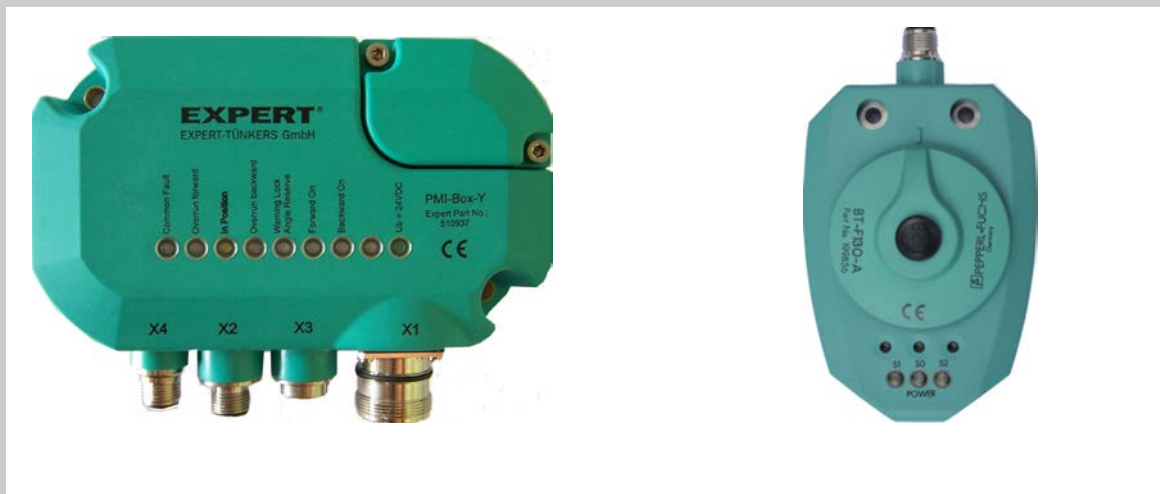


Installation and operating instructions

Turntable control SmartTurn



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1 General Information

1.1 Information about this manual

This manual enables safe and efficient maintenance of the device.

The manual is a component of the device and must be kept accessible to specialized personnel in the immediate vicinity of the device at all times.

The basic prerequisite for safe work is compliance with all safety instructions and handling instructions specified in this manual.

In addition, the local accident prevention guidelines and general safety regulations for the devices's area of implementation apply.

Illustrations in this manual are provided for basic understanding and can deviate from the actual model of the device.

General Information

1.2 Explanation of symbols

Warnings

Warnings are indicated by symbols in this operating manual. The warnings are introduced by signal words that express the scope of the hazard.

The warnings must be strictly heeded, you must act prudently to prevent accidents, personal injury, and property damage.



DANGER!

... indicates an imminent dangerous situation that can result in death or serious injury if it is not avoided.



WARNING!

... indicates a possible dangerous situation that can result in death or serious injury if it is not avoided.



CAUTION!

... indicates a possible dangerous situation that can result in minor injury if it is not avoided.



CAUTION!

... indicates a possible dangerous situation that can result in material damage if it is not avoided.

Tips and recommendations



NOTE!

... indicates useful tips and recommendations, as well as information for efficient and trouble-free operation.

1.3 Disclaimer

All information and instructions in this operating manual have been provided under due consideration of applicable guidelines, the current state of technology, as well as our many years of experience.

The manufacturer assumes no liability for damages due to:

- Failure to heed the instructions in the manual
- Non-intended use
- Deployment of untrained personnel
- Unauthorized conversions
- Technical changes
- Use of non-approved replacement parts

The actual scope of delivery can vary from the explanations and graphic representations provided in this manual in the case of special versions, if supplemental order options are desired, or on the basis of the latest technical changes.

In all other respects the agreed obligations in the delivery contract, the general terms and conditions, as well as delivery conditions of the manufacturer, and the statutory regulations valid at the time the contract was concluded, apply.

We reserve the right to make changes in the interest of enhancements and improvement of the performance characteristics.

1.4 Copyright

Treat this operating manual with confidentiality. It has been exclusively prepared for personnel working with the device. Provision of the operating manual to third-parties without written consent from the manufacturer is prohibited.



NOTE!

The content, texts, drawings, graphics, and other presentations are protected by copyright and are subject to commercial property rights. Any improper use is punishable.

Duplication in any form - including excerpts - as well as exploitation and/or communication of the content are not permitted without a written declaration from the manufacturer. Actions to the contrary make damage compensation mandatory. We reserve the right to enforce additional claims.

General Information

1.5 Replacement parts



WARNING!

Safety risk if the wrong replacement parts are used!

Incorrect or defective replacement parts can cause damage, malfunction, or total failure; they can also impair safety.

Therefore:

- Only use manufacturer's original replacement parts.

Purchase replacement parts directly from the dealer. See page 2 for manufacturer's address

The replacement part list is in the Appendix

1.6 Guarantee terms

The guarantee terms are included in the manufacturer's terms and conditions, the order confirmation, or manufacturer's contract documents.

1.7 Customer service

Our customer service organization is available for technical information. See page 2 for contact data.

Our employees are always interested in new information and experiences associated with the application, and which could prove valuable in improving our products.

For questions or ordering of replacement parts, please specify the types and serial numbers.

2 Safety

This section provides an overview of all the important safety aspects for optimal protection of personnel, as well as for safe and trouble-free operation.

Significant hazards can occur if the handling instructions and safety instructions in this manual are not complied with.

Comply with the instructions in the Installation and Operating Manual - Turntables



DANGER!
Danger of severe or fatal injuries!

Therefore:

- Strictly ensure that you have read the Installation and Operating Manual - Turntables



NOTE!

The safety instructions in the Installation and Operating manual - Turntables, and in the technical documentation must be strictly complied with.

The turntable controller is included as a component in the scope of delivery of a turntable.

2.1 Responsibility of the customer

The device is used in industrial applications. Consequently the owner of the device is subject to legal industrial safety obligations.

In addition, the customer is responsible to ensure that the system is always in technically faultless condition.

Compliance with the instructions in the operating manual is the prerequisite for trouble-free operation and the fulfillment of possible guarantee claims.

The operating manual contains important service instructions therefore it must be kept in a safe location.

Safety

2.2 Personnel requirements

2.2.1 Qualifications



WARNING!

Danger of injury due to insufficient qualification!

Improper handling can cause serious injury or material damage.

Therefore:

- Only have activities performed by personnel who are qualified to perform these activities.

Only persons from whom it can be expected that they reliably execute their work are considered as personnel. Persons whose capability to react is impaired, for instance through drugs, alcohol, or medication, are not approved.

- Comply with age-specific and job-specific regulations that are applicable at the installation site when selecting personnel.

2.3 Intended use



NOTE!

The following is prohibited unless the unit is designed exclusively for the application:

- *Use in Ex areas.*
- *Use in the vicinity of acids, gases, and fumes.*

The use conditions have been specified in the project planning.



WARNING!

Danger due to non-intended use!

Any use that extends beyond the intended use, and/or any other use of the device can cause dangerous situations.

Therefore:

- Only use the device as intended.
- Strictly comply with all instructions in this operating manual.

Claims of any type due to damage arising from non-intended use are excluded.

The customer is solely liable for all damage in the case of non-intended use.

Turntable controller - **SmartTurn**

The **SmartTurn** turntable controller is **only** designed to operate EXPERT-TÜNKERS turntables with fixed indexing and lock angles of 20, 30, 40 and 60 degrees. The step time must be greater than 1.5s.

Do not operate other turntables with the **SmartTurn** controller.

Safety

2.4 Environmental protection



CAUTION!

Environmental hazard due to incorrect handling!

Incorrect handling of environmentally hazardous substances, particularly improper disposal, can cause significant environmental damage.

Therefore:

- Always comply with the instructions cited below.
- If environmentally harmful substances should inadvertently get into the environment, initiate suitable measures immediately. If in doubt notify the responsible municipal authority about the damage.

Dispose of the controller as electrical and electronic waste.

Technical data - turntable controller

3 Technical data - turntable controller

SmartTurn sensor:

Dimensions (without plug-in connector)	Approximately 130x 75x 32mm WHD
Ambient temperature	-25 to +70 °C
Enclosure material	PBT
Degree of protection	IP67
Operating voltage	18-30 V DC
Operational current	0-100mA
Short-circuit protection	Clocked
Connection	M12x1 device plug-in connector

SmartTurn control unit:

Dimensions (without plug-in connector)	Approximately 150x 112x 33mm WHD
Ambient temperature	0 to +50 °C
Enclosure material	PBT
Degree of protection	IP65
Operating voltage	18-30 V DC
Operational current	0-150mA
Short-circuit protection	Clocked
Current carrying capacity outputs A1, A2	0 V
Current carrying capacity outputs A3-A9	0 V
Connections	X1, M23x1 device plug-in connector X2. M12x1 device plug-in connector X3. M12x1 device socket X4, M12x1 device plug-in connector - codiert

Structure and function

4 Structure and function

4.1 Overview

Sensor



Fig. 1 Sensor

Control unit



Fig. 2 Control unit

The **SmartTurn** turntable controller consists of the components:

- Inductive sensor, incl. Position encoder.
- Control unit.
- Sensor cable.
- Diagnostics cable (optional).
- PLC interface cable (optional).
- Connecting cable power unit (optional).

Structure and function

4.1.1 Device description

Sensor, Fig. 1

The sensor is equipped with:

- A connection for the control unit.
- One green LED and two yellow LEDs.

All three LEDs are illuminated when the sensor is connected to the control unit.

Control unit, Fig. 2

The controller is equipped with:

- Four connections for 24 V supply and PLC signals (X1), power unit (X2), sensor (X3), diagnostics connection (X4).
- Eight LEDs that enable fast and easy diagnosis. Faults are indicated through flashing red LEDs. More information about faults is provided in the *section -> Faults*.

LED	Function	Color
H1	System fault	Red
H2	Overrun forward	Red
H3	0-position	Yellow
H4	Overrun backward	Red
H5	End lock angle	Red
H6	Start forward on	Yellow
H7	Start backward on	Yellow
H8	Not assigned	-
H9	24 V power supply	Green

More extensive diagnoses is possible with the diagnostics software, via the diagnostics connection (X4).

Structure and function

4.2 Functional description

The **SmartTurn** turntable controller is used to control Expert-Tünkers fixed indexing turntables with any desired indexing.

The turntable can be operated in reverse mode and continuous mode.

The drive motors can be actuated directly via contactors or frequency converters.

The position encoder is mounted on the drive roller determined by position. This ensures a unique position of the drive roller, as well as of the turntable.

The sensor analyses the position encoder and transfers the position value to the control unit.

The control unit monitors the position value and the PLC signals.

With each activation the drive roller is rotated 360 degrees forward or backward. Thus the turntable is always cycled one index.

In special mode, depending on activation, 1-4 cycles will be rotated simultaneously per activation.

With each activation the drive roller is rotated 360 degrees forward or backward. Thus the turntable is always cycled one index.

If the turntable is in the 0 position, this is signaled to the PLC.

In reverse mode the forward and backward positions are output as a signal to the PLC.

Additional position sensing is necessary for turntables with more than 2 indexes or for continuous mode. For this possibility position sensing is supplied for the turntable plate as an option. In this case inductive sensors with individually-coded actuators are used.

Position sensing, standard:

Up to 15 positions are possible if there are no safety requirements.

Position sensing – safety:

1 to X positions with category 4 safety sensors.

Structure and function

4.2.1 Standard mode

In standard mode, continuous operation and reverse operation are differentiated.

Continuous mode



NOTE!

In normal operation the turntable only turns forward. The turntable controller cycles the turntable one clock cycle further with each "Forward on" activation.

The "Reverse on" activation should only be possible in jog mode in the PLC.

With "Reverse on" activation in continuous mode there is no switch off of the turntable movement through the turntable controller.

Necessary settings – continuous mode:

- Securely connect input E4 to 24 V DC.
- Set lock angle on switch S1 to setting 1 - 4 in accordance with EXPERT specification, see chap. 4.2.7.

Reverse mode



NOTE!

The turntable turns forward/backward between 2 positions (usually 180 degrees). The turntable controller cycles the turntable into the other position.

Necessary settings – reverse mode:

- Securely connect input E4 to 0 VDC.
- Set lock angle on switch S1 to setting 1 - 4 in accordance with EXPERT specification, see chap. 4.2.7.

Structure and function

4.2.2 Special mode

The turntable rotates depending on the selection via the PLC, 1 to 4 cycles forward or backward per activation. It can be rotated forward or backward as often as desired. The lock angle in special mode is fixed at 30°.

Necessary settings - special mode:

- Securely connect input E4 to 0VDC.
- Set lock angle on switch S1 to position 9.
- Pre-select the number of cycles.

Input E5 = LOW and E6 = LOW -> rotate 1 cycle

Input E5 = HIGH and E6 = LOW -> rotate 2 cycles

Input E5 = LOW and E6 = HIGH -> rotate 3 cycles *

Input E5 = HIGH and E6 = HIGH -> rotate 4 cycles *

* In preparation



NOTE!

In operation, the outputs, "0-position", "In lock angle", and "In position forward" or "In position back", will only be output after reaching the activated index, in accordance with the cycling: After activation with one clock cycle for the first index, after activation with two cycles for the second index, and so on.

However, if the movement is interrupted, e.g. through emergency stop, before reaching the activated position, and restarted, then first, regardless of the status of inputs E4/E5, the system will be stopped at the first 0 index of the drive roller.

Consequently, additional position sensing is necessary for turntables with more than 2 indexes.

Structure and function

Functional principle diagram

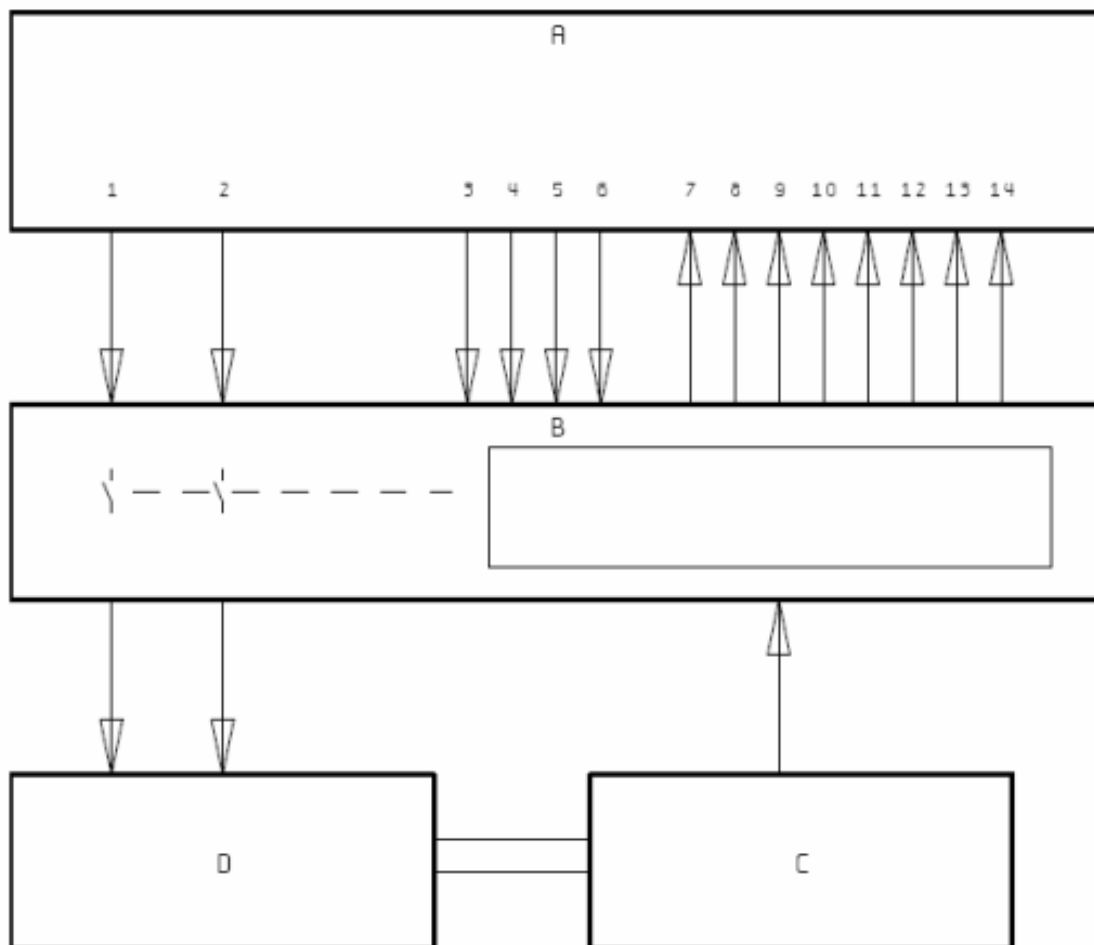


Fig. 3 Functional principle

A: PLC plant controller

- 1 "Start forward"
- 2 "Start backward"
- 3 "Slow ON"
- 4 „Operating mode"
- 5 "Pre-select cycles bit 1"
- 6 "Pre-select cycles bit 2"
- 7 "0-position"
- 8 „Overrun forward"
- 9 „Overrun back"
- 10 „End of the lock angle"
- 11 "Position forward"
- 12 „Position back"
- 13 „In the lock angle"
- 14 „System fault"

B: SmartTurn – control unit

- "Position analysis – controller"

C: SmartTurn – sensor

- "Turntable position"

D: „Turntable drive"

Structure and function

4.2.3 0-position optimization

With "Forward on" or "Backward on" the turntable controller checks the activated direction and the momentary position. If the result is OK, the output "Forward start" or "Backward start" is enabled.

The turntable will then start to rotate.

When the switch-off angle is reached, the output "Forward start" or "Backward start" is switched off and the turntable is stopped immediately.

With each rotation the turntable controller calculates the switch-off angle for the next rotation so that the turntable comes to a stop in the optimal 0-position.

When first switched on, a default value is used that is specific to the lock movement. Thereafter deviation from the optimal 0-position is determined and the switch-off angle is determined for the next rotation.

The 0-position is present when the position deviation does not exceed +/- 8 degrees based on the optimal 0-position.

If the turntable is in this position, the "0-position" signal is output to the PLC.

Calculation and optimization occur separately for forward and backward. Thus time-intensive settings at start-up are not necessary.

The turntable controller is self-adjusting and self-optimizing.

If, when switching on the operating voltage, a deviation to the last saved position is detected, then this results in a system fault.

**NOTE!**

See section -> System fault - note invalid sensor data, for additional instructions.

Structure and function

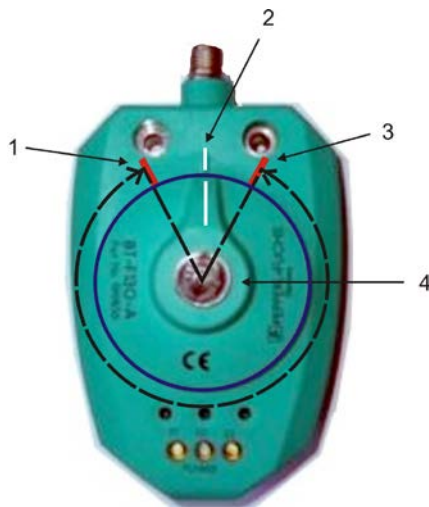


Fig. 4 0-position - sensor

0-position and switch-off angle at the sensor

- 1 Switch-off angle forward
- 2 0-position
- 3 Switch-off angle backward
- 4 Position encoder



CAUTION!

The turntable should not be activated with the "Slow on" activation in continuous mode

Therefore:

- Only use "Slow on" for inching mode, or if the turntable is started from an intermediate position.



NOTE!

There is no optimization for "Slow on" activation, in this case the system is always switched off at a fixed switch-off angle.

With "Backward on" activation in continuous mode, turntable movement is not switched off by the turntable controller.

"Reverse on" activation is only intended for inching mode in continuous mode to enable clearing, if necessary.

Structure and function

4.2.4 Brake wear monitor

If the switch off angle reaches the end of the lock movement, then the warning "End lock angle" is output to the PLC.



CAUTION!

Warning "End lock angle"!

Increased brake wear or abnormal conditions (e.g. due to overload) could be present that could damage the turntable.

Therefore:

- Check the brake on the motor.
- Check the turntable.

The turntable can still be operated, however the warning indicates that increased brake wear or abnormal conditions are present that could compromise safe turntable operation over a longer period of time.



NOTE!

Addition fault rectification instructions are provided in the section -> Sequence fault - warning end lock angle.

If the switch-off angle is more than 5 degrees outside of the lock movement, the warning "End lock angle" and "System fault" are output to the PLC.

The fault signals that increased brake wear or abnormal conditions are present that compromise safe operation of the turntable.

Further operation can cause damage to the drive elements.



CAUTION!

Switch-off over 5 degrees. Warning "End lock angle"!

Increased brake wear or abnormal conditions (e.g. due to overload) are present.

Therefore:

- Do not continue to operate the turntable.
- Check the motor on the brake and replace if necessary.
- Check the turntable.



NOTE!

Additional fault rectification instructions are provided in the section -> System fault - end of lock angle reserve reached.

Structure and function

4.2.5 Overrun monitor

If the 0-position is overrun during a rotation the warning "Overrun forward" or "Overrun backward" is output.

The warning is signaled to the PLC.

In reverse mode the fault is deleted by activation of "Reverse on" "Forward on" and leaving the overrun.

In continuous mode the fault is deleted with a subsequent "Forward on" activation. In continuous mode there is no "Overrun back" warning.

In special mode the fault is deleted through the "Forward on" or "Backward on" activation.



NOTE!

Additional fault correction instructions are provided in the section -> Sequence fault – Overrun forward / backward.

4.2.6 System monitoring

All important system components are monitored.

If an uncertain state that compromises safe operation of the turntable is detected, then the "System fault" output is set and the two outputs A1 and A2 are switched off immediately. Each activation is ignored by the PLC, the turntable movements are blocked.

System faults can be:

- Missing sensor data (sensor, sensor cable, or position encoder is defective).
- Invalid sensor data (deviation of the position data after switching on 24 V).
- Impermissible mode change.
- Short circuit on the outputs.
- End of lock angle reserve is reached.
- Internal device fault.
- Additional instructions on fault rectification are provided in the section -> System fault.



NOTE!

Additional instructions on fault rectification are provided in the section -> System fault.

Structure and function

4.2.7 Device settings - control unit

There are three setting possibilities on the control unit, S1, S2, and S3. They are behind a screw-fastened cover.

- S1 Settings mode – lock angle drive roller.
- S2 Reset system faults
- S3 Rotary direction, clockwise rotation – counter-clockwise rotation, drive roller

S1: Settings mode and lock angle

Rotary switch

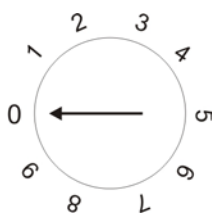


Fig. 5 Rotary switch – S1g

- | | |
|---|-----------------------------------|
| 0 | No function |
| 1 | Standard mode with 20° lock angle |
| 2 | Standard mode with 30° lock angle |
| 3 | Standard mode with 40° lock angle |
| 4 | Standard mode with 60° lock angle |
| 5 | No function |
| 6 | No function |
| 7 | No function |
| 8 | No function |
| 9 | Standard mode with 30° lock angle |

Use the rotary switch to set the respective lock movement of the drive roller.

When commissioned in the factory the drive roller is set appropriately. The default value is position 2 = 30 degrees. Settings other than positions 1-4 and 9 have no function. The settings of S1 and S3 must be marked on the inside of the cover.



NOTE!

If the device is replaced the value must be set appropriately.

S2 Reset system fault

Use the button to reset system faults on the device.



NOTE!

Additional instructions on fault rectification are provided in the section -> System faults.

Structure and function

S3 Rotary direction clockwise rotation - counter-clockwise rotation, drive roller



Fig. 6

R = clockwise rotation (default value)

L = counter-clockwise rotation

The rotary movement of the turntable plate depends on the rotary direction of the drive motor, and on the incline of the drive roller.

The turntable controller checks whether the forward/backward activation and the rotary direction of the drive roller agree.

Clockwise

In this setting the turntable controller expects drive roller / position encoder rotation to the right (clockwise) at "*Forward on*".

For "*Backward on*" left (counter-clockwise) rotation of the drive roller / position encoder is expected.

Counter-clockwise

In this setting the turntable controller expects drive roller / position encoder rotation to the left (counter-clockwise) at "*Forward on*".

At "*Backward on*" right (clockwise) rotation of the drive roller / position encoder is expected.

Structure and function

With the reversal of rotary direction, the rotary direction check of the drive roller can be reversed.

Clockwise is the factory setting.

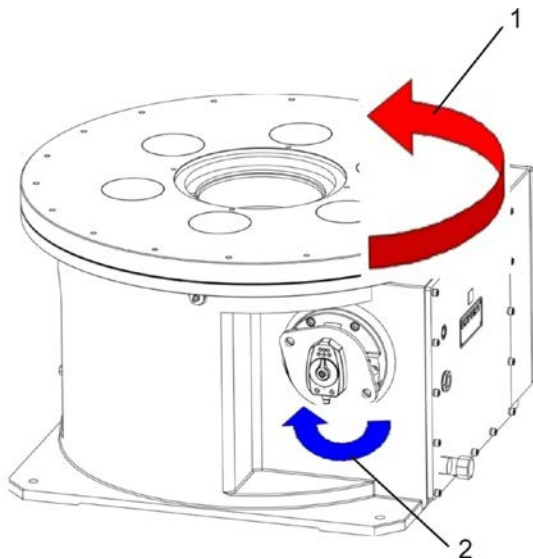
If the rotary direction of the drive roller does not agree with the setting, then this is detected as a fault at activation and the fault *"Wrong rotary direction"* is triggered.

If the device is replaced the rotary direction must be set appropriately.



NOTE!

Additional instructions in the section -> System faults – wrong rotary direction forward / backward.



Example:

Turntable with drive roller and left ascending groove. Counter-clockwise rotation should occur on the turntable plate at *"Forward on"* activation.

Connect motor so that clockwise rotation occurs at *"Forward on"* activation on the drive roller.

Setting the drive roller rotary direction: **Clockwise**

- 1 Counter-clockwise rotation of the turntable plate
- 2 Clockwise rotation of the drive roller

Fig. 7 Rotary direction example

Structure and function

4.3 Connections

Supply voltage

The control unit is operated with 24 V DC. The power is supplied via the PLC interface. The inputs/outputs have 24 V DC level, the outputs are short-circuit resistant.

4.3.1 Control unit, see Fig.

Designation	Connection	Description / plug-in connector
X1	PLC	Flange plug-in connector, M23x1, 19-pin
X2	Power	Flange connector M12x1, 4-pin
X3	Sensor	Flange socket, M12x1, 4-pin
X4	Diagnostics	Flange connector M12x1, 5-pin, B-coded



Fig. 8

Structure and function

4.3.1.1 Pin assignment control unit

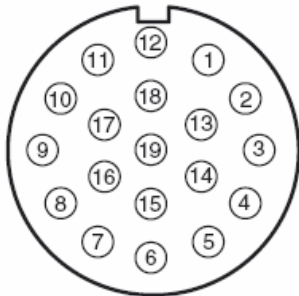


Fig. 9 Pin assignment control unit – X1

X1 – PLC interface

Pin	Pin assignment	Function
19	24V	24 V DC supply
6	0 V	Reference potential
12	PE	Protective conductor
1		NC
2		NC
3		NC
4		NC
5	E3	Input slow on
6	0 V	Reference potential
7	E4	Input mode
8	A3	Output 0-position
9	A4	Output overrun forward
10	A5	Output overrun backward
11	A6	Output system fault
12	PE	Protective conductor
13	A7	Output end lock angle
14	A8	Output position front
15	A9	Output position back
16	E5	Special mode pre-select cycles bit 1
17	A10	Sensor in the lock angle
18	E6	Special mode pre-select cycles bit 2
19	24V	24 V DC supply

Structure and function

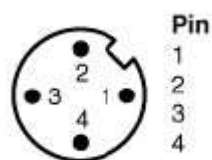


Fig. 10 Pin assignment control unit – X2

X2 – inputs/outputs power unit

Pin	Inputs	
1	E1	Forward on
3	E2	Backward on
Pin	Outputs	
2	A1	Forward start
4	A2	Backward start

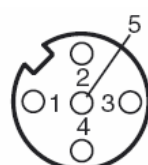


Fig. 11 Pin assignment control unit – X3

X3 – sensor interface

Pin	Pin assignment	Function
1	24V	24 V DC supply
2	T+	Cycle input
3	0 V	Reference potential
4	T-	Cycle input
5	X	NC

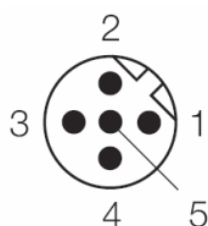


Fig. 12 Pin assignment control unit – X4

X4 – Diagnostics interface (RS232)

Pin	Pin assignment	Function
1	RxD	RxD
2	NC	NC
3	TxD	TxD
4	NC	NC
5	GND	GND

Structure and function

4.3.2 Sensor, see Fig. 1

Designation	Connection	Description / plug-in connector
-	Control unit	Flange connector M12x1, 5-pin

4.3.2.1 Pin assignment sensor

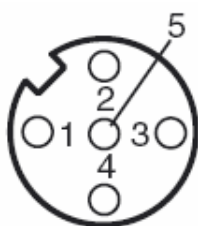


Fig. 13 Pin assignment sensor

X1 Data interface

Pin	Pin assignment	Function
1	24 V	24 V DC supply
2	T+	Cycle output
3	0 V	Reference potential
4	T-	Cycle output
5	X	N.a.

4.4 Optional components and accessories

Position sensing - standard

For simple position sensing without safety requirement up to a max. of 15 positions.

Contactless detection of turntable position through sensors and actuators based on transponder technology, thus wear-free and maintenance free.

One actuator per index is mounted on the turntable plate and thus a unique position of the turntable is supplied.

Version 1:

For a max. of 8 positions via position sensor and corresponding number of coded actuators. Output of the position via 8 NO contacts, pluggable connection.

Version 2:

For a max. of 15 positions via position sensor and corresponding number of coded actuators. Output of the position is binary-coded via 4 NO contacts and strobe output, pluggable connection.

Position sensing - safety

For position sensing of controller category 4

Contactless detection of turntable position through sensors and actuators based on transponder technology, thus wear-free and maintenance free.

A Klaschka SIDENT IV safety switch that is approved for controller category 4 SIL 3 is used.

Each sensor includes an individually-coded actuator, thus a high level of safety relative to manipulation is achieved. An appropriate number of sensors and actuators must be mounted depending on the index.

The 2-channel outputs can be directly routed to inputs of a safety PLC or a conventional safety switching device, pluggable connection.

Scope of delivery of the position sensing:

Sensors and actuators are mounted on the turntable ready to connect.

Installation and commissioning

5 Installation and commissioning



CAUTION!

Danger due to defective installation and commissioning!

Installation and commissioning errors can cause significant material damage.

Therefore:

- Only have trained, specialized personnel with sufficient experience install and commission the turntable.

5.1 Safety

Personnel

- Only trained, skilled personnel should perform installation and commissioning work.
- Only qualified electricians should perform work on the electrical equipment.

Electrical equipment



DANGER!

Life-threatening danger due to electric shock!

There is a life-threatening hazard when touching live components. Switched-on electrical components can move unexpectedly and can cause serious injuries.

Therefore:

- Safeguard the danger zone prior to starting all tasks.
- Ensure that there are no unauthorized persons in the danger zone.

Installation and commissioning

Safeguarding against restart



DANGER!

Life-threatening danger if restarted without authorization!

When installing and commissioning, there is danger of the power supply being switched on without authorization. This poses a life-threatening hazard for persons in the danger zone.

Therefore:

- Prior to starting all tasks switch off all energy supplies and safeguard them from being switched on again.

Reverse mode



CAUTION!

Material damage in reverse mode!

When commissioning in reverse mode the drive roller should not be in the overrun area. This would result in incorrect positions and cause damage.

Therefore:

- Do not traverse the drive roller into the overrun area.

5.2 Mounting instructions

Expert-Tünkers mounts the sensor and the position encoder on the drive shaft during the manufacturing process.

The customer can mount the control unit at suitable and easily accessible points with the connections facing down.

Avoid shocks. Take the length of the sensor cable into consideration when selecting the position.

5.2.1 Connecting to the power supply

- Installation and setup of the power supply is executed by the customer.

Installation and commissioning

5.3 Electrical installation

Connect the sensor and control unit via sensor cables. Only use the specified sensor cable.

Connect control unit and plant controller via cable to X1 and X2. Install the cables separate from high-voltage cables.

SmartTurn installation overview

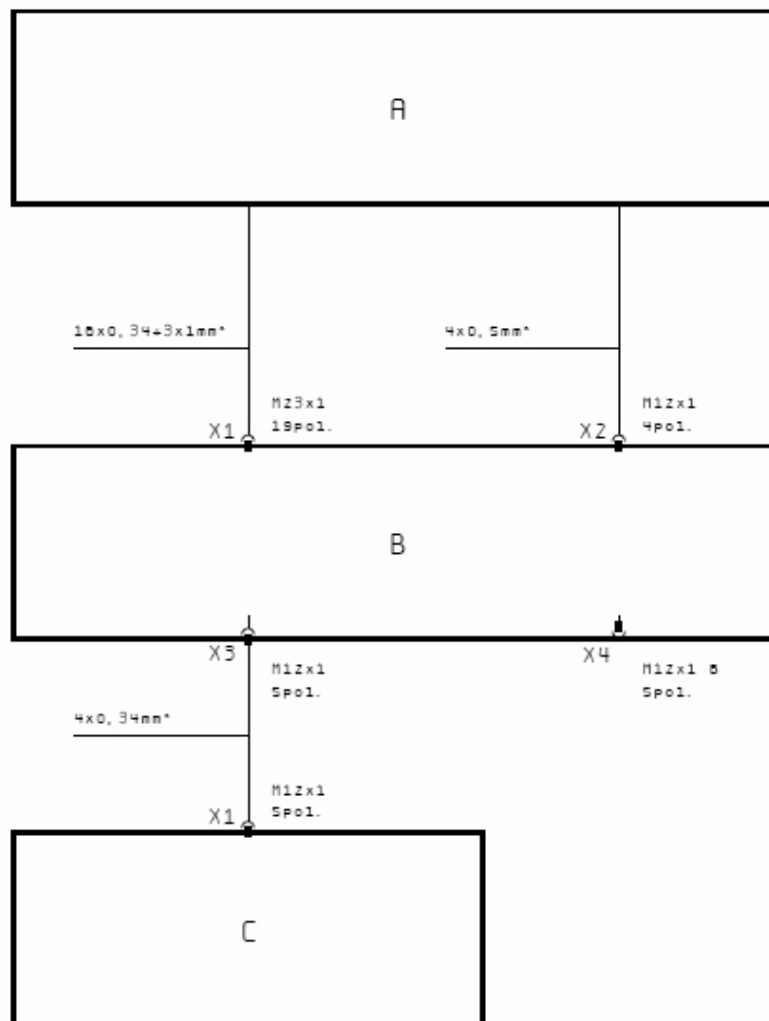


Fig. 14 Installation overview

- A Plant controller
- B Control unit
- C Sensor

Installation and commissioning

5.3.1 Description - PLC signals

All inputs and outputs are PNP-switching and potential-connected to 0VDC.

All outputs are short-circuit proof.

To protect the outputs, contactor coils that are connected to the outputs must be equipped with a varistor protective circuit.

Outputs A1 and A2 can be loaded with max. 0.6A at 24VDC (14W).
Outputs A3 to A7 can be loaded with a maximum of 0.25A at 24VDC (6W).

SmartTurn power supply

The permissible operating voltage for the SmartTurn control unit is between 18 and 30 V DC.

Pin	Connection
19	+24 V DC supply
6	0 V DC, reference potential inputs/outputs
12	PE

5.3.1.1 Inputs

Inputs – power unit – X2

E1 – forward on (pin 1)

The PLC sets the signal when the turntable should rotate forward.
The signal must be applied for the entire duration of rotation.

E2 – backward on (pin 3)

The PLC sets the signal when the turntable should rotate backward.
The signal must be applied for the entire duration of rotation.

Inputs power unit – X1

E3 – slow on (pin 5)

The PLC sets the signal when the turntable should rotate in creep speed.
For example, this is necessary when the rotary table should not be started from the 0-position.

Installation and commissioning



CAUTION!

Damage to drive elements at operating speed!

Material damage can occur on the drive elements!

Therefore:

- Do not start the turntable from a non-defined position.

E4 – operating mode (pin7)

The input must be permanently wired with 24 V or 0 V.

24 V must be applied on the input if the turntable will be operated in continuous mode.

0 V must be applied on the input if the turntable will be operated in reverse mode or special mode.

The mode of the turntable is communicated with the signal and appropriate checks are activated.

E5 – pre-select cycles bit 1 (only special mode) (pin 16)

See table for function.

E6 – pre-select cycles bit 2 (only special mode) (pin 18)

See table for function.

Functions of E5 and E6 is special mode.

E5	E6	Functions
0 V	0 V	Turn 1 cycle
24V	0 V	Turn 2 cycles
0 V	24V	Turn 3 cycles*
24V	24V	Turn 4 cycles*

* Functions in preparation

In reverse mode and continuous mode inputs E5 and E6 have no function.

Installation and commissioning

5.3.1.2 Outputs

Inputs – power unit – X2

A1 – forward start (pin 2)

Turntable rotation *forward* is enabled.

Output A1 is switched on when input E1 is activated.

Output A1 remains switched on until the turntable has reached the calculated switch-off angle in order to optimally come to a stop in the 0-position.

A2 - backward start (pin 4)

Turntable rotation *backward* is enabled.

Output A2 is switched on when input E2 is activated.

Output A2 remains switched on until the turntable has reached the calculated switch-off angle in order to optimally come to a stop in the 0-position.

Outputs power unit – X1

A3 – 0- position (pin 8)

The output (A3) is switched on when the drive roller is located in the defined lock movement position window of +/- 8 degrees.

The turntable is then in its basic position.

A4 – overrun forward (pin 9)

Output A4 is switched on, if after a start *Forward* the turntable has overrun the 0-position.

In reverse mode output A4 is also set when the turntable is in the forward position and an incorrect activation occurs from the PLC; 0-position (A2=on) + position forward (A8=on) + forward start (A1=off). If the PLC then switches forward start on (A1=on) again, the fault overrun forward (A4=on) will be set. The output 0-position (A2) continues to remain set. If the input forward start (A1) is switched off, then the fault overrun forward (A4) will be switched off again.



NOTE!

If the fault occurs you *must follow* the instructions in section -> 6.2.1 Overrun forward / backward.

Installation and commissioning

The overrun faults forward/backward A4 and A5 are set together if the two inputs forward on (E1) and backward E2 are simultaneously activated for longer than 120 ms. In this case the outputs forward start (A1) and backward start (A2) are switched off and blocked until E1 and E2 are off again.



NOTE!

If the fault occurs you *must follow* the instructions in section -> 6.2.1 Overrun forward / backward.

A5 – overrun backward (pin 10)

Output A5 is switched on, if after a "Start backward" the turntable has overrun the 0-position. The fault is only generated in continuous mode.

In reverse mode output A5 is also used when the turntable is in the back position and an incorrect activation occurs from the PLC; 0-position (A2=on) + position back (A9=on) + backward start (A2=off). If the PLC now switches backward start on (A2=on) again, then the fault overrun backward (A5=on) will be set. The output 0-position (A2) continues to remain set. If the input backward start (A2) is switched off, then the fault overrun forward (A5) will be switched off again.



NOTE!

If the fault occurs you must follow the instructions in section -> 6.2.1 Overrun forward / backward.

The overrun faults forward/backward A4 and A5 are set together if the two inputs forward on (E1) and backward E2 are simultaneously activated for longer than 120 ms. In this case the outputs forward start (A1) and backward start (A2) are switched off and blocked until E1 and E2 are off again.



NOTE!

If the fault occurs you must follow the instructions in section -> 6.2.1 Overrun forward / backward.

Installation and commissioning

A6 – system faults (pin 11)

Output A6 is switched on if faults are detected that compromise safe operation of the turntable. System faults can only be acknowledged on the turntable controller via the reset button.



NOTE!

When the fault occurs the instructions in section -> Monitor system must be complied with.

A7 – end lock angle (pin 13)

The A7 output is switched on if the switch-off angle has reached the end of the drive roller lock movement.



NOTE!

When the fault occurs the instructions in section -> Monitoring brake wear must be complied with.

A8 – position forward (pin 14)

Output A8 is switched on if the turntable is in the 0 position after one revolution forward.

A9 – position back (pin 15)

Output A9 is switched on if the turntable is in the 0-position after one revolution backward.

The output is not activated in continuous mode.

A10 – sensor in the set lock angle (pin 17)

The output is set when the sensor is in the lock angle that is set on switch S1. The signal can be used for a pre-enable. However the signal does not mean that the turntable is in the defined 0 position.

Installation and commissioning

5.3.2 System integration in the plant control system

Connection – brake

The brake application time of the brake used should not exceed 25 ms.

Switch the brake directly and not via the PLC.

The respectively valid safety guidelines for motor-brake activation must be complied with.

When using SEW motors, Expert-Tünkers recommends the use of a type BMKB1.5 brake rectifier.

If a brake rectifier, other than type BMKB1.5 is used, then it must always be wired on the direct current and alternating current sides so that the brake can work with fast application.

If motors from different manufacturers are used, then the wiring must be adapted in accordance with the specifications.

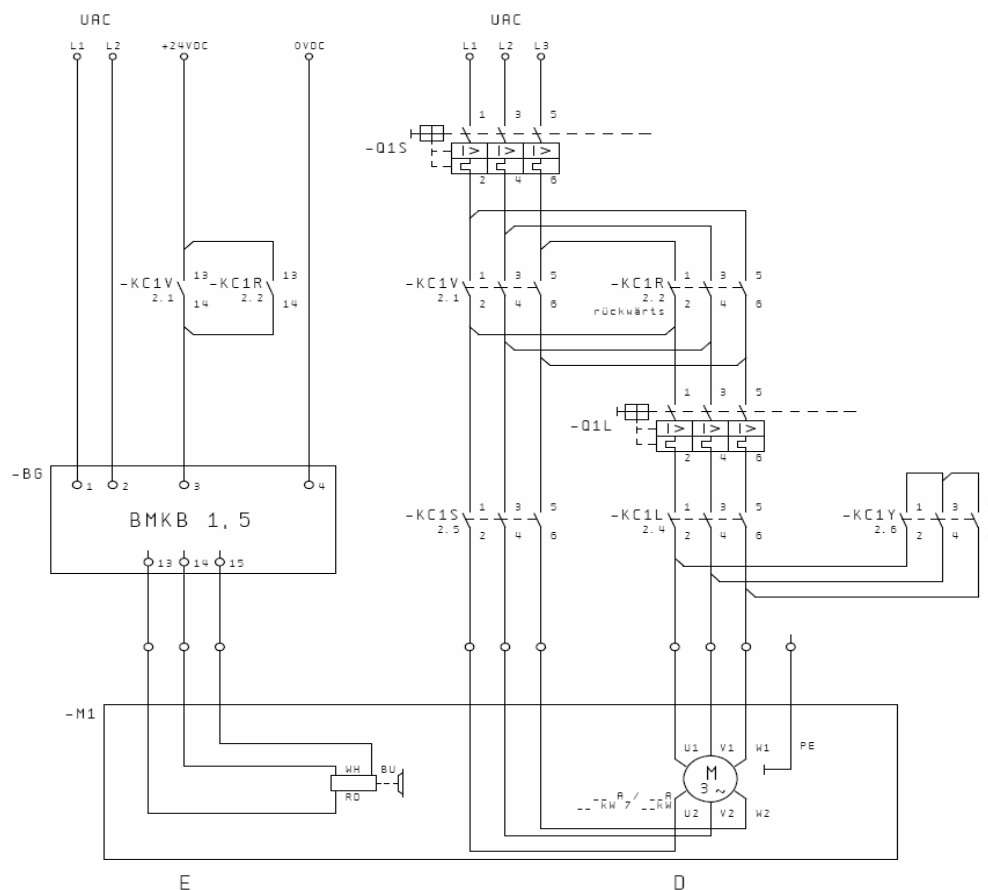


Fig. 15 SEW brake motor, switchable polarity with BMKB1.5 brake rectifier

E: Brake

D: Drive motor

Installation and commissioning

Connection - power unit

The connections of the power unit are on connector X2. Power unit and control unit of the SmartTurn are separated from each other internally. Semiconductors are used for switching the outputs.

If the use of safety functions in accordance with DIN EN ISO 13849-1 is necessary to safely stop the drive, then outputs A1, A2 and activation of the power contactors must be separated through coupling relays, see Fig. 16.

The SmartTurn power unit must only be directly wired into the plant controller from power contactors, if for operating the turntable **no** safety functions in accordance with DIN EN ISO 13849-1 are required, see Fig. 17.

The connected power contactors must be wired with a varistor contactor circuit. Other protective circuits must not be used, because they impermissibly delay the contactor dropout time. The contactor dropout time should not exceed 25 ms.

Technical data - Siemens Sirius reference contactor

Sirius S00 3RT10 1.:

Power consumption - magnet coils at DC activation 3.3 W.

Contactor dropout time with varistor at DC activation ≤ 15 ms.

Sirius S0 3RT10 2.:

Power consumption - magnet coils at DC activation 5.4 W.

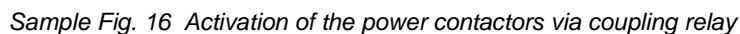
Permissible residual current at 24 VDC activation < 16 mA

Contactor dropout time with Varistor at DC activation ≤ 20 ms.



NOTE!

The connecting lines on connector X2 must not have LED displays.

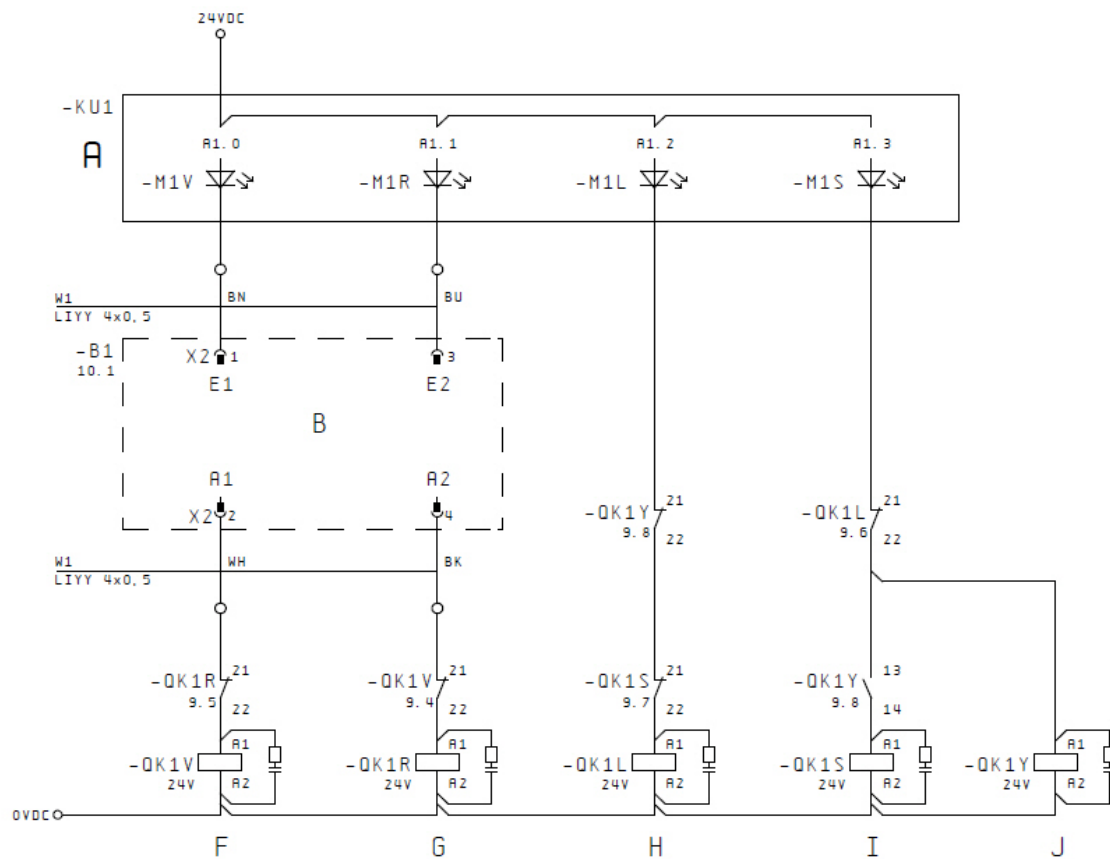


- A: PLC plant controller
- B: SmartTurn control unit
- F: "Turntable forward"
- G: "Turntable backward"
- H: "Turntable slow"
- I: "Turntable fast"
- J: "Turntable fast - star (wye) contactor"
- S: "Emergency stop, protective grate, sliding door, etc."



The SmartTurn control unit is not a safety component as defined in the Machinery Directive. If when operating the turntable, risks can occur that demand the use of safety functions in accordance with DIN EN ISO 13849-1, then safety switching devices must be used that safely interrupt the activation of the power contactors, and thus stop the turntable.

Installation and commissioning



Example Fig. 17 Direct activation of the power contactors



NOTE!

Direct activation of the power contactors is only permitted if safety functions in accordance with DIN EN ISO 13849-1 are not necessary.

- A: PLC
- B: SmartTurn
- F: "Turntable forward"
- G: "Turntable backward"

- H: "Turntable slow"
- I: "Turntable fast"
- J: "Turntable fast – star (wye) contactor"

Installation and commissioning

Connections control unit

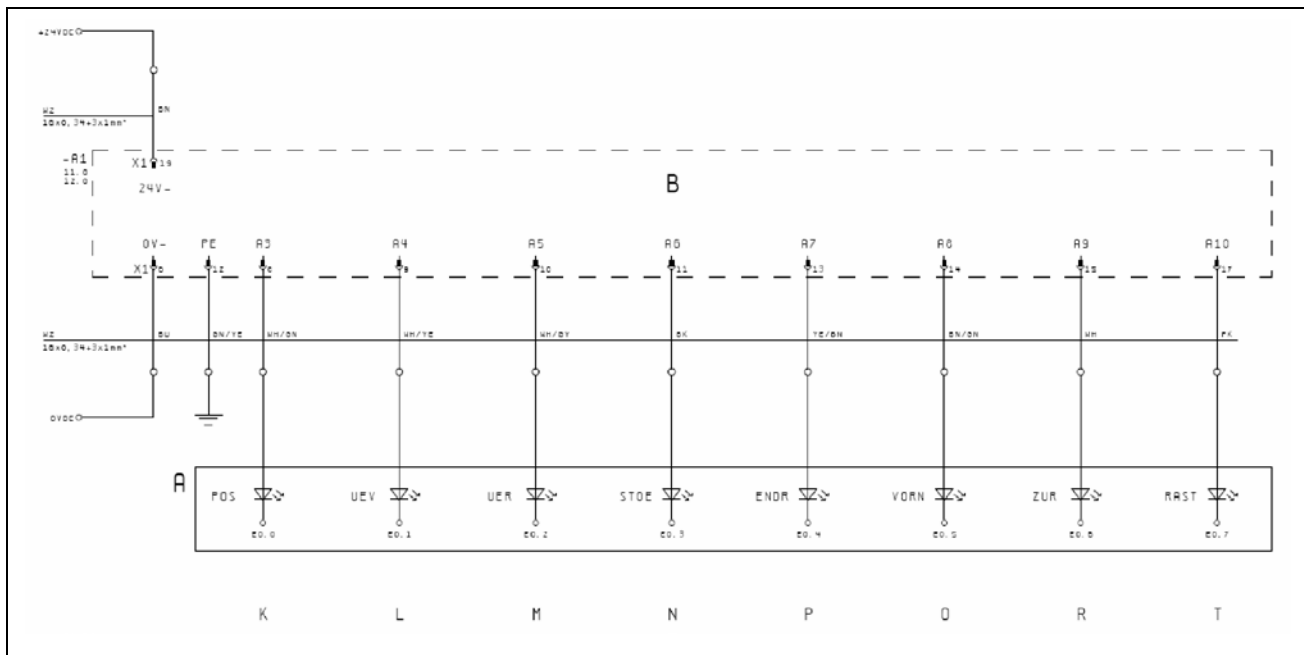


Fig. 18 SmartTurn outputs

- A: PLC plant controller
- B: SmartTurn control unit
- K: „0-position“
- L: “Overrun forward”
- M: “Overrun back”
- N: “System fault”
- P: „End lock angle“
- O: “Operating mode”
- R: „Position back“
- T: “In the lock angle”

Installation and commissioning

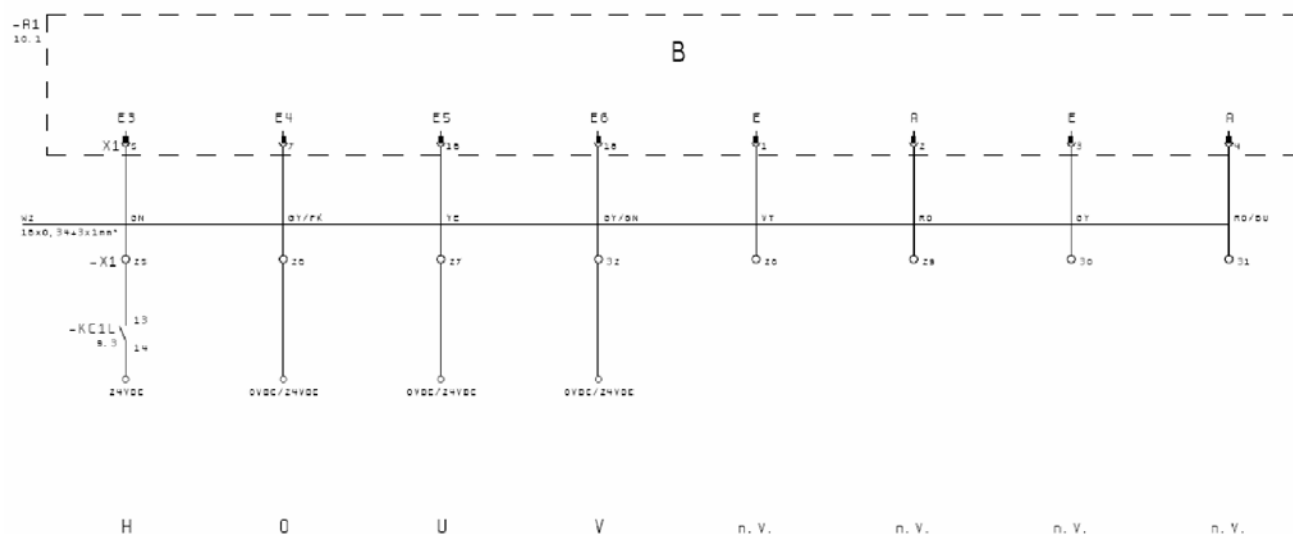


Fig. 19 SmartTurn inputs

- B: SmartTurn control unit
- H: "Turntable slow on"
- O: "Operating mode"
- U: „Pre-select cycles bit 1"
- V: „Pre-select cycles bit 2"

Installation and commissioning

5.3.3 PLC programming

Reverse mode

The following diagram shows the signal exchange with the PLC as an example.

Switch S1 in position 1-4

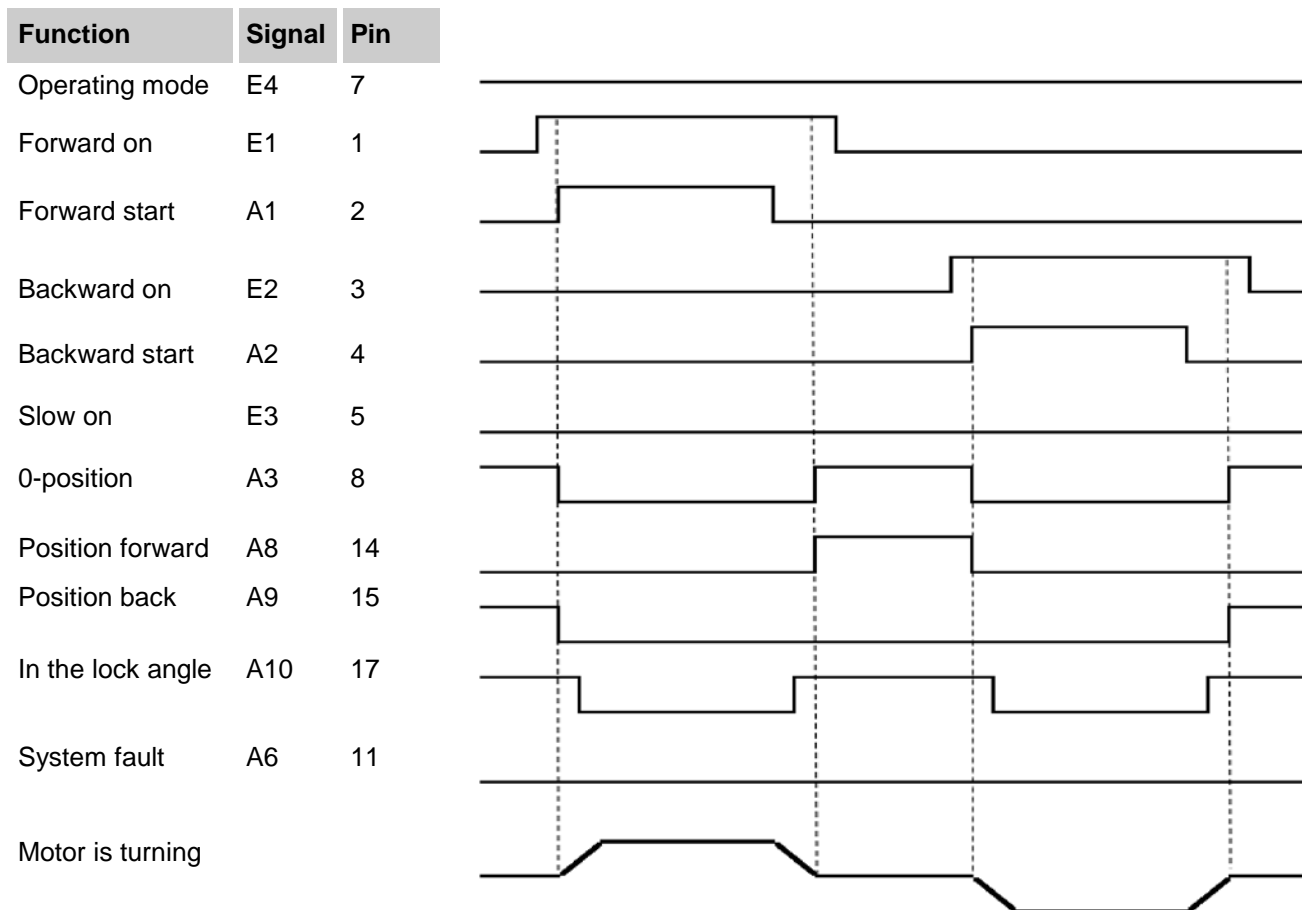


Fig. 20 Sequence graphic – reverse mode

Installation and commissioning

Continuous mode

The following diagram shows the signal exchange with the PLC as an example.

Switch S1 in position 1-4

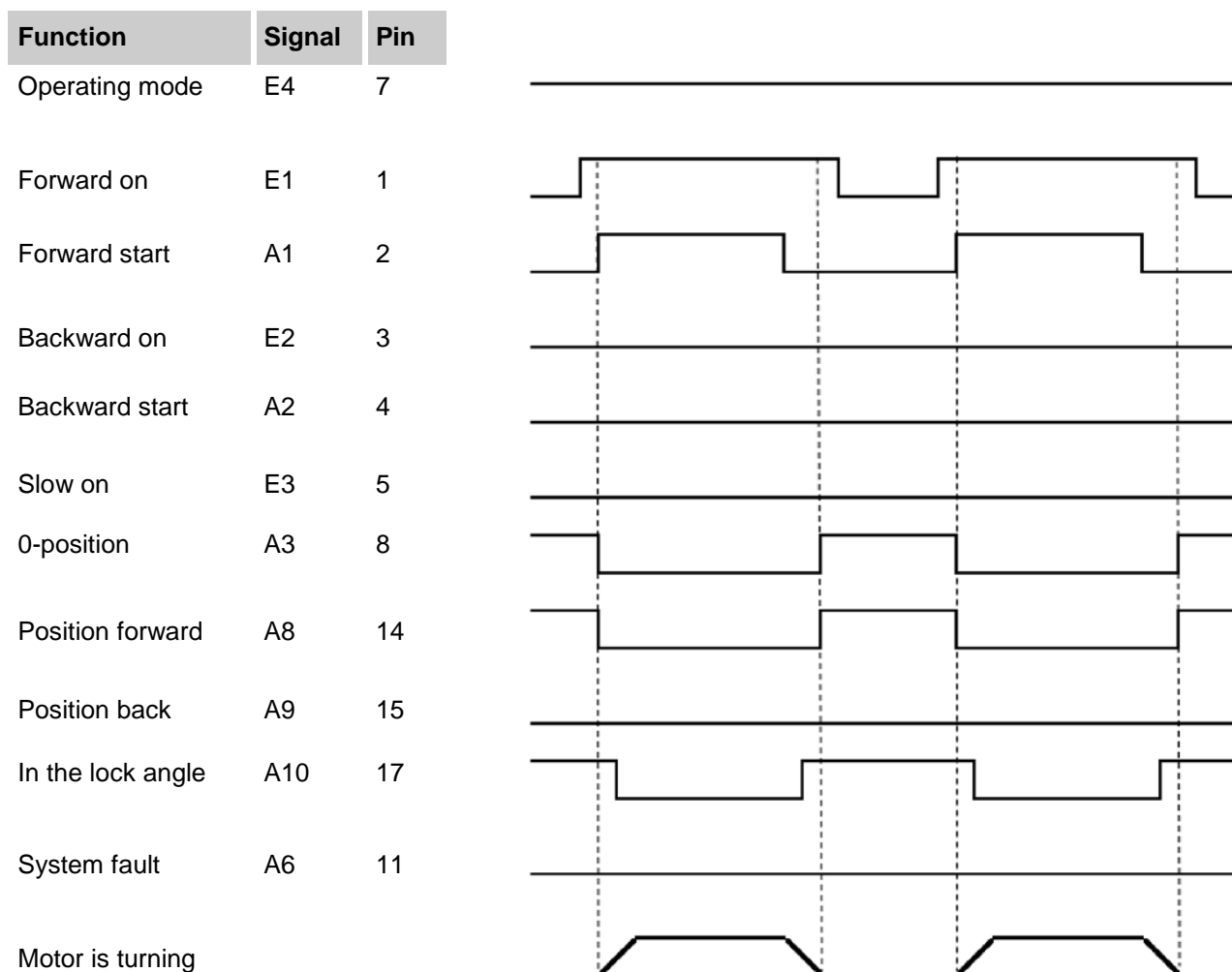


Fig. 21 Sequence graphic – continuous mode

Installation and commissioning

Special mode

Sequence special mode 1 cycle / 2 cycles

Switch S1 in position 9

Number of cycle:

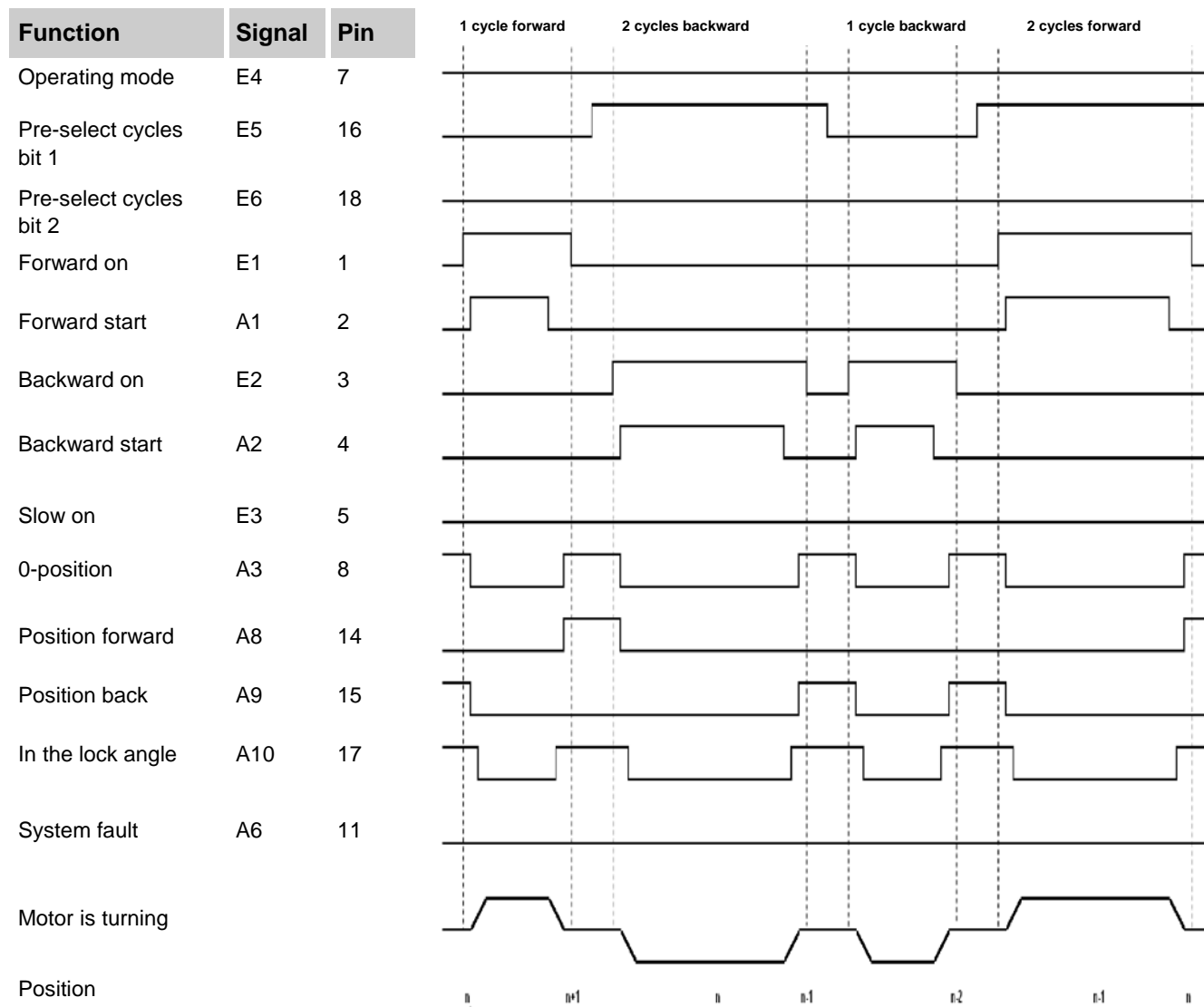


Fig. 22 Sequence graphic – special mode

Installation and commissioning

5.4 Commissioning

**NOTE!**

The turntable is commissioned in the factory by EXPERT-TÜNKERS.

When the turntable is commissioned it is tested and the mode is adjusted to customer specifications in reverse mode, continuous mode or special mode.

When the operating voltage on the turntable is switched on, simultaneously input E4 must be connected with 0 V for reverse mode and special mode, or with 24 V for continuous mode.

Subsequent level change is not permissible and results in a system fault.

Another commissioning process is only necessary when:

- The control unit is replaced,
- The mode is changed
- or a system fault makes this necessary.

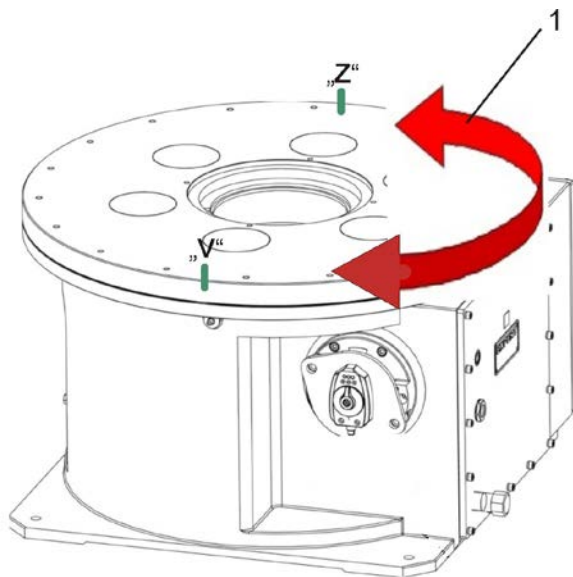
**NOTE!**

See section -> System faults.

All data is saved in the control unit, failsafe. With the commissioning process a default value specific to the lock movement is used as switch-off angle. Thereafter deviation from the optimal 0-position is determined and the switch-off angle is determined for the next turn.

Installation and commissioning

Commissioning sequence



1 Movement range

"B" backward

"F" forward

Fig. 23 Example: Movement range

1. Turn drive roller (position encoder) in the movement range (1), at least 45 degrees outside of the 0-position. The turntable will then be between the positions "Front" and "Back" (only necessary in reverse mode).
2. Set mode - lock movement drive roller on rotary switch S1.
3. Set clockwise rotation / counter-clockwise rotation - drive roller switch S3.
4. Switch on the operating voltage.
5. Press "Reset" button 3 s – LED system fault will go out.
6. Turn the turntable several times at operating speed



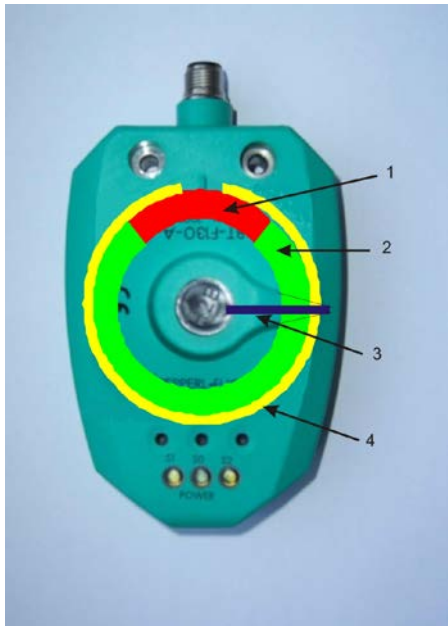
NOTE!

If the turntable stops several times without fault in the 0-position the self-adjustment and the commissioning processes are concluded.

The settings of S1 and S3 are marked on the inside of the cover at commissioning.

Installation and commissioning

Position of the position encoder when commissioning in reverse mode.



- 1 Blocked area ± 45 degrees in front of 0-position.
- 2 Permitted range.
- 3 Position of the position encoder.
- 4 Movement range.

Fig. 24 Position encoder in reverse mode

Installation and commissioning

5.4.1 Re-commissioning in the plant

When re-commissioning the turntable in the plant the settings made during the commissioning process must be checked and any adaptations to local conditions must be executed.

Re-commissioning sequence

1. Switch on the operating voltage.
2. Turn the turntable several times at creep speed.
3. Check direction of motor rotation, drive roller.
4. If necessary change direction of motor rotation and set clockwise / counter-clockwise drive roller direction.
5. Press the reset button 3s - system fault LED goes out
6. Turn the turntable several times at operating speed.

If the turntable stops several times without fault in the 0-position, the self-adjustment and re-commissioning are concluded.



NOTE!

After first-time operation of the turntable with the customer load, or after changes to the load, overrun faults could occur. In this case it is necessary to turn the turntable several times at operating speed until the turntable controller has concluded the optimization process.

6 Faults

Possible fault causes and the tasks to correct these faults are described in the following section.

Contact the manufacturer if there are faults that cannot be corrected by following the instructions below; see the service address in the Appendix.

Behavior in the event of fault

The following always applies:

1. Determine the cause of the fault.
2. Immediately inform the responsible parties at the installation site of the fault.
3. Have authorized specialists eliminate the fault.

6.1 Safety

Personnel

- Some tasks should only be executed by experts with special training or by the manufacturer.
- Only qualified electricians should perform work on the electrical equipment.

6.2 Sequence faults

Sequence faults are faults that can occur during normal operation through brake wear,

and/or due to impermissible turntable operation, e.g. due to overload, change in load, or incorrect activation of the brake and motor.



NOTE!

The fault tables below are provided to help you localize and rectify the fault.

Or contact one of the EXPERT-TÜNKERS service addresses.

6.2.1 Overrun forward / backward

The fault is generated if the turntable does not come to a stop in the 0-position and overruns the 0-position by more than 8 degrees.

The fault is also generated when the turntable is in the forward or backward position and an incorrect activation is executed by the PLC.

Faults

The fault is also generated if the two inputs forward on (E1) and backward on (E2) are simultaneously activated by the controller for longer than 120 ms. In this case the outputs forward start (A1) and backward start (A2) are switched off and blocked until E1 and E2 are off again. If E1 and E2 are off, after 3 s the overrun faults forward/backward A4 and A5 are reset. In the diagnostics software when the fault occurs, the fault message "Both Inputs On" is set, this fault message remains until reset or switch-off of the 24 V supply. See also section 6.2.4 "Input forward and backward on" (Both Inputs On)

Possible causes	Measures
Brake pads are worn or the brake is defective	Check the air gap of the brake and adjust Replace the brake if necessary
The brake is incorrectly connected or is not quickly applied	Check the activation of the brake and correct if necessary
Excessive brake application time	Use a brake with shorter application time (under 25 ms)
Turntable overloaded	Reduce the load to the calculated value
Turntable cycle time too short	Reduce the motor speed so that the turntable cycle time is not underranged
The direction of drive rotation does not agree with the set rotary direction	Set the direction of drive roller rotation on switch S3, change the direction of motor rotation if necessary
In reverse mode, wrong rotary direction activation through the PLC: - Activation of forward start even though the turntable is in the forward position. - Activation of backward start even though the turntable is in the back position.	Avoid wrong activation through the PLC. - Switch off forward start, correct PLC activation - Switch off backward start, correct PLC activation
Wrong protective circuit on the power contactors and/or the braking contactor	Only use varistor protective circuits, other protective circuits can significantly extend the contactor dropout time, and thus extend the turntable stop distance
Sudden significant load change	Turn the turntable several times so that the switch-off angle can be adapted
Forward on (E1) and backward on (E2) are activated simultaneously by the PLC for longer than 120 ms	Check and correct the PLC activation

Reset fault**NOTE!**

Eliminate cause.

In reverse mode the fault is deleted by activation of *the opposite direction* and leaving the overrun.

In continuous mode and in special mode the fault is deleted with a subsequent *"Forward on"* activation.

6.2.2 Warning end lock angle (lock angle reserve)

The brake pads wear out in the course of operation. The turntable controller compensates for this by offsetting the switch-off angle.

If the end of the lock movement is reached then the warning *"End lock angle"* is output to the PLC.

The turntable can still be operated. However we recommend that you check the brake at the next possibility and replace it if necessary.

If the brake is not checked, over time this fault results in a system fault *"End lock angle"* and further operation is disabled.

Possible causes	Measures
Brake pads are worn or the brake is defective	Check the air gap of the brake and adjust Replace the brake if necessary
Turntable overloaded	Reduce the load to the calculated value
Turntable cycle time too short	Reduce the motor speed so that the turntable cycle time is not underranged

Reset fault**NOTE!**

Eliminate cause.

- Unscrew the cover on the turntable control unit.
- Press the reset button for at least 3 s.
- System fault LED goes out.
- Turn the turntable several times at operating speed.

Press the reset button and the default values will be used for turntable control.

Faults

6.2.3 End of lock angle reserve reached (end of lock angle reserve)

If the switch-off angle is more than 5 degrees outside of the lock movement, the warning "*End lock angle*" and "*System fault*" are output to the PLC simultaneously.

Do not continue to operate the turntable. Further operation can cause damage to the drive elements.



CAUTION!

Switch-off over 5 degrees.

Further operation can cause damage to the drive elements!

Therefore:

- Do not continue to operate the turntable.
- Eliminate the cause.

Possible causes:	Measures
Brake pads are worn or the brake is defective	Check the brake and replace it if necessary
Mech. damage on the turntable	Check turntable for mechanical damage

Reset fault



NOTE!

Eliminate cause.

Unscrew the cover on the turntable controller and press the reset button for at least 3s.

Press the reset button and the default values will be used for turntable control.

6.2.4 Input forward and backward on (Both Inputs On)

The fault is also generated if the two inputs forward on (E1) and backward on (E2) are simultaneously activated by the controller for longer than 120 ms. In this case the outputs forward start (A1) and backward start (A2) are switched off and blocked until E1 and E2 are off again. If E1 and E2 are off, after 3s the overrun faults forward/backward A4 and A5 are reset.

In the SmartTurn_V14 EXE diagnostics software when the fault occurs, the fault message "Both Inputs On" is set, this fault message remains until reset or switch-off of the 24V supply.



NOTE!

If the fault occurs you must follow the instructions in section -> 6.2.1 Overrun forward / backward .

Possible causes:	Measures
Forward on (E1) and backward on (E2) are activated simultaneously by the PLC for longer than 120 ms	Check and correct the PLC activation

6.3 System faults

System faults are faults that compromise safe operation of the turntable.

If a system fault is detected, then the two outputs A1 and A2 are blocked and the "System fault" A6 output is output as group fault.

A detailed fault analysis is possible via the diagnostic interface with the diagnostic software.

The following system faults are displayed in the diagnostic software.

Extended diagnostics with the data logger tool

With a separate data logger tool you can read out the last 10s prior to occurrence of the fault, thus all relevant diagnostic data is secured and allows detailed fault analysis. The diagnostics data will remain accessible until the system fault is deleted on the turntable controller.

Use of the tool requires consultation with Expert Tünkens.

Faults

6.3.1 Sensor fault (sensor defect)

Possible causes	Measures
Sensor is defective	Check sensor and replace if necessary
Position encoder is defective or is not in the detection range of the sensor	Check the position sensor, replace if necessary
Sensor cable is defective or loose	Check the position sensor, replace if necessary
Sensor cable has been inadvertently unscrewed	Screw on the sensor cable

Reset fault


NOTE!

Eliminate cause.

- Unscrew the cover on the turntable control unit.
- Press the reset button for at least 3 s.
- System fault LED goes out.
- Turn the turntable several times at operating speed.

Press the reset button and the default values will be used for turntable control.

6.3.2 Short circuit at output

Possible causes	Measures
Activated contactor coil defective	Check the contactor coil, replace if necessary
Excessive power consumption of the activated contactor coil	Only use contactor coils with a max. power consumption of 14 W at 24 V DC
Contactor coil without protective circuit	Always wire contactor coils with Varistor protective circuit
Short circuit due to wiring fault	Check wiring and change

Reset fault



NOTE!
Eliminate cause.

- Unscrew the cover on the turntable control unit.
- Press the reset button for at least 3 s.
- System fault LED goes out.
- Turn the turntable several times at operating speed.

Press the reset button and the default values will be used for turntable control.



NOTE!
Comply with the supplemental instructions in the section -> Commissioning

Faults

6.3.3 Invalid sensor data (changed sensor position)

If after switching on the operating voltage, a deviation from the last saved position is detected, this results in a fault.

Possible causes	Measures
Turntable has been dismantled and no longer has the same position	Reverse mode: <ul style="list-style-type: none"> ■ Turn drive roller (position encoder) a min. of 45 degrees outside of the 0-position in the movement range between the positions "Front" and "Back" Continuous mode and special mode: <ul style="list-style-type: none"> ■ None
The turntable has been turned without operating voltage applied on the turntable controller	
Failure of the 24 V power supply while the turntable is turning	

Reset fault



NOTE!

Eliminate cause.

- Unscrew the cover on the turntable control unit.
- Press the reset button for at least 3 s.
- System fault LED goes out.
- Turn the turntable several times at operating speed.

Press the reset button and the default values will be used for turntable control.



NOTE!

Comply with the supplemental instructions in the section -> Commissioning

6.3.4 Change mode (changed rotary mode)

The mode deviates from the saved mode or impermissible level change on input E4 "Mode"

Change from position 9 to position 1-4 or vice versa on rotary switch S1.

Possible causes	Measures
Mode change from: - Continuous run in reverse mode - Special to reverse mode (change from position 9 to 1-4 on rotary switch S1)	Reverse mode: ■ Turn drive roller (position encoder) a min. 45 degrees outside of the 0-position in the movement range between the positions "Front" and "Back".
Mode change from: - Reverse mode to continuous mode - Special to continuous mode (change from position 9 to 1-4 on rotary switch S1) - Continuous to special mode (change from position 9 to 1-4 on rotary switch S1)	Continuous mode, special mode: ■ None

Reset fault**NOTE!**

Eliminate cause.

- Unscrew the cover on the turntable control unit.
- Press the reset button for at least 3 s.
- System fault LED goes out.
- Turn the turntable several times at operating speed.

Press the reset button and the default values will be used for turntable control.

**NOTE!**

Comply with the supplemental instructions in the section -> Commissioning

Faults

6.3.5 Change mode (changed rotary direction)

Rotary direction deviates from the saved rotary direction or change rotary direction right/left on switch S3.

Possible causes	Measures
Reverse mode / change S3	Reverse mode: <ul style="list-style-type: none"> ■ Turn drive roller (position encoder) a min. 45 degrees outside of the 0-position in the movement range between the positions "Front" and "Back"
Continuous mode / change S3	Continuous mode – special mode: <ul style="list-style-type: none"> ■ None

Reset fault



NOTE!

Eliminate cause.

- Unscrew the cover on the turntable control unit.
- Press the reset button for at least 3 s.
- System fault LED goes out.
- Turn the turntable several times at operating speed.

Press the reset button and the default values will be used for turntable control.



NOTE!

Comply with the supplemental instructions in the section -> Commissioning

6.3.6 Changed lock angle

Lock angle setting deviates from the saved lock angle setting or change of the lock angle on switch S1.

Possible causes	Measures
Reverse mode / continuous mode	Continuous mode, reverse mode ■ None

Reset fault



NOTE!
Eliminate cause.

- Unscrew the cover on the turntable control unit.
- Press the reset button for at least 3 s.
- System fault LED goes out.
- Turn the turntable several times at operating speed.

Press the reset button and the default values will be used for turntable control.



NOTE!
Comply with the supplemental instructions in the section -> Commissioning

Faults

6.3.7 Wrong rotary direction (direction forward / backward)

At each start the rotary direction of the drive roller is checked against the setting on switch S3 clockwise/counter-clockwise.

Possible causes	Measures
<p>The actual rotary direction of the drive roller does not agree with the setting on S3 clockwise/counter-clockwise</p> <p>Reverse mode</p>	<p>Reverse mode:</p> <ul style="list-style-type: none"> ■ Turn drive roller (position encoder) a min. of 45 degrees outside of the 0-position in the movement range between the positions "Front" and "Back". ■ Change the motor rotary field or change setting S3 so that the desired rotary direction of the turntable forward/backward agrees with the setting on S3.
Continuous mode	<ul style="list-style-type: none"> ■ Change the motor rotary field or change setting S3 so that the desired rotary direction of the turntable forward/backward agrees with the setting on S3.

Reset fault



NOTE!

Eliminate cause.

- Unscrew the cover on the turntable control unit.
- Press the reset button for at least 3 s.
- System fault LED goes out.
- Turn the turntable several times at operating speed.

Press the reset button and the default values will be used for turntable control.



NOTE!

Comply with the supplemental instructions in the section -> Commissioning

6.3.8 Internal device fault (secure state)

Possible causes	Measures
SmartTurn control unit defective	<p>Replace SmartTurn control unit. Apply S1, S3 – settings.</p> <p>Reverse mode:</p> <ul style="list-style-type: none"> ■ Turn drive roller (position encoder) a min. 45 degrees outside of the 0-position in the movement range between the positions "Front" and "Back" <p>Continuous mode – special mode:</p> <ul style="list-style-type: none"> ■ None

Reset fault**NOTE!**

Eliminate cause.

- Unscrew the cover on the turntable control unit.
- Press the reset button for at least 3 s.
- System fault LED goes out.
- Turn the turntable several times at operating speed.

Press the reset button and the default values will be used for turntable control.

**NOTE!**

Comply with the supplemental instructions in the section -> Commissioning

**NOTE!**

Press the reset button and the default values will be used for turntable control.

Faults

6.4 Start up after corrected fault

After correcting the fault execute the following steps to start up again:

1. Reset the emergency-stop devices.
2. Acknowledge the fault on the controller.
3. Ensure that that no one is in the danger zone.

SmartTurn – spare parts

7 SmartTurn – spare parts

Designation	Part number
Sensor	502765
Sensor actuator	504480
Control unit, SmartTurn 2011	510937
Sensor cable 5 m	504775
Diagnostics cable 2 m	517719
Position sensing - standard for max. 8 positions: <ul style="list-style-type: none"> ● Sensor ● Transponder ● Connecting line 10 m 	506815 X* 506000
Position sensing - standard for max. 15 positions: <ul style="list-style-type: none"> ● Sensor ● Transponder ● Connecting line 10 m 	506815* X* 506000
Position sensing - safety: <ul style="list-style-type: none"> ● Sensor ● Transponder ● Connecting line 10 m 	505986 505987 505988
Coupling M23x1, 19-pin with connecting cable 16x0.5+3x1 mm ² for plug X1, length=5 m	646303
Coupling M23x1, 19-pin with connecting cable 16x0.5+3x1 mm ² for plug X1, length=10 m	664564
Coupling M23x1, 19-pin with connecting cable 16x0.5+3x1 mm ² for plug X1, length=15 m	664565
Coupling M23x1, 19-pin with connecting cable 16x0.5+3x1 mm ² for plug X1, length=20 m	664567
Coupling M12x1, 4-pin with connecting cable 4x0.75 mm ² for plug X2, length=5 m	527697
Coupling M12x1, 4-pin with connecting cable 4x0.75 mm ² for plug X2, length=10 m	527696
Coupling M12x1, 4-pin with connecting cable 4x0.75 mm ² for plug X2, length=15 m	527695

SmartTurn – spare parts

Designation	Part number
Coupling M12x1, 4-pin with connecting cable 4x0.75 mm ² for plug X2, length=20 m	527651
Coupling M12x1, 4-pin, for self-assembly for plug X2	X*

X* Contact one of the EXPERT-TÜNKERS service addresses.

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