

# ***Automatization***

***for the  
PC-controlled milling machine***



***Edition A2003-11  
A6Z 640 020***



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### Pneumatic unit

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### Pneumatic vice

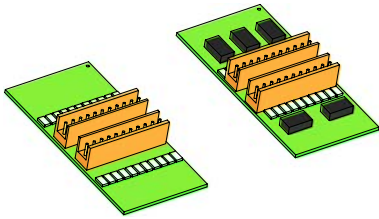
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## Automatization-Survey

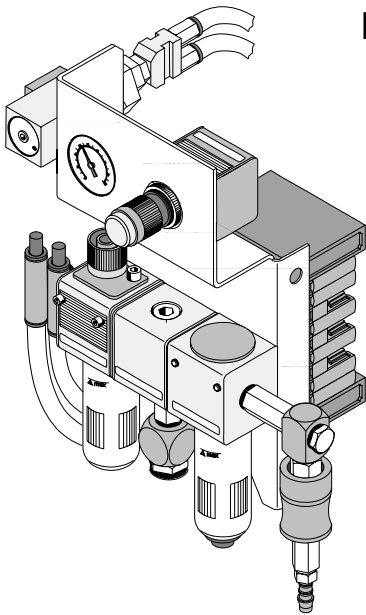


### I/O-Extension

#### Prerequisite for:

- Automatic door mechanism
- Pneumatic vice
- Robotics interface

Order-No. A6Z 640



### Pneumatic unit for

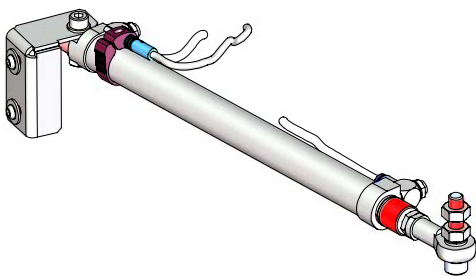
#### Prerequisite for:

- Automatic door mechanism
- Pneumatic vice with blow-out device

Order-No. F1Z 250

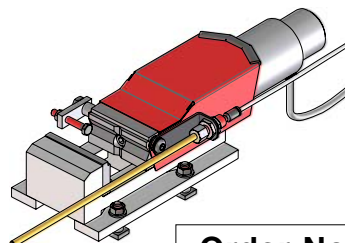
and/or

### Automatic door mechanism



Order-No. F1Z 210

### Pneumatic vice with blow-out device

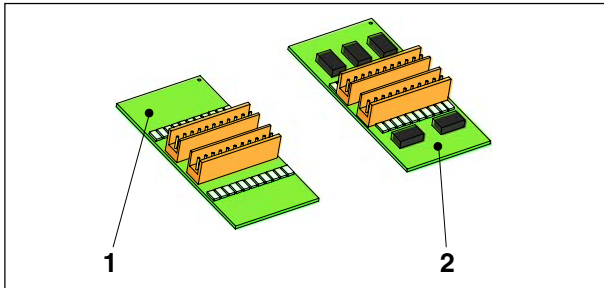


Order-No. F1Z 720



### Robotics interface

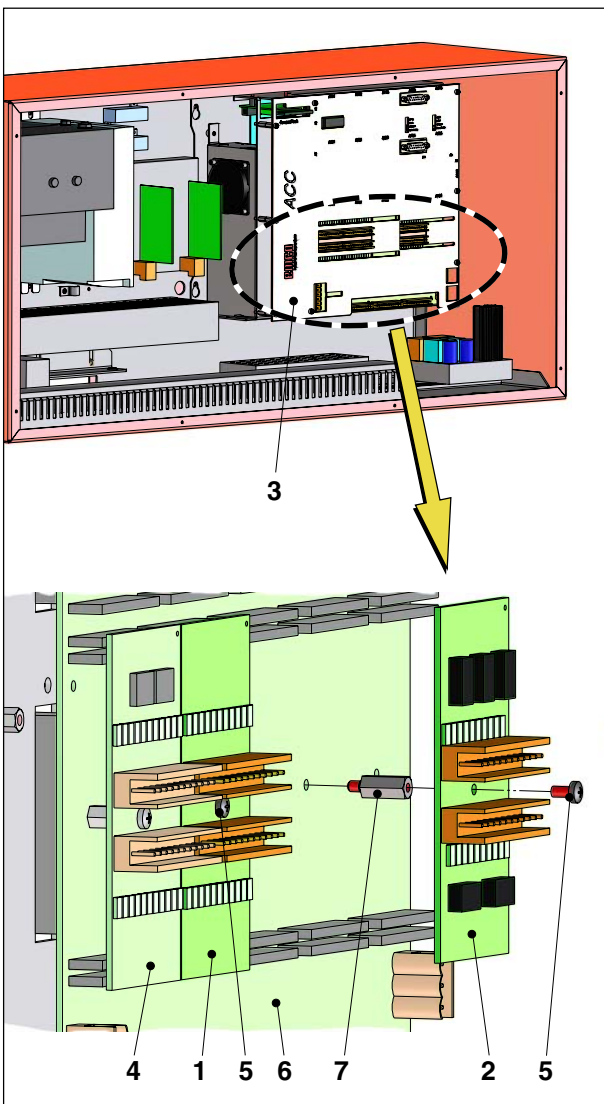
Order-No. X1A 000



I/O-extension modules

**Danger:**

Mounting the I/O-modules may only be carried out by an electrician expert and during machine standstill. (Take off mains plug!).



Backside of machine - mounting the I/O-modules

## I/O-Extension

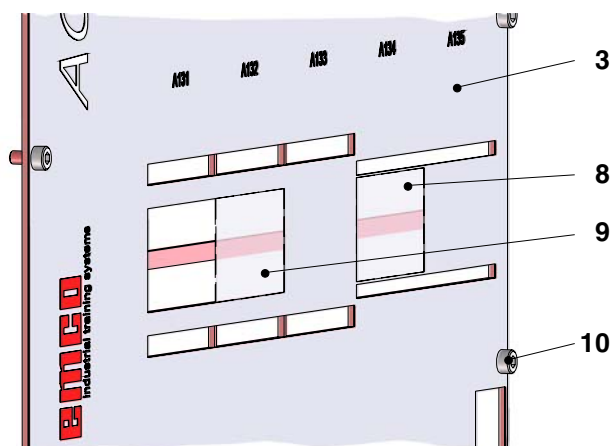
Order-No. .... **A6Z 640**

The I/O-extension is necessary for triggering the automatization devices.

Furthermore there are inlets and outlets on the I/O-modules for triggering other devices such as e.g. a robot control.

## Mounting the I/O-modules

- Take off cover of electrical cabinet on the rear side of the machine
- Dismount front plate (3) of the ACC-axis controller by untightening the 8 socket head screws KS2,5 (19).
- Untighten the screws M2,5x5 on the board (6) at the positions "A132" and "A134" (see front plate), and replace it with the distance bolts (7).
- Put the input-module (1) at the position "A132" of the board (6) (right side of the reference module (4)).
- Put output-module (2) at the position "A134".
- Fix the modules with the screws M2,5x5 (5).
- Clip out the perforated parts at the positions "A132" and "A134" of the front plate (3) and mount the front plate.



## Pneumatic unit

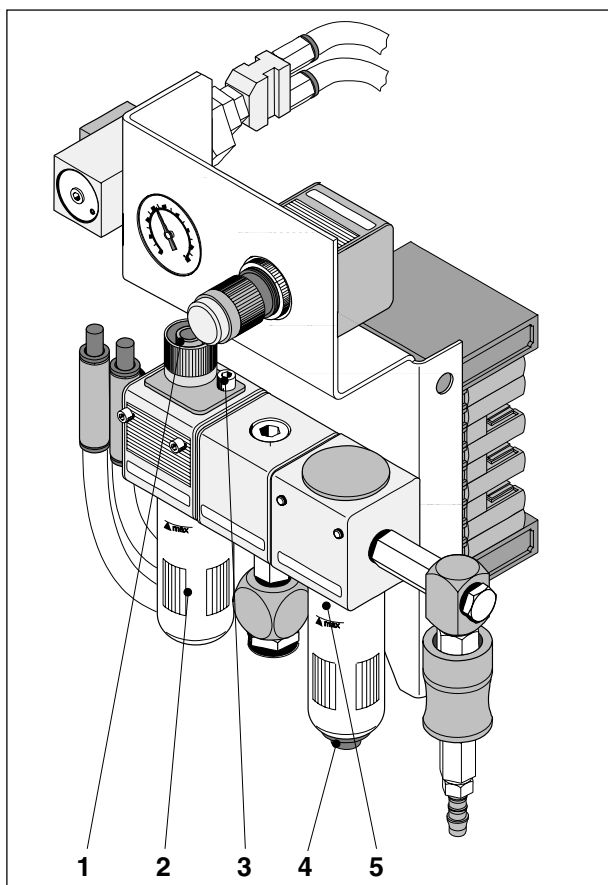
**Order No. .... F1Z 250**

The pneumatic unit is needed for the automatic door mechanism and/or the pneumatic vice with blow-out device, minimal coolant device and the blow-out device of the tool magazine.

It contains all connections and valves to be able to trigger the accessories.

Supply pressure ..... 4-6 bar

Pneumatic connection .....  $\varnothing 10$  mm



*Pneumatic maintenance unit*

### Maintenance

The oil level of the compressed-air oiler has to be controlled daily at the tank (2) of the maintenance unit.

If necessary an adequate oil has to be refilled.

- Screw off filling screw (3) and fill in oil up to the "max" mark at the tank (2).
- The control knob (1) serves for setting the mixture ratio air/oil.  
It is preset by the manufacturer and should not be changed.

### Oil quality for compressed-air oiler

Pneumatic oil DIN 51 524 ISO VG 32

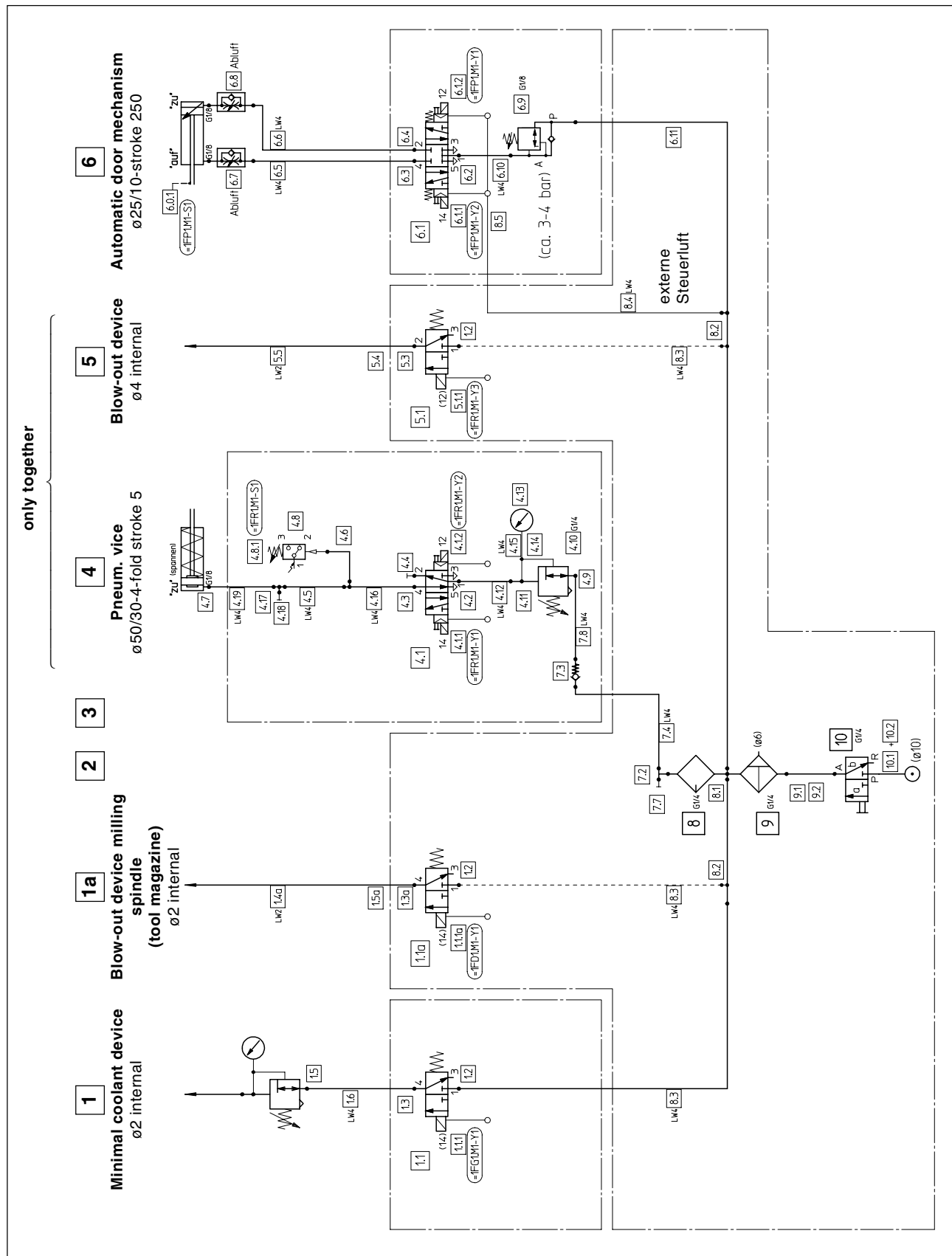
e.g. CASTROL Magnaglide D 32  
MOBIL HLP 32

### Water separator

To keep the compressed air as free as possible from water a water separator is installed in the maintenance unit.

The separator tank (5) is emptied by unscrewing the screw plug (4).

## Pneumatic scheme



Pneumatic scheme with all available options



## Pneumatic vice

The pneumatic vice is mounted as option by the manufacturer.

A prerequisite is a pneumatic maintenance unit available as option.

In the scope of supply also a blow-out device is included.

When adjusting the copper tube mind that the tools clamped in the tool drum can be swivelled through without collision.

Distance of jaws ..... max. 70 mm

Width of jaws ..... 72 mm

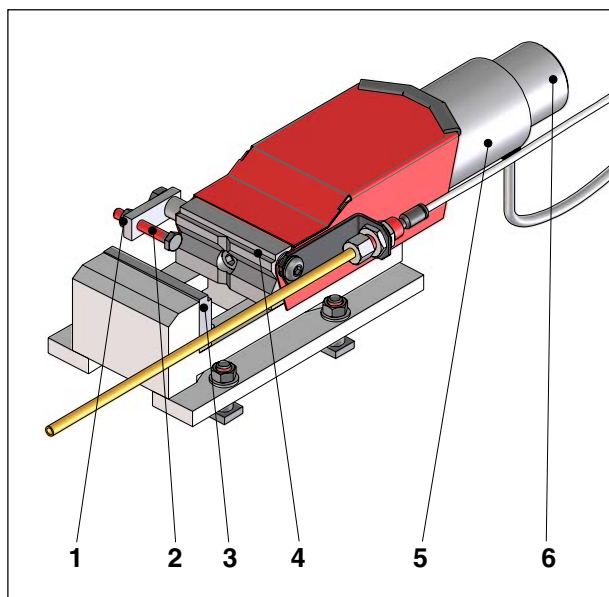
Jaw stroke ..... 5 mm

Clamping force ..... max. 3000 N

**Order no. .... F1Z 720**

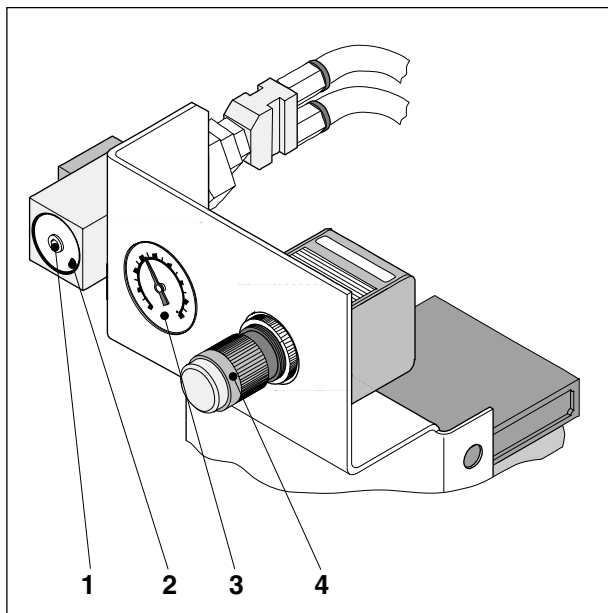
## Adjusting the clamping position

For easier clamping of cylindrical workpieces prisms are installed in the clamping jaws of the vice in horizontal and vertical direction.



*pneumatic vice*

- Set clamping device state of the control on "Release" (message "Vice open!" is displayed on the screen).
- Place workpiece on vice against the clamping jaw (3) of the vice.
- Approach clamping jaw (4) of the vice by turning the knurling wheel (5) up to a distance of approx. 2 mm from the workpiece (adjust jaw distance via the workpiece length to be clamped).  
When turning the knurling wheel mind that the sliding valve (6) does not turn with the wheel (counterhold).
- Laterally at the vice a stop is mounted on the clamping jaw (4) which has to be adjusted by twisting the hexagon screw M6×40, SW10 (2). The adjustment is fixed by means of the counter nut SW10 (1).  
A second setting screw (2) M6×20 is contained in the scope of supply of the vice. It should be used for wider workpieces to avoid a collision of the milling head with the setting screw.
- When closing the vice via the control the workpiece is clamped with the set pressure (the jaw stroke of the clamping jaw (4) is 5 mm).



Setting the clamping device pressure

## Setting the clamping device pressure

The clamping force of the vice can be regulated by changing the air pressure at the pneumatic maintenance unit.

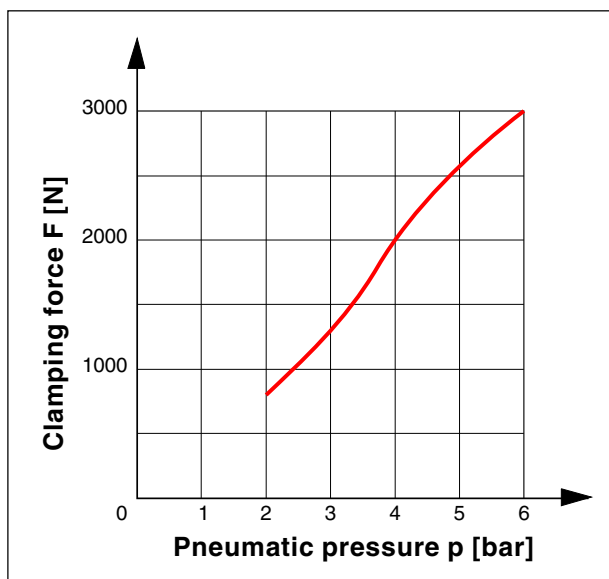
Additionally a press switch is mounted which controls the pressure set at the manometer.

If the set pressure is not achieved an alarm message is displayed on the screen.

- Close clamping device.
- Set clamping device pressure – 0,5 bar.  
Set pressure which lies about 0.5 bar below the desired clamping device pressure by means of the turning knob (4) at the pressure control unit. The set pressure can be read at the manometer (3).
- Loosen fixation screw (2) at the press switch.
- Turn setting screw (1) at the press switch until the message "*Vice not ready*" is displayed on the screen.

Increase pressure ... turn in clockwise direction  
Reduce pressure ..... turn in counter-clockwise direction

- Tighten fixation screw (2) with caution.
- Set desired clamping device pressure at the turning knob (4) of the pressure control unit.
- Acknowledge the alarm message on the screen.  
If the workpiece is clamped again no alarm message must be displayed on the screen.

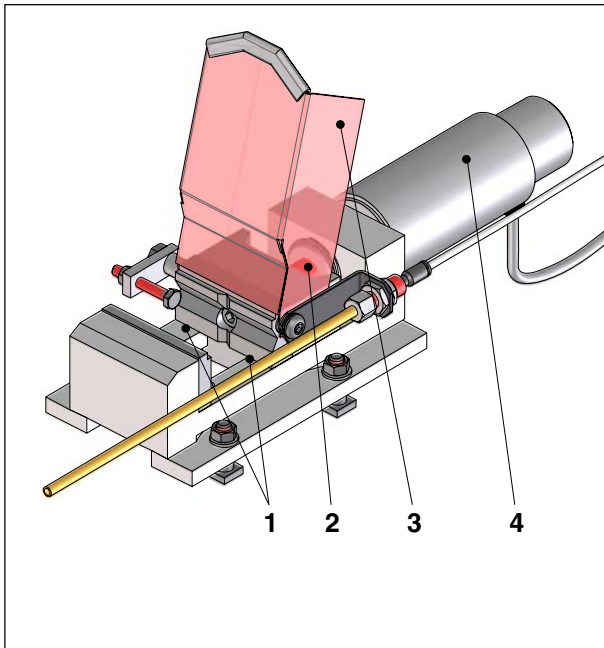


Clamping force diagram for vice

## Standard values for the clamping pressure

Minimum clamping pressure ..... 2 bar  
Maximum clamping pressure ..... 6 bar

The clamping forces with set clamping pressure are to be seen at the opposite diagram.



*Lubricating the vice*

## Maintenance

Clean the vice daily (every 8 hours) from chips and other kinds of dirt to avoid damage at the jaw guides and to guarantee safe clamping.

The jaw guides (2) have to be lubricated daily (every 8 hours) with slideway oil after cleaning (see lubricant recommendations).

The vice spindle has to be lubricated with grease approx. every 200 hours (once a year).

The spindle can be reached after closing the jaws at the knurled wheel (5) and opening the cover (4).

The cover (4) can be swivelled upwards by loosening the hexagon screw SW13 (1) and the fillister head screw SW5 (3).

## Robotics interface

Order no. .... X1A 000

With the robotics interface the machine can be connected to further machines and devices (e.g. a robot).

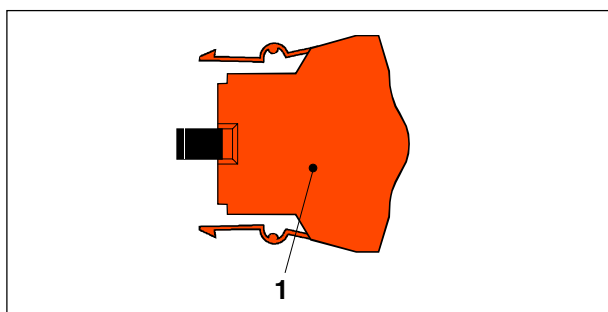
The robotics interface consists of a disk, the software has to be installed

### Break contact

The break contact (1) can be mounted at the base of the EMERGENCY-OFF key.

If, with mounted and correctly connected break contact, the EMERGENCY-OFF key on the machine is pressed, this EMERGENCY-OFF state is reported also to the robot connected.

Information on the cabling of the break contact can be seen in the manual of your robot.



*Break contact for emergency-off state on the robot*

#### Note:

The outlets and inlets at the I/O-board for triggering the robot are also to be seen in the electric documentation of your machine.



### Safety

With the integration of the machine in a complete system, you have to pay attention following:

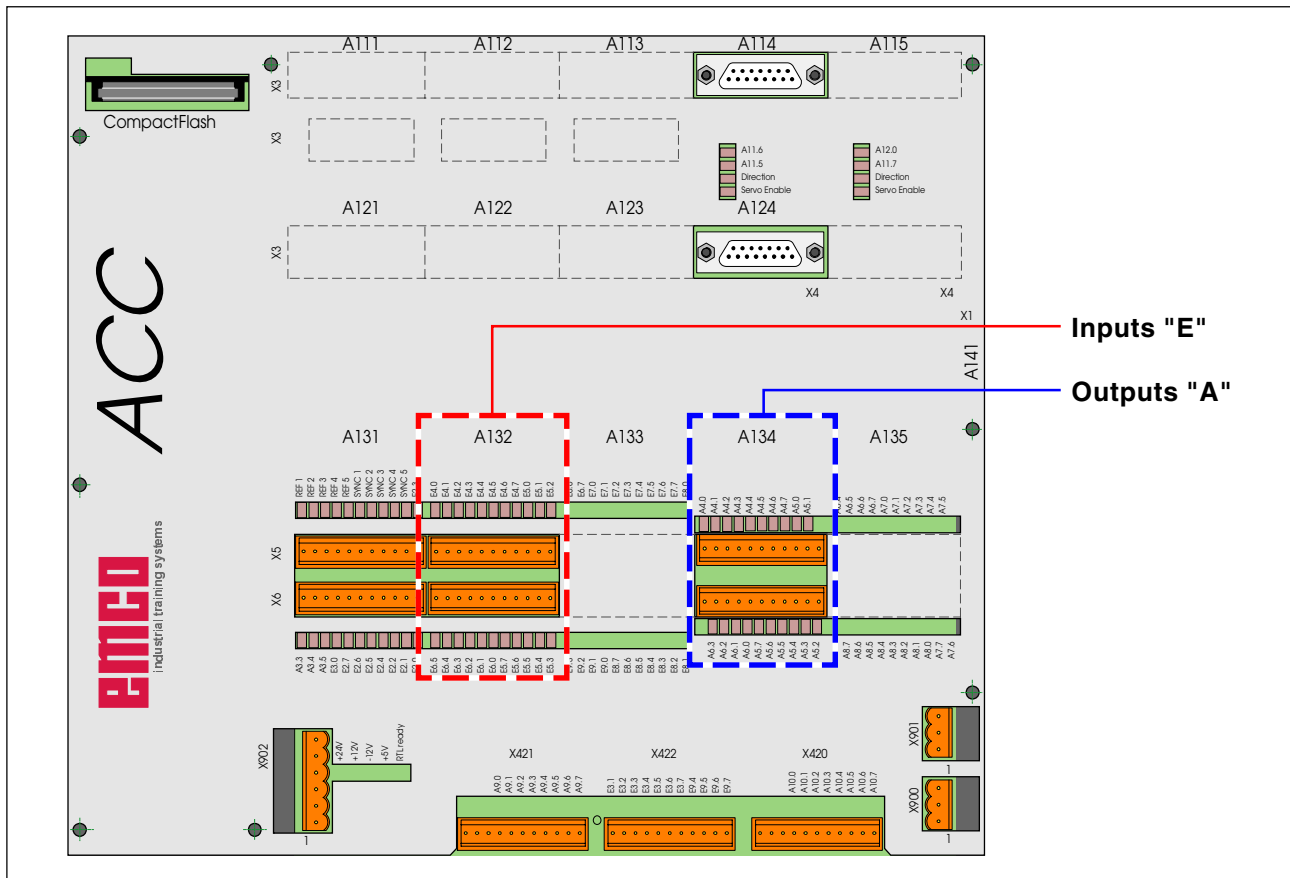
- The automatic closing of the machine door applies in accordance with CE-guidelines as a dangerous movement.
- Therefore special precautions have to be set, for the protection of persons (safety fence, footstep maps, optical safety devices, ...).
- Further the machine may only be started up, if the CE-conformity of the complete system is established, in which the machine is integrated.



#### Danger:

The inputs and outputs on the robotic board are **NOT** potential-free (not insulated)!

## In-/ Outputs on the robotic board



INPUTS	
Signal level	0 V...5 V      LOW 15 V...24 V    HIGH
Input impedance	2 kΩ
Signal	Description
E 5.0	<b>Close pneumatic machine door with robotics</b> With a +24V signal the input will be selected, until machine door is closed
E 5.1	<b>Open pneumatic machine door</b> With a +24V signal the input will be selected, until machine door is open
E 5.2	<b>Open clamping device</b> With a +24V impuls (min 0,5s) the pneumatic clamping device will be opened
E 5.3	<b>Close clamping device</b> With a +24V impuls (min 0,5s) the pneumatic clamping device will be closed
E 5.6	<b>Start program</b> With a +24V impuls (min 0,5s) the program will be started, which is set on the machine
E 5.7	<b>Stop feed</b> With a +24V signal the axis-movements could be stopped

OUTPUTS	
<b>Signal level</b>	20 V...24V HIGH
All outputs are overload protected and bearable with 0.2 A	
Signal	Description
<b>A 5.0</b>	<b>Machine in the Reset-state</b> +24V signal if on the machine M0,M1,M2 or M30 is active.
<b>A 5.1</b>	<b>Axes are standing on reference-point</b>
<b>A 5.3</b>	<b>Pneumatic door open</b> +24V signal if the pneumatic machine door is open
<b>A 5.4</b>	<b>Pneumatic door closed</b> +24V signal if the pneumatic machine door is closed
<b>A 5.5</b>	<b>Clamping device open</b> +24V signal if the clamping device is open
<b>A 5.6</b>	<b>Clamping device closed</b> +24V signal if the clamping device is closed
<b>A 5.7</b>	<b>Output on the axiscontroller!</b> <b>Alarm-output</b> The output has a +24V signal, if a machine-alarm occurs

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