



Conversion Kit Trumpf PSS 3056 – PNOZmulti

PILZ
THE SPIRIT OF SAFETY

- Configurable safe small controllers PNOZmulti 2

Operating Manual – 1006509-EN-01

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SD means Secure Digital

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1. Introduction

1.1. Validity of document

This documentation is valid for the Trumpf Conversion Kit PSS 3056 – PNOZmulti from Version HW:01, SW: 01.00. In the following document it is called the Conversion Kit. The documentation includes installation, operation and diagnostics. Further information on the safety components that are used can be found in the individual manuals produced by the manufacturer.

1.2. Safety requirements

The requirements for use can be found in the respective current edition of the standard “EN 12622 (Safety of machine tools - Hydraulic press brakes)”.

“EN 12622:2009+A1:2013” was the current edition at the time this operating manual was produced.

1.3. General guidelines



Pilz cannot accept any responsibility for the correct application of the Conversion Kit and/or the overall application. When using the Conversion Kit, please note the following in particular:

- The press manufacturer / integrator is responsible for creating appropriate safety concepts for the overall machine and connection to the control system, including the user program. Consider all the relevant standards and comply with all relevant legislation.

1.4. Important applicable documents

- Standards
 - EN 12622:2009-11+A1:2013-10 (Safety of machine tools - Hydraulic press brakes)
- Operating manuals, handbooks, system descriptions, certificates for the following Pilz products
 - PNOZ m B1
 - PNOZ m EF 16DI
 - PNOZ m EF 8DI4DO
 - PNOZ m EF 8DI2DOT
 - PNOZ m ES 14DO

1.5. Scope of delivery

The Conversion Kit consists of a mounting plate, on which the devices of the configurable safe small controller PNOZmulti 2 are hard-wired to plug-in connectors in the same position as the PSS 3056. The function of the PNOZmulti is pre-set with a fixed configuration. The Conversion Kit includes a blue cable 2m x 0.5mm² to adapt the wiring.

1.6. Intended use

The Conversion Kit may only be used as a replacement for a Pilz controller type PSS 3056 Trumpf01, 03, 05 with Pilz order numbers 301301, 301305, 301307. Any other applications are contrary to its intended use and shall be at the user's own risk.
The configuration of the PNOZ m B1 may not be modified.

1.7. System description

1.7.1. PSS 3056 TRUMPF controller



Figure 1.6.1: Example PSS 3056 Trumpf Controller and Multi Conversion Kit

2. Function description

2.1. General

Where possible technically and in normative terms, the function of the PSS 3056-Trumpf has been reproduced identically. Any differences are not safety-related and are described in this document. The last Version A018 was implemented. This also replaces all previous versions.

2.2. Safety information



WARNING!

In the special operating mode called “Robot mode”, the press allows an automatic robot feed. In the process, safety functions to protect the operator are disabled. **This special mode may not be selected with manual feed.**

2.3. Safety functions

- All safety outputs are shut down in the event of an emergency stop.
- An active optoelectronic protective device enables the fast closing movement with 2-hand or foot switch. Without an optoelectronic protective device, a fast closing movement cannot occur.
- Position monitoring of the safety valves, per working stroke
- Safe control of the restraining valves

2.4. Normative adjustments

In the event of a fast closing movement ($>10\text{mm/s}$), EN 12622 for hydraulic press brakes requires that an optoelectronic protective device is used in addition to a two-hand control. This requirement is implemented in the current version of the Conversion Kit. If the press brake was supplied before EN 12622 came into force, the behaviour when using two-hand control may be changed following the conversion. If the function “Two-hand fast speed without ESPE” is still required, please refer to Section 8.

2.5. Functional restrictions

The Conversion Kit version 1.0 does not support the function of the mobile protection system AKAS (Fiessler) or BendGuard (Lazersafe). Please contact Pilz if this function is required.

2.6. Resetting errors

All errors are reset by operating one of the two two-hand buttons on the main console. Errors that occur are shown on the PNOZ m B1 display. In the case of valve monitoring errors, the button must be pressed for at least 1 second.

3. Installation

3.1. Safety information

The Conversion Kit concerns the safe control of the machine, which guarantees safe operation and protects the operator from accidents. Use the attached check list when making the exchange, and carry out a safety check after the exchange.

The device may only be installed and commissioned by a trained electrical engineer who is familiar with the information in this manual and the relevant regulations concerning health and safety and accident prevention.

Ensure compliance with local electrical codes, particularly the protective measures. The relevant safety regulations for the respective application must also be met.

Electrostatic discharge can damage components on the controller. Ensure against discharge before touching the PSS, e.g. by touching an earthed, conductive surface or by wearing an earthed armband.

If the wiring or controller is modified, the guarantee and any liability on the part of Pilz are rendered invalid.

3.2. Preparation

Before upgrading, check that the connection wiring on the PSS 3056 Trumpf is still in its original state (see circuit diagram for the Trumpf Trumabend machine). No modifications are permitted, e.g. additional wire jumpers. These can negatively impact on safety. If there are any anomalies, restore the plant to its original state, in accordance with the circuit diagram.

3.3. Removal

1. Note down the data for the PSS 3056 in accordance with the check list.
2. Switch off the machine at the main switch.
3. Wait until the display on the PSS 3056 has gone out.
4. Remove connectors X0 to X8 on the PSS 3056.
5. Loosen the lower screws by approx. 2 turns.
6. Remove the upper screws and remove the PSS 3056.

3.4. Installation

1. Note down the data for the PSS 3056-Multi in accordance with the check list.
2. Use washers when attaching the device to the mounting plate.
3. Position the PSS 3056-Multi on the lower screws and attach it using the upper screws.
4. Tighten up the lower screws again.
5. Plug in connectors X1 to X8. Connector X0 remains unplugged and can stay in the cable duct.

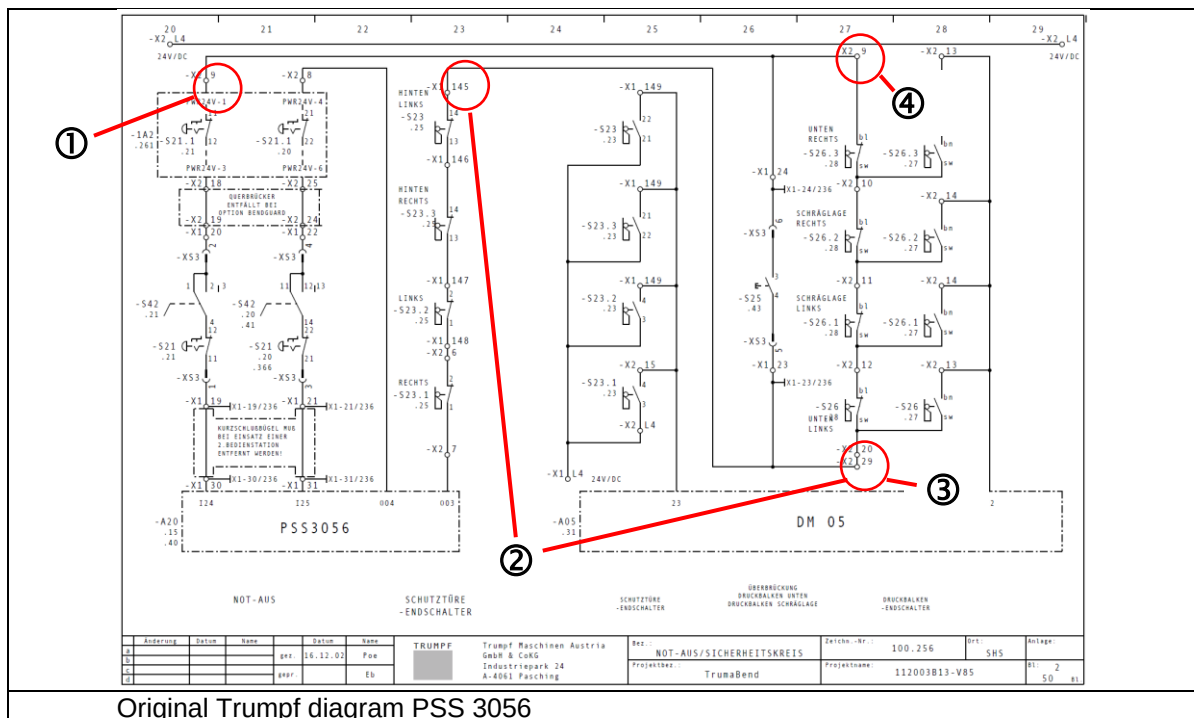
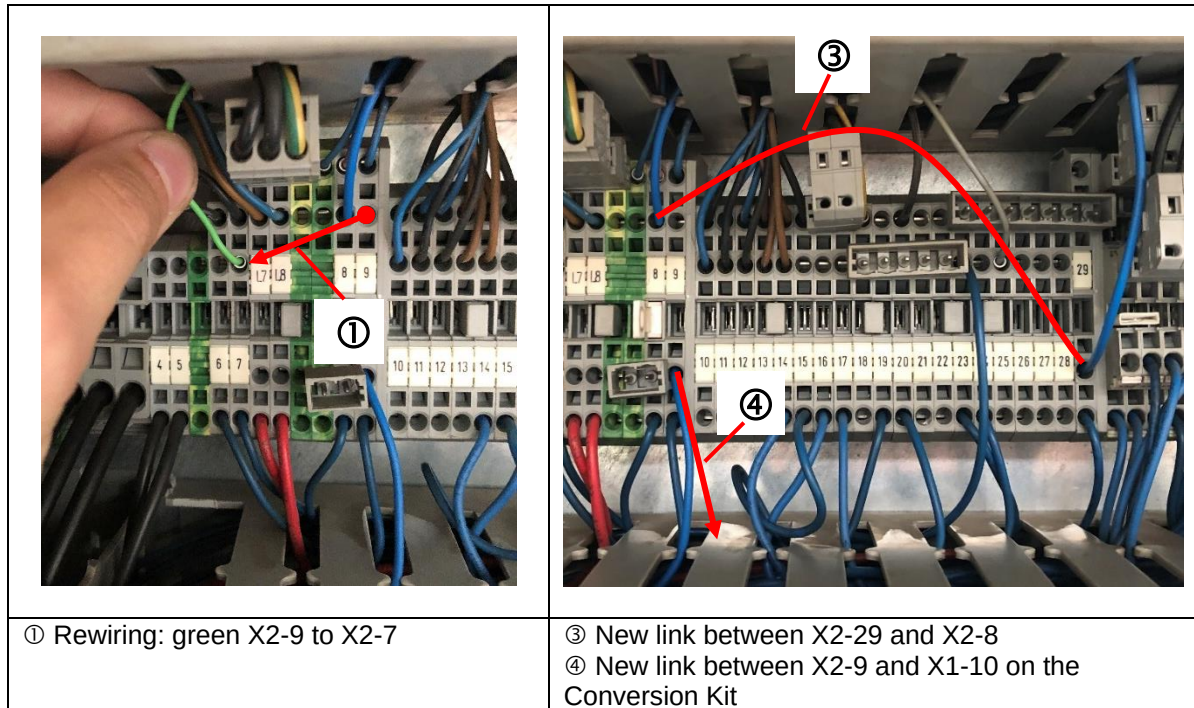
3.5. Adaptation of wiring

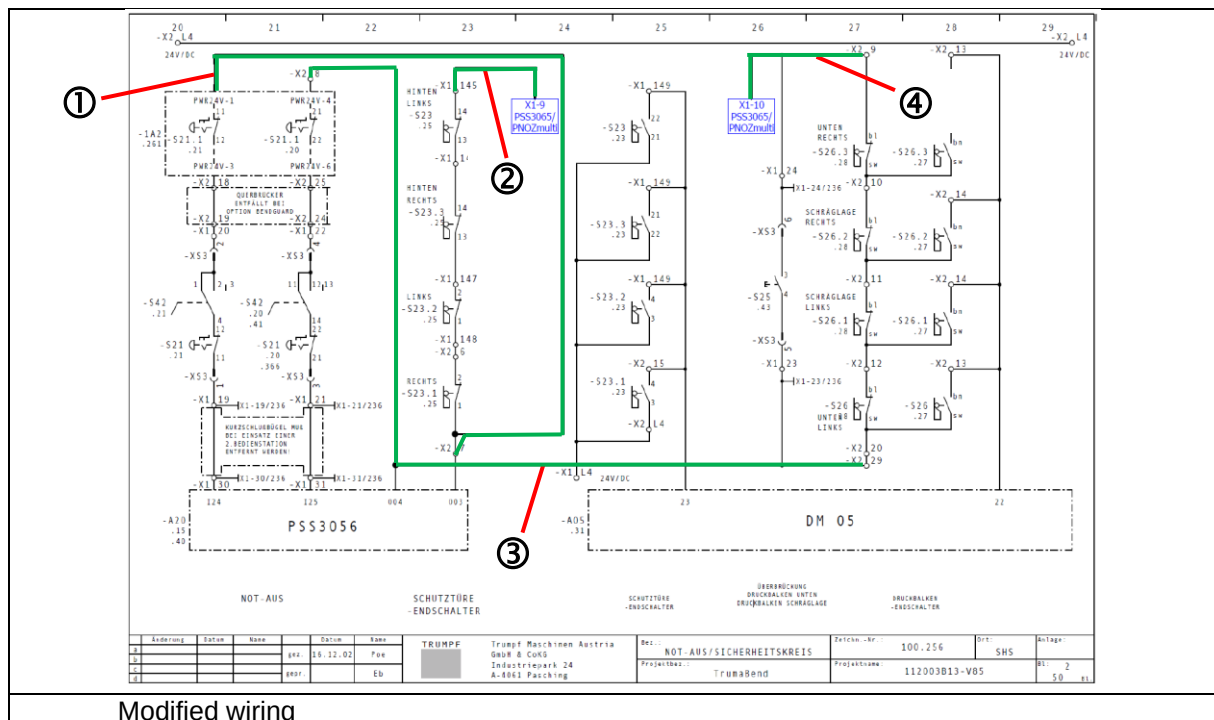
When press brakes in the TrumaBend series are in their original state, the safety gate switches and inclined position sensors are interrogated in series with an E-STOP channel. To adapt the safety to current specifications, the safety gates and inclined position monitoring must be arranged separately from the E-STOP. This also helps to provide better diagnostics.

Use blue stranded cable with 0.5-0.75 mm² cross section for the new connections.

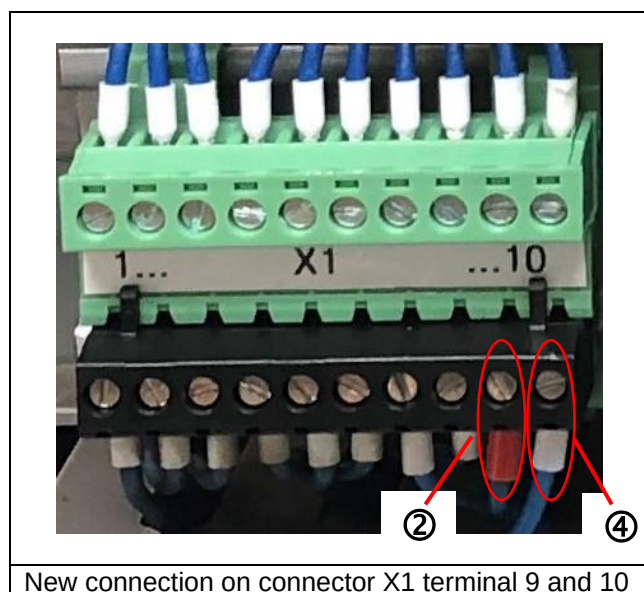
The following changes must be made at terminal strip X2 (in the top of the control cabinet):

- ① Rewire E-STOP channel 1 (green wire) from terminal -X2-9 to -X2-7
- ② Original connection from -X1-145 to -X2-29; connect now from -X1-145 directly to connector X1-9 on the Conversion Kit
- ③ Establish a new connection (30cm) from -X2-29 to -X2-8
- ④ Establish a new connection (110cm) from -X2-9 to connector X1-10 on the Conversion Kit





Modified wiring



3.6. Commissioning

1. Switch on the machine at the main switch.
2. Wait until the display appears.
3. Carry out the check as per the check list.
4. Switch the plant to setup mode.
5. Check all operating modes.
6. Complete the check list and keep this with your machine documentation.

3.7. Remote maintenance

The Conversion Kit has an Ethernet interface, which can be used for remote maintenance. Additional security measures are required when connecting to an open network. We recommend you to use the Pilz Security Bridge (311502).

3.8. Comparison of inputs and outputs

Connector	PSS 3056 Input	PNOZ Multi Input	Description
X0-1	24 V	Not used	CPU supply
X0-2	--	Not used	n.c.
X0-3	GND	Not used	Ground
X0-4	0 V	Not used	CPU supply
X1-1	I00	A1.1-I00	Operating mode S41_7/8
X1-2	I01	A1.1-I01	Operating mode S41_5/6
X1-3	I02	A1.1-I02	Operating mode S41_3/4
X1-4	I03	A1.1-I03	Operating mode S41_1/2
X1-5	I04	A1.1-I04	Operating mode ESPE S41.1_1/2
X1-6	I05	A1.1-I05	Operating mode ESPE S41.1_3/4
X1-7	I06	A1.1-I06	CNC selection, console 2
X1-8	I07	A1.1-I07	Robot mode
X1-9	n.c.	A1.4-I08	Safety gates (new)
X1-10	0 V	A1.4-I09	Inclined position (new)
X2-1	I08	A1.2-I00	2H1 li NC
X2-2	I09	A1.2-I01	2H1 li NO
X2-3	I10	A1.2-I02	2H1 re NC
X2-4	I11	A1.2-I03	2H1 re NO
X2-5	I12	A1.2-I04	Foot1 NC
X2-6	I13	A1.2-I05	Foot1 NO
X2-7	I14	A1.3-I04	CNC-TDC
X2-8	I15	A1.3-I05	CNC-Mute
X2-9	n.c.	A1.4-I10	Reserve
X2-10	0 V	A1.4-I11	Reserve
X3-1	I16	A1.3-I00	2H2 li NC
X3-2	I17	A1.3-I01	2H2 li NO
X3-3	I18	A1.3-I02	2H2 re NC
X3-4	I19	A1.3-I03	2H2 re NO
X3-5	I20	A1.2-I06	Foot2 NC
X3-6	I21	A1.2-I07	Foot2 NO
X3-7	I22	A1.3-I06	ESPE-OSSD1
X3-8	I23	A1.3-I07	ESPE-OSSD2
X3-9	n.c.	A1.4-I12	Reserve
X3-10	0 V	A1.4-I13	Reserve
X4-1	I24	A1.4-I00	E-STOP+Gates
X4-2	I25	A1.4-I01	E-STOP
X4-3	I26	A1.4-I02	CNC stroke enable
X4-4	I27	A1.4-I03	FL restraining valve left
X4-5	I28	A1.4-I04	FL restraining valve right
X4-6	I29	A1.4-I05	FL prop. valve left
X4-7	I30	A1.4-I06	FL prop. valve right
X4-8	I31	A1.4-I07	CNC UP
X4-9	n.c.	A1.4-I14	Reserve
X4-10	0 V	A1.4-I15	0V potential inputs / res.

Connector	PSS 3056 Output	PNOZ Multi Output	Description
X5-1	O00	A1.0-T0	Pulse 0
X5-2	O01	A1.0-T1	Pulse 1
X5-3	O02	A1.0-T2	Pulse 2
X5-4	O03	A1.0-T3	Pulse 3
X5-5	O04	A1.0-T0	Pulse 4 (0)
X5-6	O05	A1.0-T1	Pulse 5 (1)
X5-7	O06	A1.0-T2	Pulse 6 (2)
X5-8	O07	A1.0-T3	Pulse 7 (3)
X5-9	24 V	A1.0-24V	Supply 24 V output
X5-10	0 V	A1.0-0V	Supply 0 V output
X6-1	O08	A1.1-O0	Fast speed enable -> CNC
X6-2	O09	A1.1-O1	Press speed enable -> CNC
X6-3	O10	A1.5-O0	Setup mode -> CNC
X6-4	O11	A1.5-O1	Two Hand not OK -> CNC
X6-5	O12	A1.5-O2	Test input ESPE
X6-6	O13	A1.2-O0	E-STOP circuit L5
X6-7	O14	A1.2-O1	E-STOP circuit L9
X6-8	O15	A1.2-O2	E-STOP circuit L10
X6-9	24 V	A1.1,,2,,4-24V	Supply 24 V output
X6-10	0 V	A1.1,,2,,4-0V	Supply 0 V output
X7-1	O16+	A1.3-O0+	Fast Down + Up valve Y62 +
X7-2	O16-	A1.3-O0-	Fast Down + Up valve Y62 -
X7-3	O17+	A1.5-O3	Display console 1 active +
X7-4	O17-	0 V	Display console 1 active -
X7-5	O18+	A1.5-O4	Display console 2 active +
X7-6	O18-	0 V	Display console 2 active -
X7-7	O19+	A1.3-O1+	res. +
X7-8	O19-	A1.3-O1-	res. -
X7-9	24 V	A1.3-24V	Supply 24 V output
X7-10	24 V	A1.3-24V	Supply 24 V output
X8-1	O20+	A1.1-O2	res. +
X8-2	O20-	0 V	res. -
X8-3	O21+	A1.1-O3	res. +
X8-4	O21-	0 V	res. -
X8-5	O22+	A1.2-O3	Bendguard active CR422+ (A014)
X8-6	O22-	0 V	Bendguard active CR422- (A014)
X8-7	O23+	A1.5-O5	R229+ (A014)
X8-8	O23-	0 V	R229- (A014)
X8-9	0 V	A1.3-0V	Supply 0 V output
X8-10	0 V	A1.3-0V	Supply 0 V output

	Safety output - consider during test
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4. Diagnostics

The following messages may appear on the PNOZ m B1 display:

ID	Message	Description / remedy
1	L restrain valve not at home	Left-hand restraining valve not registering a home position before switch-on. Check signal contact
2	R restrain valve not at home	Right-hand restraining valve not registering a home position before switch-on. Check signal contact
3	L prop. valve not at home	Left-hand proportional valve not registering a 0-position before switch-on. Check signal contact
4	R prop. valve not at home	Right-hand proportional valve not registering a 0-position before switch-on. Check signal contact
5	L restrain valve not switching	Left-hand restraining valve is not switching on (in time). -> Press reset. Should this re-occur, maintenance.
6	R restrain valve not switching	Right-hand restraining valve is not switching on (in time). -> Press reset. Should this re-occur, maintenance.
7	L prop. valve fault	Left-hand proportional valve is not switching (in time). -> Press reset. Should this re-occur, maintenance.
8	R prop. valve fault	Right-hand proportional valve is not switching (in time). -> Press reset. Should this re-occur, maintenance.
9	FB loop error restrain valve	Response outside of on/off monitoring: Check restraining valve and feedback
10	2 hand improper operated	Over 0.5 sec. difference in operation of two-hand console 1
11	Foot switch fault	There is a signal error on the foot switch.
12	beam inclined position	Inclined position of upper beam detected. → For remedy see Trumpf operating manual.
13	Safety gate open	Safety gate opened at the side or rear.
14	E-Stop operated	One of the E-STOP pushbuttons was operated.
15	ESPE test fault	Fault determined on cyclical ESPE test
16	ESPE interrupted	The light curtain is interrupted
17	ESPE Reset required	Press reset
18	ESPE 1-break waiting	Interrupt ESPE to start
19	ESPE 2-break waiting	Interrupt ESPE 2x to start
20	ESPE Test	ESPE must be interrupted for function test

5. Commissioning test

Once the new controller is installed, the following tests must be carried out.

5.1. Check list, PSS 3056 Trumpf Conversion Kit

Inspection date: _____

Trumabend Type: _____ Machine Number: _____ Year of construction: _____

PSS 3056: Order Number: 301 10 ____ Serial Number: _____ Indication on display: _____

3056-Multi: Order Number: _____ Serial Number: _____ Indication on display: _____

Adaptation of wiring:

Pos	Description	Yes	No
1	E-STOP was arranged separately from safety gates and inclined position		
2	Safety gates front left, front right and rear were arranged separately		

Test step 1: E-STOP

Press each E-STOP button on the machine separately.

When the E-STOP is pressed, the following outputs must be off:

Terminal	Output	Function	Console	2-hand 1	2-hand 2
X6-1	A1.1-O0	Fast speed enable -> CNC			
X6-2	A1.1-O1	Press speed enable -> CNC			
X6-6	A1.2-O0	E-STOP circuit L5			
X6-7	A1.2-O1	E-STOP circuit L9			
X6-8	A1.2-O2	E-STOP circuit L10			
X7-1	A1.3-O0+	Fast Down + Up valve Y62 +			
X7-2	A1.3-O0-	Fast Down + Up valve Y62 -			

Test step 2: Safety gates

Open the safety gates to the front left, front right and rear of the machine separately, one by one.

When the safety gate is open, the following outputs must be off:

Terminal	Output	Function	Front left	Front right	Rear
X6-1	A1.1-O0	Fast speed enable -> CNC			
X6-2	A1.1-O1	Press speed enable -> CNC			
X6-6	A1.2-O0	E-STOP circuit L5			
X6-7	A1.2-O1	E-STOP circuit L9			
X6-8	A1.2-O2	E-STOP circuit L10			
X7-1	A1.3-O0+	Fast Down + Up valve Y62 +			
X7-2	A1.3-O0-	Fast Down + Up valve Y62 -			

Test step 3: Two-hand control

Operate each two-hand pushbutton and then release one pushbutton.

After it is released, the following outputs must be "off":

Terminal	Output	Function	2-hand 1	2-hand 2
X6-1	A1.1-O0	Fast speed enable -> CNC		
X6-2	A1.1-O1	Press speed enable -> CNC		
X7-1	A1.3-O0+	Fast Down + Up valve Y62 +		
X7-2	A1.3-O0-	Fast Down + Up valve Y62 -		

Test step 4: Foot switch

Press each foot switch and then release it.

After it is released, the following outputs must be off:

Terminal	Output	Function	Foot switch 1	Foot switch 2
X6-1	A1.1-O0	Fast speed enable -> CNC		
X6-2	A1.1-O1	Press speed enable -> CNC		
X7-1	A1.3-O0+	Fast Down + Up valve Y62 +		
X7-2	A1.3-O0-	Fast Down + Up valve Y62 -		

Test step 5: ESPE

Interrupt the light curtain with a test rod on the down stroke.

After it is interrupted, the following outputs must be off:

Terminal	Output	Function	OK
X6-1	A1.1-O0	Fast speed enable -> CNC	
X6-2	A1.1-O1	Press speed enable -> CNC	
X7-1	A1.3-O0+	Fast Down + Up valve Y62 +	
X7-2	A1.3-O0-	Fast Down + Up valve Y62 -	

Test step 6: Static valve test

Before the downward movement, unplug the connector for the monitoring sensor.

It must not be possible to start the presses.

The relevant error ID and message must appear on the display:

Equip-ID	Function	Error ID	OK
S67	FL restraining valve left	1	
S68	FL restraining valve right	2	
B65	0 setting prop left	3	
B66	0 setting prop right	4	

Test step 7: Dynamic valve test

Before the downward movement, connect the monitoring sensor input to 24 V.

The press must stop shortly after the downward stroke, or no further downstroke stroke must be possible after the upward movement.

The relevant error ID and message must appear on the display:

Equip-ID	Function	Error ID	OK
S67	FL restraining valve left	5	
S68	FL restraining valve right	6	
B65	0 setting prop left	7	
B66	0 setting prop right	8	

Comments:

Name of inspector: _____

Signature: _____

6. Technical details

General	
Certification	CE
Application range	Failsafe
Electrical data	
Supply voltage	24 VDC
Voltage tolerance	-20% / +25%
Max. power dissipation of all modules with no load	26W
External fuse protection max.	10A, automatic circuit breaker 24 VDC, B-characteristic
Environmental data	
Condensation during operation	Not permitted
Max. operating height above sea level	2000m
Mechanical data	
Mounting position	Horizontal to mounting rail
Connection type	Plug-in connectors
Conductor cross section	0.25-1.0 mm ²
Torque setting of screw terminals	0.5 Nm
Dimensions	
Height	120mm
Width	230mm
Depth	275mm
Weight	2.7 Kg

Für further technical details see operating manual for the individual Pilz components.

7. Order information

7.1. Product

Quant.	Description	Order No.
1	Conversion Kit Trumpf PSS 3056 – PNOZmulti	772750

7.2. Spare parts, input/output modules

Quant.	Description	Order No.
1	PNOZ m EF 16DI	772140
2	PNOZ m EF 8DI4DO	772142
1	PNOZ m EF 8DI2DOT	772144
1	PNOZ m ES 14DO	772181

Note:

The controller PNOZ m B1 (772101) cannot be ordered separately, because it does not contain the necessary configuration software. If necessary please contact Pilz.

7.3. Accessories

Quant.	Description	Order No.
1	PCOM Sec br2	311502

8. Activation of the function “Two-hand fast speed down without ESPE”

8.1. Note

The standard EN 12622:2001 for press brakes was harmonised on 14.06.2002. This stipulates that a two-hand control is not permitted as the only protection during fast speed down. This means that even when a two-hand control is used, an optical safeguard must protect front access to enable the press to travel downwards in fast speed.

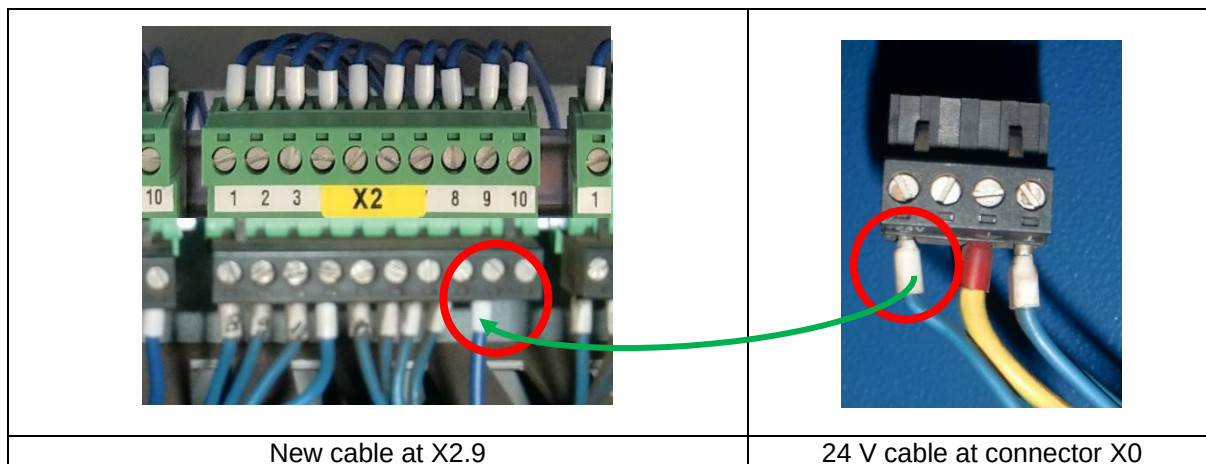
This new guard function was implemented in all PSS 3056 Trumpf from Version 2.8.

If you own a press brake that was placed on the market within the EU prior to 14.6.2002 and replace a PSS 3056 Trumpf Version 2.7 or lower with the Conversion Kit, there is the option in the Conversion Kit to activate the function “Two-hand fast speed down without ESPE”. Activation is not permitted on press brakes that were placed on the market from 14.6.2002.

If in doubt, check the EU Declaration of Conformity that accompanies the machine.

8.2. Activation

Switch off the machine. Connect the terminal X2-9 on the safety controller to 24 V. You can use the 24 V cable on the now unused 4-pin connector on the PSS 3056. After that, switch the machine back on.



9. EU declaration of conformity

This product meets the requirements of the Directives 2014/30/EU and 2011/65/EU of the European Parliament and of the Council. The complete EU declaration of conformity for the product is available on the Internet at www.pilz.com/downloads.

Authorised representative: Pilz GmbH & Co. KG, Felix-Wankel-Straße 2, 73760 Ostfildern, Germany

10. Changes

V1.0 05.05.2023 Operating manual *Conversion Kit Trumpf PSS 3056 – PNOZmulti* created

Created by:

Pilz GmbH & Co. KG
Felix-Wankel-Straße 2
73760 Ostfildern, Germany

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