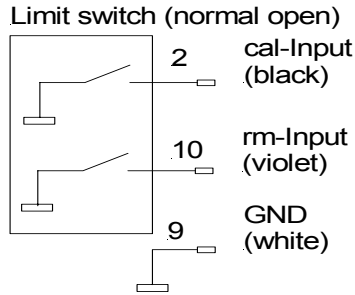
Procedure to configure the limit switch inputs

Go through following steps:

1. Define the switch type settings, see command ***setsw***
2. Store the settings, see command ***nsave***
3. Perform a softreset, see command ***nreset***

Limit switch wiring via RJ45 connector





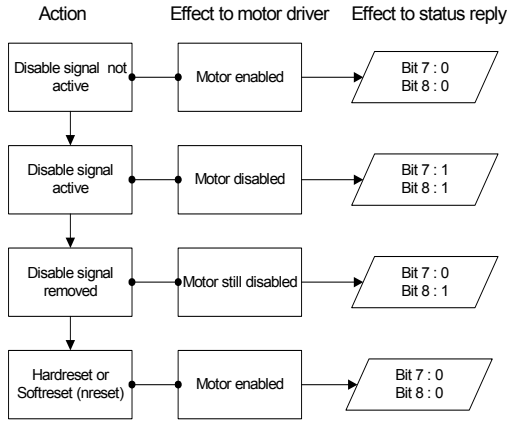
Pollux-Box uses the same wiring schemes.
The pin numbers are different. See chapter "Connectors".

Safety device (Option)

For safety reasons Pollux can be equipped with an additional input to disable motor power. In this state the motor has no holding torque.
Nevertheless the Pollux controller is able to communicate via the RS-232 Interface, so the motor disable status can be read out from the software.
To start the motor driver after a motor disable condition, first the disable input signal must be removed and a hard reset or software reset must be performed.
The reply of Venus-2 command ***nstatus*** is reflecting the safety device condition in Bit 7 and Bit 8
See Venus-2 command language.

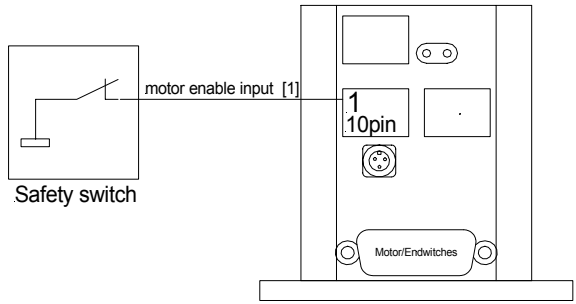
Principal function

Following chart demonstrates the effect of the motor disable input onto motor driver and controller status replies.

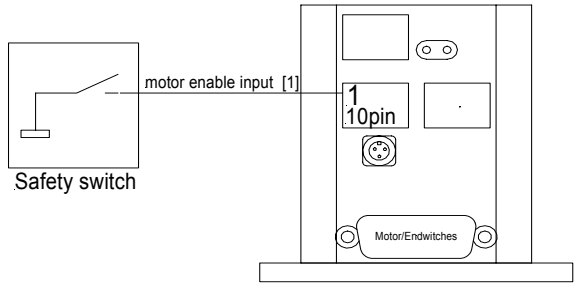


Safety switch wiring

Motor driver enabled



Motor driver disabled



Chapter 3

Connectors

Limit switch connector (1 x 10 pin RJ45)

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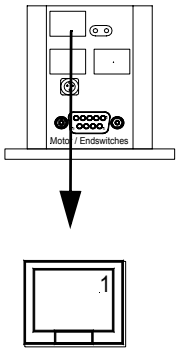


Pin	Name	Description
1	+5V	Power output
2	cal-Input *getmotiondir* = 0 rm-Input *getmotiondir* = 1	Limit switch input "cal" or "rm", Depends on the settings of ***setmotiondir***
3	not used	
4	not used	
5	not used	
6	not used	
7	not used	
8		
9	GND	Ground
10	rm-Input *getmotiondir* = 0 cal-Input *getmotiondir* = 1	Limit switch input "cal" or "rm", Depends on the settings of ***setmotiondir***

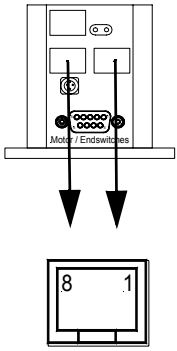
Important:
Do not plug in any cable while the system is running.

RS-232 connectors (2 x 8 pin RJ45 connector)

To simplify daisy chain operation, the Pollux 24V power input is also integrated in the RS-232 connectors.
In this manner the power supply of maximum two Pollux devices can be daisy chained.
If more than two Pollux devices should connected to the RS-232 line, it is recommended to supply the controllers via the additional circular power connector separately.

If a device is supplied via the power connector, the voltage is also impressed at the RJ45 connectors.

Important:
Do not plug in any cable while the system is running.



Pin	Name	Description
1	nc	
2	nc	
3	GND	Ground
4	RxD	Pollux RS-232 receive input
5	TxD	Pollux RS-232 transmit output
6	nc	
7	GND	Ground
8	24V	Power

RS-232 connector with "safety device" support (Option)

If Pollux supports the safety device function, the hardware is equipped with one RS-232 10pin RJ45 connector instead of a 8pin type. With this connector two Pin‘s are added. Therefore the pin arrangement of this connector has changed.
See following table.

Motor enable function:

- **If motor enable input is set to GND, the motor is enabled.**
- **If motor enable input is open or VCC, the motor is disabled.**

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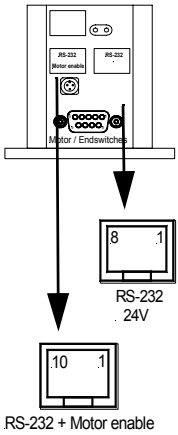


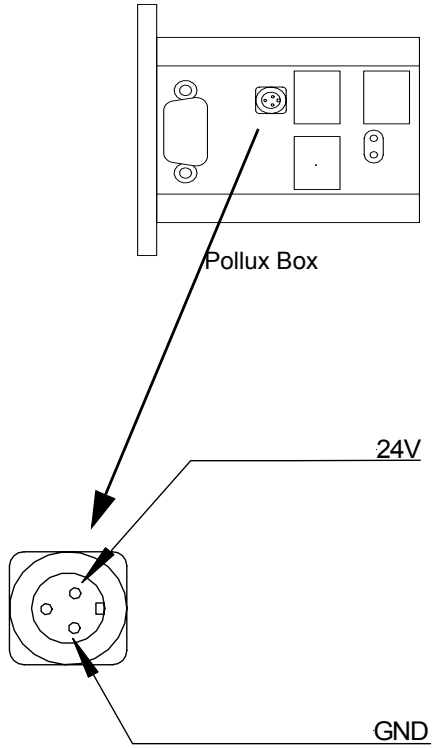
Pin	Name	Description
1		Motor enable
2		
3		
4	GND	Ground
5	RxD	Pollux RS-232 receive input
6	TxD	Pollux RS-232 transmit output
7	nc	nc
8	GND	Ground
9	24V	Power
10	24V	Power

Power Input (3 Pin circular connector)

With this connector Pollux is provided to connect a power supply separately.

If the power is connected via the RJ45 connector, the 24V input voltage is also impressed at the circular connector pins.

Important:
Do not plug in the power cable while the power is On.



Motor connector Pollux-Box with D" Type 9 (Standard)

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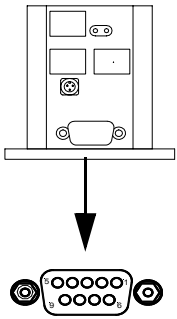

Pin	Name	Description
1	Ph 1A	Motor phase 1 A
2	Ph 1B	Motor phase 2 B
3	Ph 2A	Motor phase 2 A
4	Ph 2B	Motor phase 2 B
5	GND	Ground
6	cal-Input if *getmotiondir* = 0 rm-Input if *getmotiondir* = 1	Limit switch input "cal" or "rm". Depends on the settings of ***setmotiondir***
7	rm-Input if *getmotiondir* = 0 cal-Input if *getmotiondir* = 1	Limit switch input "cal" or "rm", Depends on the settings of ***setmotiondir***
8	+5V	Power output
9	nc	not connected

Motor connector Pollux-Box with "D" Type 15

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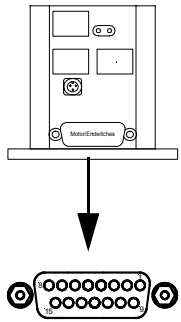
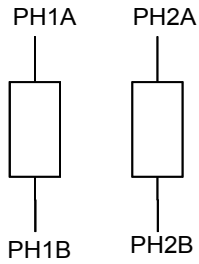


Motor / Limits

Pin	Name	Description
1	Ph 1A	Motor phase 1 A
2	Ph 1B	Motor phase 1 B
3	Ph 2A	Motor phase 2 A
4	Ph 2B	Motor phase 2 B
5	nc	not connected
6	+5V	Power output
7	nc	not connected
8	nc	not connected
9	Ph 1A	Motor phase 1 A -> (Pin 1)
10	Ph 1B	Motor phase 1 B -> (Pin 2)
11	Ph 2A	Motor phase 2 A -> (Pin 3)
12	Ph 2B	Motor phase 2 B -> (Pin 4)
13	cal-Input if *getmotiondir* = 0 rm-Input if *getmotiondir* = 1	Limit switch input "cal" or "rm". Depends on the settings of ***setmotiondir***
14	rm-Input if *getmotiondir* = 0 cal-Input if *getmotiondir* = 1	Limit switch input "cal" or "rm", Depends on the settings of ***setmotiondir***
15	GND	Ground

Pollux Box motor wiring

2 Phase Stepper Motor



For your notices: