



Rho P10 200/250

Service Manual – Diagnostics

Edition 09.04.2014

Table of contents

1	About this document	5
1.1	Purpose and target group	5
1.2	Revisions	5
1.3	Symbols and markers	5
1.3.1	Structure of warnings	6
2	Emergency operation.....	7
2.1	Emergency operation with only one UV lamp.....	7
2.1.1	Pre-requirements.....	7
2.1.2	Activating emergency operation	7
2.2	Emergency operation with a defective media feed roll unit	8
2.3	Emergency operation with a defective HMD unit.....	8
2.3.1	Exchanging the components HMD unit and MFR unit	8
2.3.2	Using an MFR motor as a HMD motor	9
2.3.3	Resetting the MFR motor	10
2.4	Emergency operation with a defective media transport encoder	10
2.5	Deactivating individual print heads	11
2.6	Deactivating print head rows	13
3	Diagnostics	14
3.1	Troubleshooting with printer software.....	14
3.1.1	Commands	14
3.2	Error code list.....	19
3.3	Pilz safety controller.....	40
3.3.1	Pin/LED assignment for the program LH4010P6	40
3.3.2	Meaning of LEDs on the PNOZ m1p.....	45
3.4	ACS Controller.....	47
3.4.1	Preparing the SpiiPlus MMI Application Studio.....	47
3.4.2	Safety and Faults Monitor	47
3.4.3	Print carriage motion test	50
3.4.4	Media transport belt initialization	51
3.5	Media transport analysis.....	52
3.5.1	Preparing the media transport analysis.....	52
3.5.2	Testing the encoder during printing.....	54
3.5.3	Testing the belt breakthrough.....	56
3.5.4	Testing the gear play	58
3.5.5	Testing the sine error	60
3.6	HMD motor (M-drive troubleshooting)	62
3.6.1	Checking communication	62
3.6.2	Reading the error number	62

3.6.3	Interrogating the reference switch / limit switch	63
3.6.4	M-drive error code list.....	64
3.7	Testing the media detection sensor.....	67
3.8	Fusion board	68
3.8.1	Checking the internal power supply to the printed circuit board	68
3.8.2	Checking that the fusion board has booted up correctly	69
3.8.3	Checking the correct data connection	69
3.8.4	Checking the temperature of the fusion board	70
3.8.5	Checking the quality of the signal in the light guide	70
3.9	UV unit	71
3.10	Print head.....	71

1 About this document

- ▶ Make sure that this document is accessible at all times.
- ▶ Insert all supplements received from Durst Phototechnik AG into this document.
- ▶ Read and comply with this document and all other documents in the service documentation.

1.1 Purpose and target group

This document is part of the service documentation and contains information on the facilities for emergency operation and for diagnostics in the event of faults.

This information applies to printers of the Rho P10 200/250 range of Durst Phototechnik AG and should be referred to by the following personnel:




- Durst Phototechnik AG Service Engineers (Service Engineer DV)
- General service technicians (Service Technician GV)
- Customer's technicians trained on site (In-house Technician)


1.2 Revisions

Edition of the document	What is new?
14.02.2014	First edition
10.03.2014	Fusion board modified
31.03.2014	Emergency operation with only one UV lamp modified, chapter ACS Controller added
09.04.2014	Update of error code list

Tab. 1: Revision index

1.3 Symbols and markers


Symbol	Meaning
✓	Pre-requirement for an action
▶	Request for a single-step action
1.	Step within a request for a multi-step action
↪	Result of an action sequence
	Note for easier or safer work
→	Cross-reference
 DANGER!	Immediately dangerous situation, where disregard of the safety measures will lead to death or serious injury.
 WARNING!	Potentially dangerous situation, where disregard of the safety measures may lead to death or serious injury.

Symbol	Meaning
 CAUTION!	Potentially dangerous situation, where disregard of safety measures may lead to minor injury.
NOTE!	Potentially dangerous situation, where disregard of safety measures may lead to damage to property.


Tab. 2: Symbols and markers

1.3.1 Structure of warnings

Warnings are structured as follows (shown here as an example: the warning level "WARNING"):

-  **WARNING! Type and source of the hazard**
- Consequences of the hazard.
 - ▷ Measures for avoiding the hazard.
 - ▶ Read the warning and comply with it.

2 Emergency operation

 In the event of some faults (such as a defective UV bulb), emergency operation is available. Some types of emergency operation are displayed in the bottom right corner of the printer software as “Emergency op.”.

- ▷ Comply with the pre-requirements (e.g. software version and firmware version) for emergency operation.


2.1 Emergency operation with only one UV lamp

2.1.1 Pre-requirements

- ✓ It must be known which UV bulb is not operational.
- ✓ The signal “shutter closed” must be operational for both UV lamps
- ✓ The necessary software must be installed:
 - Printer software version 1.1 Rev02 RC3 or higher


Checking the operation of the “Shutter closed” signal

1. Select the **Other** tab.
2. Open and close the shutters for UV lamp 1 and UV lamp 2.
3. Check that the “Shutter closed” input is correctly displayed at the Pilz safety controller (→ Chapter 3.3.1, p. 40).

 If the “Shutter closed” signal is missing for either UV lamp, the Pilz safety controller intervenes and prevents emergency operation.

Procedure if the “Shutter closed” signal is missing

- ▶ Bridge the “shutter closed” signal at the connection unit of the UV system (relays K4 and K5).

 ▷ After exchanging the defective component and deactivation of emergency operation, remove the bridge otherwise the UV system will not operate correctly.

2.1.2 Activating emergency operation


1. Agree with the customer which emergency operation to select:
 - Unidirectional glossy
 - Unidirectional matt
2. Make sure that all components (EPS, cables, bulb, exhaust fan) are operational for the selected lamp. If necessary, exchange the position of a component.
3. Activate emergency operation in the DurstPrinter.setup file: Change the value for `RhoUVLampEmergencyOperation` accordingly and insert/change the parameter with the respective value.

Print mode	Lamp required	Value for <code>RhoUVLampEmergencyOperation</code>
Not in emergency operation	Both lamps	0
Unidirectional glossy	Lamp 1	1
Unidirectional matt	Lamp 2	2

Tab. 3: Available values for RhoUVLampEmergencyOperation

4. Save the DurstPrinter.setup file.
5. Restart the printer software.
6. Select the **Configuration** tab.
7. Press the **Send to Rho** button in the **Feature Data** area.

2.2 Emergency operation with a defective media feed roll unit

 When the printer is switched off, the height of the media feed roll unit can be adjusted manually by means of the toothed belt.


1. Activate emergency operation of the MFR motor in the DurstPrinter.setup file: Change the value for RhoMediaFeedRollConfiguration accordingly and insert the parameter with the respective value.

Mode	Value for RhoMediaFeedRollConfiguration
Not in emergency operation	0
Operation without an MFR unit	1

Tab. 4: Available values for RhoMediaFeedRollConfiguration

2. Save the DurstPrinter.setup file.
3. Restart the printer software.
4. Select the **Configuration** tab.
5. Press the **Send to Rho** button in the **Feature Data** area.

2.3 Emergency operation with a defective HMD unit

 The same types of electrical components are used for the height adjustment of the media feed roll unit (MFR) and of the print carriage (HMD). Of course the motors have different motor addresses and programs, but can however be interchanged. In the event of a defective HMD motor, the MFR motor can also be used for emergency operation.

The emergency operation works in case of a defect of the following electrical components:

- Reference switch
- Limit switch
- MDrive filter PCB
- Motor

2.3.1 Exchanging the components HMD unit and MFR unit

1. Establish which component of the HMD unit is defective.
2. Remove the corresponding part from the MFR unit.
3. Activating emergency operation with a defective media feed roll unit (→ Chapter 2.2, p. 8).

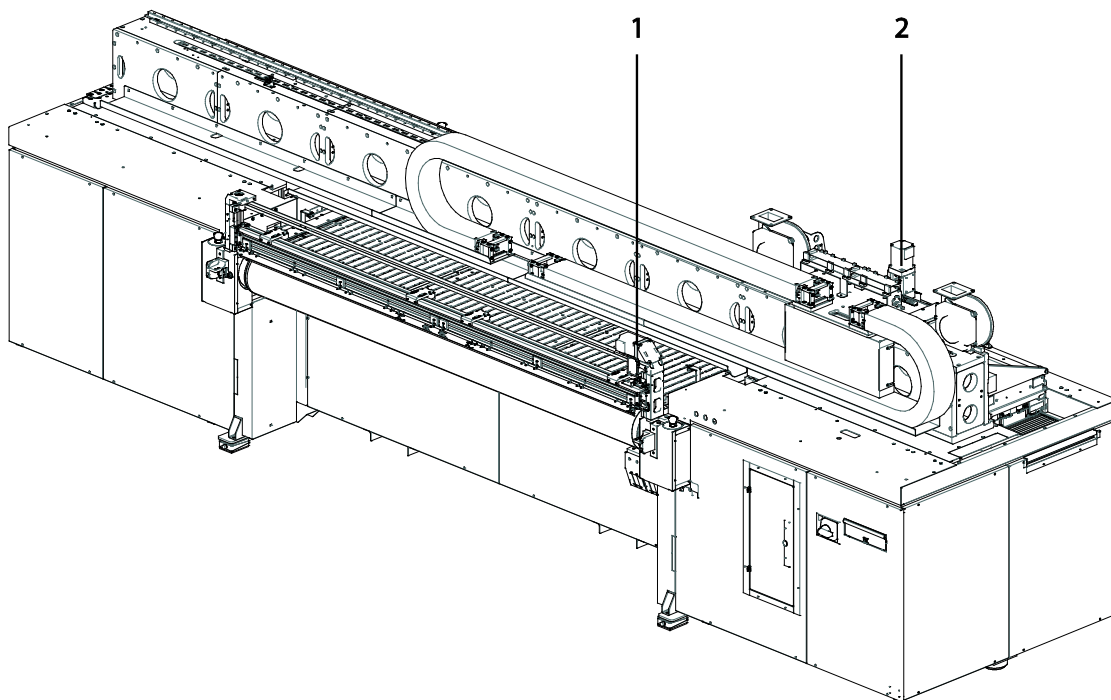


Fig. 1: Position of the M-drive motors

- 1 MFR motor – motor address b
- 2 HMD motor – motor address a

2.3.2 Using an MFR motor as a HMD motor

NOTE! Connecting and disconnecting cables whilst the printer is switched on will damage the motor!

- ▷ Always switch the printer off at the main switch.
- ▷ Wait approx. 10 min before connecting the M-drive motors individually, so that the condensers on the circuit boards have time to be discharged.

1. Switch the printer off at the main switch.
2. Disconnect the electrical connections to the HMD motor.
3. Switch the printer on at the main switch.
4. Select the **Communication** tab.
5. To test the communication to the MFR motor b, send a serial command YCMD**b**PR DN.
Response: YCMD "b"
6. To change the address of the MFR motor from b to a (HMD motor), send a serial command YCMD**b**DN="a".
7. To set the echo mode to full duplex, send a serial command YCMD**a**EM=0.
8. To save changes in the motor, send a serial command YCMD**a**S.
9. Switch the printer off at the main switch.
10. Exchange the HMD motor for the MFR motor.
11. Switch the printer on at the main switch.
12. Adjust the reference switch for the HMD motor and the head media distance (→ Service Manual Settings).

2.3.3 Resetting the MFR motor

i As soon as the HMD motor can be exchanged, the MFR motor must be restored to its position, since the two motors differ in their programming.

1. Switch the printer on at the main switch.
2. Select the **Communication** tab.
3. To test the communication to the HMD motor, send a serial command `YCMDaPR DN`.
Response: `YCMD "a"`
4. To change the address of the HMD motor from a to b (MFR motor), send a serial command `YCMDaDN="b"`.
5. To set the echo mode to Full Duplex, send a serial command `YCMDbEM=0`.
6. To save changes in the motor, send a serial command `YCMDbS`.
7. Switch the printer off at the main switch.
8. Exchange the MFR motor for the HMD motor.
9. Switch the printer on at the main switch.
10. Move the motors to their positions and adjust the reference switches, the head media distance and the media feed roll unit distance (→ Service Manual Settings).

2.4 Emergency operation with a defective media transport encoder

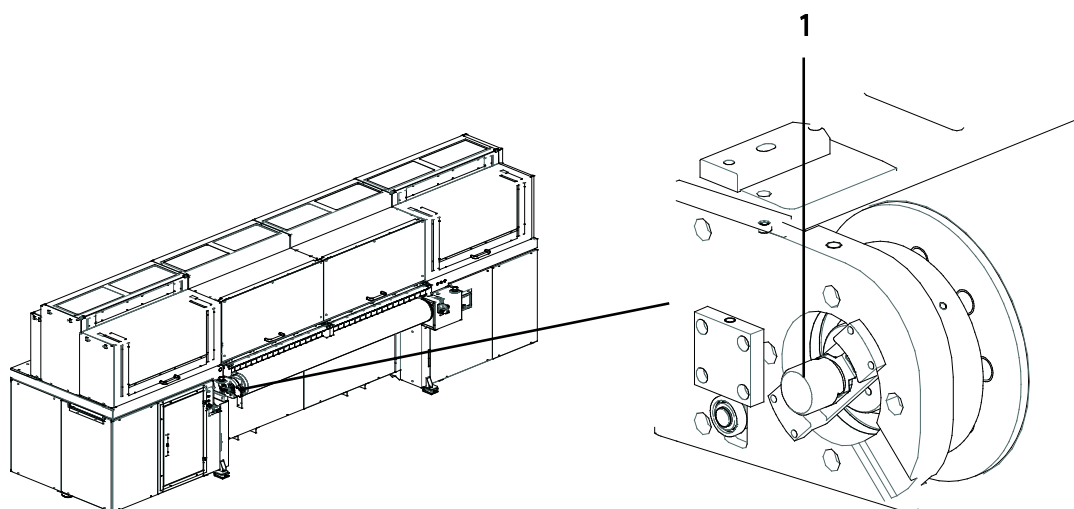


Fig. 2: Position of the media transport encoder

- 1 Media transport encoder

i If the media transport encoder is missing or defective, the printer can continue to print in emergency operation. It may be necessary to select a higher print quality so as to minimise the banding effect.

1. Activate emergency operation in the `DurstPrinter.setup` file: Change the value for `RhoMediaEncoderEmergencyOperation` accordingly and insert the parameter with the respective value.

Mode	Value for RhoMediaEncoderEmergencyOperation
Not in emergency operation	0
Operation without the media transport encoder	1

Tab. 5: Available values for RhoMediaEncoderEmergencyOperation

2. Save the DurstPrinter.setup file.
3. Restart the printer software.
4. Select the **Configuration** tab.
5. Press the **Send to Rho** button in the **Feature Data** area.

2.5 Deactivating individual print heads



This function can be used in the event of the following print head defects:

- Defective LOIS sensor
- Defective NTC temperature sensor
- Defective heater cartridge

- ✓ The necessary printer firmware must be installed:
 - With the following firmware versions the emergency operation works for all colors except white (F5, F6):
LE4051P_0Z_SVN2018 or higher (Rho P10 200)
LE5051P_1Z_SVN2016 or higher (Rho P10 250)
 - With the following firmware versions the emergency operation works for all colors:
LE4051P_2Z_SVN2624 or higher (Rho P10 200)
LE5051P_3Z_SVN2629 or higher (Rho P10 250)

1. Select the **Communication** tab.
2. Send the serial command YSHPabcde. In this command, replace abcde with the respective values:

Variable	Description	Values
a	Print head	0 – CK 1 – MY 2 – YM 3 – KC 4 – BO or F5 (white under) 5 – OB or F6 (white over) 6 – cm 7 – mc
b	Defines: Print head defective in row 1?	0 – print head defective
c	Defines: Print head defective in row 2?	1 – print head operational
d	Defines: Print head defective in row 3?	
e	Defines: Print head defective in row 4?	

Tab. 6: Variables for the serial command YSHPabcde for deactivation of print heads

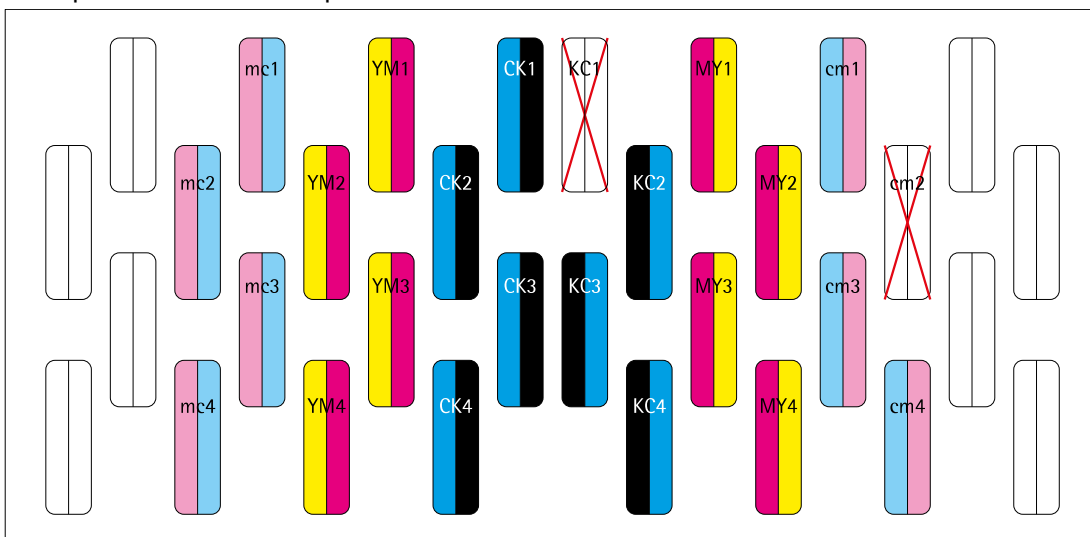
↪ The print head is deactivated.

i Restarting the printer (switch the main switch off and on again) reactivates all the print heads.

NOTE! Escape of ink from the print heads due to loss of vacuum!

- ▷ Completely disconnect all tubes and cables from the deactivated print head (meniscus, ink tube, electrical connections).
- 3. Disconnect all tubes and cables from the print head, or if it is dripping, dismantle the print head module (→ Service Manual – Print Head).
- 4. Deactivate all the print head rows in order to ensure print quality despite the lack of the missing print head (→ Chapter 2.6, p. 13).

Example of deactivation of print heads:



Deactivation of KC1:

- ▶ Send serial command YSHP30111.

Deactivation of cm2:

- ▶ Send serial command YSHP61011

After the fault has been rectified (for instance by exchanging the print head module):

- ▶ Restart the printer.
Emergency operation is then switched off.

2.6 Deactivating print head rows

i If the print heads are defective (LOIS sensor, NTC, heater cartridge, slot dripping) they must first be deactivated (→ Chapter 2.5, p. 11) and then if necessary removed.

The deactivation of the print head rows affects only the normal print procedure. Test patterns can still be printed with all the print head rows (even those that are deactivated).

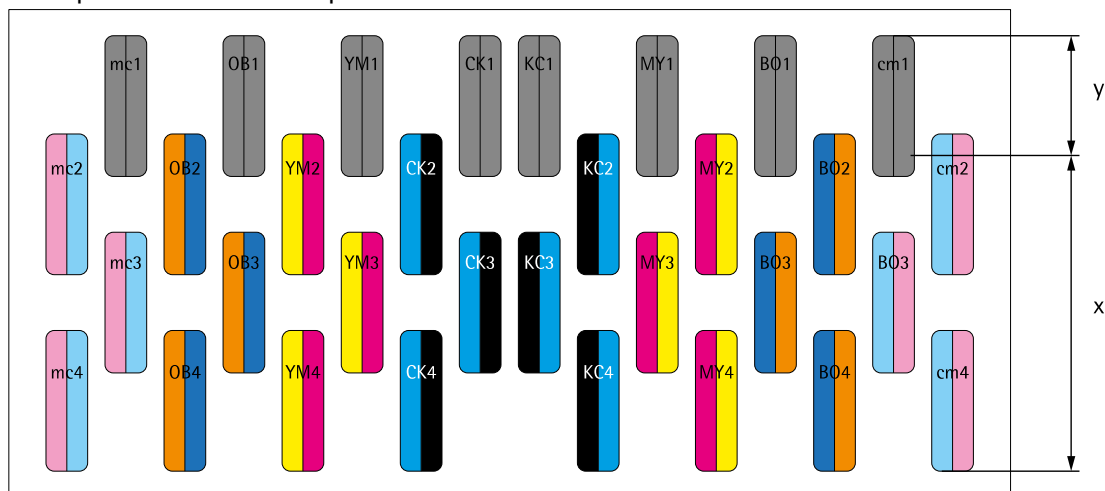
1. Deactivate the print head rows in the `DurstPrinter.setup` file: Change the values for `RhoNumOfPrintheadsPerColorToUse` and `RhoNumOfPrintheadsPerColorOffset` accordingly and insert the parameter with the respective value.

Parameter	Value range	Description
<code>RhoNumOfPrintheadsPerColorToUse</code>	1-8	Number of print head rows with operational print heads in a block
<code>RhoNumOfPrintheadsPerColorOffset</code>	0-7	Offset of the operational print heads to row 1

Tab. 7: Parameter for deactivation of the print head rows

2. Save the `DurstPrinter.setup` file.
3. Reboot the printer software.

Example of deactivation of print head rows:



Deactivation of the first print head row:

- `RhoNumOfPrintheadsPerColorToUse 3`
- `RhoNumOfPrintheadsPerColorOffset 1`

After the fault has been rectified (for instance by exchanging the print head module):

- ▶ Delete the entries `RhoNumOfPrintheadsPerColorToUse` and `RhoNumOfPrintheadsPerColorOffset` from the `DurstPrinter.setup` file, or comment them out by inserting `#` at the start of the line. The print head row is activated.

3 Diagnostics

3.1 Troubleshooting with printer software

3.1.1 Commands

Operational interrogation of sensors

- ▶ Select **Communication** in the printer software tab, and send the appropriate command.

Command	Response	Description
Pilz Virtual Port Status Query	YPVPSQu,a,b,c,d,e,f	Interrogate the status of the virtual Pilz unit ports. Response time < 2 s
	u = 0 ok	
	u = 1 Fehler	
	a = VPort I0 (LSB) – I7 (MSB)	
	Bit 0: HV Start	
	Bit 1: UV Start	
	b = VPort I8 (LSB) – I15 (MSB)	
	c = VPort I16 (LSB) – I23	
	d = VPort O0 (LSB) – O7	
	Bit 0: Keylock	
	Bit 1: Doors	
	Bit 2: Lighttrap	
	Bit 3: UV-Shutter	
	Bit 4: Sledge Temperature Error	
	Bit 5: Sledge Temperature Warning	
	Bit 6: Exchange Mode	
	Bit 7: MC4U ES Okay	
	e = Port O8 (LSB) – O15	
	Bit 0: HV ON	
	Bit 1: HV ON	
	Bit 2: END POS1	
	Bit 3: END POS2	
	Bit 4: UV Start	
	f = Port O16 (LSB) – O23	

	Command	Response	Description
Query Machine State	QMST	QMST0:xxx 1:y	Interrogate the status of the printer Response time > 1 s Send the command YQSFP for further information xxx = Temperature FGPA y = State SFP Module Bit 0 = 1 – Registervalue 117 not ok Bit 1 = 1 – Registervalue 116 not ok Bit 2 = 1 – Registervalue 110 not ok
Query Diaginfo SFP	YQSFP	YQSFPa,b,c,d	Read Diagregister SFP Module Fusion Response time < 1 s a = Registervalue 117: 0x00 normal Bit: 7 Rx Power High Warning Bit: 6 Rx Power Low Warning b = Registervalue 116: 0x00 normal Bit: 7 Temp High Warning Bit: 6 Temp Low Warning Bit: 5 Vcc High Warning Bit: 4 Vcc Low Warning Bit: 3 Tx Bias High Warning Bit: 2 Tx Bias Low Warning Bit: 1 Tx Power High Warning Bit: 0 Tx Power Low Warning c = Registervalue 110: 0x10 normal (Statusinfo) Bit: 7 TX_DISABLE State Bit: 6 Soft TX_DISABLE Bit: 5 Reserved Bit: 4 Reserved Bit: 3 Reserved Bit: 2 TX_FAULT State Bit: 1 RX_LOS State Bit: 0 Data Ready (Bar) indicates transceiver is powered and real time sense data is ready (0 = ready) d = temperature

	Command	Response	Description
Crash Sensor Status	YCSP?S_SAFIN.#ES	YCSP0 x	x=1 OK: No sensors tripped x=0 FAULT: One or more sensors tripped Determines the status of the crash sensors (incl. media security sensors, light trap switch, front door switches)
Serial Communication Test	YSC	e.g. Heater Control 1 #DA2454.0Z#	The response must be a version number for all items. If it is not, there is a communications problem between the fusion master boards and the PCBs.
UV Lamp Hour Counter	YSB.u0_x	YSB.0u_xyyyyy,yy	This command works only with a Hönle µcontroller Replace x as follows: L = UV bulb 1 M = UV bulb 2
UV Lamp Hour Reset	YSB.u0_x		This command works only with a Hönle µcontroller Replace x as follows: f1 = bulb 1 f2 = bulb 2
Read Spii Firmware Version	YQSPV	YQSPV0,vvvvvvvvv	v = version of the Spii firmware, e.g. LE4011P1.0Z
Encoder Readout	YCSP?{%12.0f}FPOSx	YCSP0 aaaa	Fault indication for ACS Spii Replace x as follows: 0 = X-axis (carriage linear motor) 2 = Y-axis (media transport motor) Result: a = position
Number of Advances	YCSP?VorschubCnt	YCSP0 aaaa	a = total number of passes b = number of passes with a positioning error > 5 µm
Number of Advances out of Range (minor errors)	YCSP?VorschubErrCnt_1	YCSP0 bbbb	b = number of passes with a positioning error > 5 µm

	Command	Response	Description
Number of Advances out of Range (major errors)	YCSP?VorschubErrCnt_2	YCSP0 cccc	c = number of passes with a positioning error > 10 µm
Status of Spii Carriage and Transport Belt Controller	YCSP?B/FAULTx	YCSP0 00000000,000utsrq, ponmlkji,hgfedcba	Fault indication for ACS Spii Replace x as follows: 0 = X-axis (carriage linear motor and encoder), A-axis (media transport motor) 2 = media transport encoder Meaning of the bits (→ Tab. 9, p. 18)

Tab. 8: Useful commands

Bit	Error description
a	RIGHT LIMIT 1 = right limit switch activated
b	LEFT LIMIT 1 = left limit switch activated
c	RIGHT LIMIT 2 1 = right limit switch activated
d	LEFT LIMIT 2 1 = left limit switch activated
e	MOTOR OVERHEAT 1 = temperature sensors on the motor indicate overheating
f	SOFTWARE RIGHT LIMIT 1 = reference position of the axis is greater than the right hand limit in the software
g	SOFTWARE LEFT LIMIT 1 = reference position of the axis is less than the left hand limit in the software
h	ENCODER NOT CONNECTED 1 = primary encoder not connected
j	DRIVE ALARM 1 = signal from the drive indicating a fault
k	ENCODER ERROR 1 = primary encoder has miscounted
m	POSITION ERROR 1 = a positional error has occurred
n	CRITICAL POSITION ERROR 1 = the positional error has exceeded the critical limit
o	VELOCITY LIMIT 1 = the absolute value of the speed has exceeded the limit defined by the parameters
p	ACCELERATION LIMIT 1 = the absolute value of the acceleration has exceeded the limit defined by the parameters
q	CURRENT LIMIT 1 = the voltage calculated by the servo-processor has exceeded the limit defined by the parameters
r	SERVO PROCESSOR ALARM 1 = the axes servo-processor has lost synchronisation with the MPU . This error indicates a serious problem with the controller
u	HSSI NOT CONNECTED 1 = the HSSI module is not connected

Tab. 9: Meaning of the bits for the "Status of Spii Carriage and Transport Belt Controller"

3.2 Error code list

Code	Description	Possible solution
2001	Printer not initialized	Initialise the printer in the Maintenance tab.
2002	Capping unit is moved out. Please initialize printer	
2190	Failed to backup printer configuration	
2194	Unable to start purging cycle	
2215	Error switching on safety relais	
2217	Error switching off safety relais	
2222	Failed to set media feed roll distance	Make sure all safety doors are closed, and attempt to initialise the motor. Check the limit switches, cable connections and supply voltage.
2223	Failed to set head media distance	
2228	Front encoder not working	Check the cable connections and supply voltage; check the encoder for mechanical damage.
2233	Printhead carriage not working	
2246	Table vacuum fan does not react	
2247	Error switching table fan	
2253	Light trap emergency switch check failed	
2254	Print carriage status check failed	
2255	Timeout waiting for printhead carriage	
2256	Light trap is not inserted	
2257	Cover emergency switch check failed	Check the cable connections. Check the switch for correct operation.
2258	Printer cover open	
2259	Invalid printhead carriage status	
2260	Timeout waiting for print table	
2261	Invalid print table status	
2267	Unable to start ink heating system	
2268	Unable to query printhead target temperature	
2270	Waste ink tank full. Please empty ink tank	Empty the ink waste bin.
2271	Failed to control sledge heating system	
2272	Unable to query printhead temperature	
2273	Ink heating system error: Heater control switched off	

Code	Description	Possible solution
2274	Ink heating system error: Heating voltage fault	
2276	Ink heating system error: NTC shorted	
2277	Ink heating system error: NTC open	
2278	Ink heating system error: Heater control timeout	
2279	Ink heating system error: Printhead query failed	
2280	Configuration data mismatch. - Please update configuration or printer	
2302	Unable to calibrate the front encoder	
2307	Unable to switch the rimless print	
2308	Unable to teach media stop sensor	
2309	Unable to send the feeding offset	
2311	Lois offset not programmed	
2312	Lois offset not programmed	
2313	Lois voltage not programmed	
2320	Workstation was unable to communicate with printer device	
2381	Error querying main ink tank	Check the connection to the ink sensor in the main tank. Check the ink sensor in the main tank for correct operation. Fill the main tank with ink.
2382	Insufficient ink in main tank. Please refill ink	
2451	Head voltage data differ from saved configuration. Please update configuration	
2700	PDF file not found	
2701	Movie file not found	
2702	Movie player not installed correctly	
2703	Movie player is running	
2704	PDF viewer is running	
2705	PDF file not specified	
2706	Movie file not specified	
6001	Printer not working	
6002	Sledge control unit failed	
6003	Printing Error - please check the UV lamps	
6004	Printing Error - Data transfer failed - Please check the optical data link interface - (link status, cable, correct driver installation). - If the error persists, shutdown and restart the workstation	

Code	Description	Possible solution
6005	Printing Error - Sledge start failed	
6008	Printing Error - Sledge check failed - - Please check the serial interface	
6009	Printhead carriage uninitialized	
6020	Sledge control failed. Advance out of range	
6021	Sledge print encoder failed	
6022	Purge vacuum pump failed	
6023	Purge up/down motor failed	
6024	Purge in/out motor failed	
6025	Purge head media distance wrong	
6026	Cover open	
6027	Purge tub open	
6028	Purge security switch active	
6029	Key lock active	
6030	Sledge temperature fault	
6600	Crash sensor of the print carriage detected	
6600	Crash sensor detected	
6600	Crash sensor detected during printing. - Please remove the medium and press "Ok"	
6600	Crash sensor detected during test pattern printing. - Please remove the medium and press "Ok"	
6600	Crash sensor detected during purge cycle. - Please remove the medium and press "Ok"	
6619	Security unit not ready	
6630	Sledge control unit failed	
6631	Printhead carriage uninitialized	
6632	Crash sensor detected	
6633	Sledge print encoder failed	
6634	Print carriage check failed. Security unit not ready	
6635	Print carriage check failed. Cover or purge tub open	
6636	Print carriage check failed. Firmware error	
6637	Print carriage check failed. Capping unit error	
6638	Print carriage check failed. Purge unit error	
6640	Purge vacuum pump failed	
6641	Purge up/down motor failed	

Code	Description	Possible solution
6642	Purge in/out motor failed	
6643	Purge head media distance wrong	
6644	Print carriage check failed. Cover open	
6645	Print carriage check failed. Purge tub open	
6646	Print carriage check failed. Purge security switch active	
6647	Print carriage check failed. Key lock active	
6648	Firmware error	
6649	Capping unit error	
6650	Head media distance below limit for capping	
6651	Purge unit error	
6652	Print carriage check failed. Sledge temperature fault	
6653	SPii Plus controller communication failed	
6654	Lenze controller failed	
6660	Print table reference not found	
6661	Print table emergency stop detected	
6661	Print table emergency stop detected	
6662	Print table check failed. Emergency stop detected	
6663	Print table fault detected	
6663	Print table fault detected	
6664	Print table check failed. Table fault detected	
6665	Print table encoder fault detected	
6666	Print table check failed. Encoder fault detected	
6667	Security unit not ready	
6668	Print table check failed. Security unit not ready	
6669	Cover or purge tub open	
6670	Print table check failed. Cover or purge tub open	
6671	Firmware error	
6672	Print table check failed. Firmware error	
6673	Loading door open	
6674	Print table check failed. Loading door open	
6675	Maintenance door open	
6676	Print table check failed. Maintenance door open	
6677	Key lock active	

Code	Description	Possible solution
6678	Print table check failed. Key lock active	
6679	Print table temperature fault	
6680	Print table check failed. Temperature fault	
6681	Print table uninitialized	
6682	Print table check failed. Table uninitialized	
6683	Print carriage check failed	
6684	Print carriage check failed	
6685	Print table check failed	
6686	Print table check failed	
7200	Remove any medium from printer	
7255	Failed to set printing resolution	
7256	UV lamp mode not set	
7257	Uni-/Bidirectional print mode not set	
8009	Error on Optolink interface (DHS NOT READY)	
8101	Error on Optolink interface (DHS_COULD_NOT_OPEN_DEVICE)	
8103	Error on Optolink interface (DHS_COULD_SET_ASYNC_MODE)	
8207	Error on Optolink interface (DHS_LEN)	
8208	Error on Optolink interface (DHS_SMAX)	
8209	Error on Optolink interface (DHS_AWRITE)	
8210	Error on Optolink interface (DHS_ACHECK)	
8211	Error on Optolink interface (DHS_ASTAT)	
8212	Error on Optolink interface (DHS_COULD_NOT_RESET_DRIVER)	
8213	Error on Optolink interface (DHS_COULD_SET_TXSPEED)	
8214	Error in Optolink data transfer	
8230	Failed to open Fusion datalink interface channel 0	
8231	Failed to open Fusion datalink interface channel 1	
8232	Failed to open Fusion datalink interface channel 2	
8233	Failed to open Fusion datalink interface channel 3	
8234	Invalid Fusion datalink interface channel	
8235	Failed to write to Fusion datalink interface - Error copying data from user-space to kernel-space	

Code	Description	Possible solution
8236	Failed to write to Fusion datalink interface - Error detected by link card	
8237	Failed to write to Fusion datalink interface - Timeout occurred during transfer	
8238	Failed to write to Fusion datalink interface - Received an interrupt signal	
8239	Failed to write to Fusion datalink interface	
9010	Reading image file failed	
9013	Writing file to fifo failed	
9020	Timeout writing to printer	
9031	Media Id already exists. Enter a non existing Id	
9032	Currently loaded medium changed - please reload medium	
9032	Currently loaded medium changed - please reload medium	
9045	Failed to move print carriage	
9046	Failed to park print carriage	
9047	Failed to move print carriage from purge adjust position	
9048	Failed to move print carriage to purge adjust position	
9049	Failed to rotate print carriage	
9050	Failed to initialize print table	
9051	Failed to park print table	
9052	Failed to move print table	
9053	Print table security move failed	
9054	Print table status check failed	
9086	Unable to set the head voltage	
9087	Unable to switch the head voltage	
10005	Failed to query media feed roll distance	
10006	Media transport failed	
10007	Failed to query media advance	
10008	Error querying status of media feed	
10009	Unknown answer when querying status of media feed	
10011	Failed to switch UV lamps On or Off	

Code	Description	Possible solution
10012	Failed to set UV lamps Intensity	
10013	Error querying vacuum motor distance	
10014	Unknown answer when querying vacuum motor distance	
10015	Unable to set vacuum motor distance	
10016	Error querying waste ink tank	
10017	Error checking pressure systems	
10018	External pressure: Not ok	
10019	Meniscus pressure: Not ok	
10021	Unable to switch power for motors	
10022	Error setting Microlynx holding current	
10023	Head media distance is not adjustable	The HMD system has reached its mechanical limit. Communication with the motor was lost. The motor encoder is defective.
10024	Failed to query head media distance	
10025	Unable to load medium	
10026	Error querying light trap emergency switch	Check the switches.
10027	Error querying cover emergency switch	
10028	Error querying SPiiPlus-MDrive	
10029	Error setting feed mode: Roll table motor	
10030	Error setting feed mode: Media stop sensor	
10031	Error switching roll table motor	
10032	Failed to start sledge initialization	
10033	Unknown answer when querying crash sensor	
10034	Initialization of reference positions failed with timeout	
10035	Unable to query UV lamp status	
10036	Initialization of reference positions failed	
10037	Head media distance reference not found	
10038	Media feed roll reference not found	
10039	Vacuum system reference not found	
10040	Print carriage reference not found	
10041	Media transport reference not found	
10042	Security unit not ready	
10043	Edge holder up/down reference not found	

Code	Description	Possible solution
10044	Edge holder in/out reference not found	
10045	Feeder reference not found	
10046	Purge up/down reference not found	
10047	Purge in/out reference not found	
10048	Media transport fault	
10049	Media transport check failed. Media transport encoder or media transport motor fault	
10050	Media transport check failed. Cover or purge tub open	
10051	Media eject roll reference not found	
10060	Failed to set quality mode	
10061	Error querying Lenze error code	
10103	Error sending command to RS-485 bus	
10104	Media feed roll distance is not adjustable	
10110	Unable to set curing parameters for unidirectional printing	
10120	Lung vacuum: Not ok	
10143	Error in UV lamp system	
10144	UV lamp 1 error: shutter not working	
10145	UV lamp 2 error: shutter not working	
10146	UV lamp 1 failure	
10147	UV lamp 2 failure	
10148	UV safety device failure	
10149	UV lamp 1 not ready	
10150	UV Lamp 2 not ready	
10152	Error in UV lamp system	
10153	Failed to initialize the printer	
10154	Feature data mismatch. - Please update configuration or printer	
10155	Media family is in use	
10156	Vacuum system not adjustable	
10157	Eject and remove board medium first	
10158	Medium not unloaded! - Continue loading medium?	

Code	Description	Possible solution
10159	Medium still not unloaded! - Continue with medium selection (yes) or return to main menu (no)?	
10160	Medium not loaded correctly - please reload medium	
10161	Drop fly time is not configured properly	
10162	Error stopping expose program	
10163	Error setting feed table type	
10164	Error selecting detect switches	
10165	Unable to print test pattern on selected position	
10166	The minimal requested width of the medium is 42cm/16.55in.	
10167	Medium not loaded correctly - please reload medium	
10168	Medium cannot be ejected	
10169	User Abort	
10170	Timeout in purge cycle	
10171	Error switching SPiiPlus buffer	
10172	Switching on UV lamp 1 timed out (lamp still cooling)	
10173	Switching on UV lamp 2 timed out (lamp still cooling)	
10174	Switching on UV lamps timed out (lamps still cooling)	
10175	Error setting configuration data	
10176	Media eject failed	
10177	Media feed failed	
10178	Media advance failed	
10179	Media advance failed	
10180	Media reverse advance failed	
10181	Media transport is busy	
10182	Failed to set feature data	
20000	Unable to switch on the head voltage	
20003	Cannot create fifo	
20004	Cannot open fifo	
20006	Failed to write shared image buffer	

Code	Description	Possible solution
20014	Failed to set reference positions	
20015	Error executing security move	
20016	Ink heating was not switched On	
20017	Unable to start ink heating system	
20018	Please refill main tanks	
20019	Error in checking printhead ink tanks	
20020	Loading of new board failed	
20021	Please insert the light trap completely. - Then pull out to the stop	
20022	Please insert the light trap completely	
20023	Please close the printer cover	
20024	Sledge control unit error	
20025	Crash Sensor triggered	
20026	Security move requires printhead carriage at right hand position	
20027	Printhead temperature could not be reached in time	Check the temperature of each print head.
20028	Failed to switch on the UV lamps	Switch the printer off and on again and initialise it.
20029	Opening image file failed	
20030	Type conversion failed	
20031	Please eject medium first	
20032	System has been locked by Autotimer. - If this error persists, please reboot the workstation	
20033	Unable to switch table vacuum relais	
20034	No medium loaded	
20035	No medium detected	
20036	Unexpected feeding tool error	
20037	End of medium detected or heavy roll tool not ready	
20038	Continuous feeding tool not ready	
20039	Error in checking printhead ink tanks. - Communication error in ink level control. Please call Customer Service	Exchange the ink filter on the main tank for the relevant color.
20040	Error in checking printhead ink tanks. - Timeouterror caused by ink level control	

Code	Description	Possible solution
20041	Error in checking printhead ink tanks. - At least one head has not reached the nominal temperature. Heating-up will take a few more minutes	
20042	Error in checking printhead ink tanks. - Defect of ink level sensor. Please call Customer Service	
20043	Error in checking printhead ink tanks. - Ink level control not working. Please call Customer Service	
20044	Error in checking printhead ink tanks. - Ink level not yet reached. Filling will take a few more minutes	
20045	Failed to query feeder equipment	
20046	Failed to control feeder	
20047	Failed to query feeder status	
20048	Feeder is activated for currently loaded medium - Please attach the feeder unit	
20049	Failed to query white ink mixer status	
20050	White ink mixer not working	
20051	Failed to set feeder prefetch mode	
20052	Failed to set unidirectional return speed	
20053	Unable to spit colors	
20054	Unable to print a test pattern on a board	
20055	Media advance failed	
20056	Head media distance and medium distance must not exceed purge height	
20057	Failed to control continuous board feeding tool	
20058	Continuous feeding tool error: - Next board position is invalid (below buffer min)	
20059	Continuous feeding tool error: - Next board position is invalid (within page row)	
20060	Continuous feeding tool error: - Next board position is invalid (within print carriage)	
20061	Continuous feeding tool error: - Failed to query next board position	
20062	Failed to detect medium - please reload medium	
20063	Board feeding failed (timeout)	
20064	Failed to query stacker status - Please check if the stacker is switched on and properly connected	

Code	Description	Possible solution
20065	Stacker is full - Please empty the stacker	
20066	Media feed failed: - Media thickness limit exceeded	
20067	Feeder is empty - Please reload the feeder	
20068	Failed to set board eject length offset	
20069	Failed to set load delay	
20070	Unable to set printhead target temperature	
20071	Unable to switch printhead temperature on or off	
20072	Failed to query printhead data	
20073	Failed to switch sledge oiling unit on/off	
20074	Failed to query sledge oiling unit status	
20075	Failed to set board insert length offset	
20076	Failed to set fire pulse	
20077	Failed to set jet straightening pulse	
20078	Failed to set feeding side	
20079	Please refill oiling unit(s) as soon as possible, - otherwise the sledge system will be damaged!	
20080	Please refill main tanks!	
20081	Print sledge is busy	
20082	Head media distance reference is uninitialized	
20083	Vacuum table offset is uninitialized	
20084	Purge up/down offset is uninitialized	
20085	Purge up/down distance is below allowed minimum	
20086	Print sledge is not in home position	
20087	Failed to set continuous feeding mode	
20088	Failed to control continuous feeder - Please check if the feeding unit is switched on and properly connected	
20089	Failed to set feeder board length - Please check if the feeding unit is switched on and properly connected	
20090	Failed to set feeder board count - Please check if the feeding unit is switched on and properly connected	
20091	Failed to set feeder board measurement calibration	

Code	Description	Possible solution
20092	Failed to get board leading edge position	
20093	Failed to query continuous feeding system error status - Please check if the feeding unit is switched on and properly connected	
20094	Failed to query continuous feeding system error status - Please check if the eject unit is switched on and properly connected	
20095	Continuous feeding system check detected an error - Please check if the feeding unit is switched on and properly connected	
20096	Continuous feeding system check detected an error - Please check if the eject unit is switched on and properly connected	
20097	Failed to set jet straightening factor	
20098	Failed to set 'insert next board' mode	
20099	Failed to enable 'insert next board'	
20100	Failed to get media edge detect status	
20101	Failed to move print carriage to capping unit	
20102	Failed to move print carriage from capping unit	
20103	Failed to set capping unit	
20104	Failed to query capping unit position	
20105	Failed to switch ionizer unit	
20106	Failed to query ionizer unit alarm	
20107	Failed to query ionizer unit service status	
20108	Capping unit position invalid	
20109	Failed to set SPiiPlus load/unload	
20110	Failed to reset media advance status	
20111	Failed to query media advance status	
20112	Failed to set feeder board width - Please check if the feeding unit is switched on and properly connected	
20113	Failed to set feeder board thickness - Please check if the feeding unit is switched on and properly connected	
20114	Failed to set feeder track count - Please check if the feeding unit is switched on and properly connected	
20115	Failed to set flexible board feed mode	

Code	Description	Possible solution
20116	Failed to set flexible board eject mode	
20117	Crash Sensor triggered. - Please remove the medium and press "Ok"	
20119	Failed to set media detect mode	
20120	Failed to switch transport belt control on or off	
20121	Failed to set velocity for transport belt control	
20122	Failed to set capping unit pump	
20123	Failed to set wet capping unit control	
20124	Failed to query main flush tank	
20125	Failed to query faceplate solution tank	
20126	Failed to set capping unit pumps	
20127	Failed to query status of capping unit pumps	
20128	Capping unit pumps error	
20129	Capping unit pumps timeout	
20130	Failed to set media feed roll additional distance	
20131	Failed to set media feed roll input delay	
20132	Failed to set spitting purge delay	
20133	Failed to set meniscus target pressure	
20134	Faceplate solution is empty! Please refill it	
20135	Failed to set purge unit	
20136	Failed to set purge unit ambient valve	
20137	Failed to query purge unit ambient valve	
20138	Failed to set purge faceplate valve	
20139	Failed to set capping unit meniscus valve	
20140	Ink main tank check detected empty main tank(s). - Please refill ink(s)	
20141	Failed to switch MC4U headvoltage power on or off	
20142	Failed to start or stop capping unit ink pump task	
20143	Failed to query status of capping unit ink pump task	
20144	Failed to set signal tower	
20145	Failed to query signal tower	
20146	Failed to set queue operation status	
20147	Failed to set sledge velocity	

Code	Description	Possible solution
20148	Failed to set media advance boost	
20149	Failed to set sledge boost	
20150	Key lock is active	
20151	Purge up/down error	
20152	Failed to read encoder value	
20153	Failed to switch blocking valve	
20154	Failed to query blocking valve	
20155	Print sledge temperature fault	
20156	MC4U communication error	
20157	MC4U component error	
20158	Failed to set sledge 'fine text' mode	
20159	Blocking switch is active	
20160	Failed to start or stop stresstest	
20161	Failed to query status of stresstest	
20162	Failed to query number of stresstest cycles	
20163	Failed to query feeder/stacker limit switch	
20164	Failed to set media cutting unit	
20165	Failed to query media cutting unit	
20166	Failed to query media cutting unit connect state	
20167	Media cutting unit error detected	
20168	Media cutting unit error - Paper jam detected	
20169	Media cutting unit error - Incorrect 'up' position of cutting tool detected	
20170	Media cutting unit error - Incorrect 'down' position of cutting tool detected	
20171	Failed to query status of sensor	
20172	Failed to read data from MDrive motor	
20173	Failed to set exhauster fans	
20174	Failed to query exhauster fans	
20175	Failed to set media eject roll distance	
20176	Failed to query media eject roll distance	
20177	Failed to set media eject roll up/down mode	
20178	Failed to set registration table advance support mode	
20179	Failed to query fusion temperature status	

Code	Description	Possible solution
20180	Feeding unit error - 'Out of media' detected or feeding unit not ready	
20181	Feeding unit error - 'Out of media' detected	
20182	Feeding unit error - Feeding unit communication failed	
20183	Feeding unit error - Feeding unit motor failure	
20184	Feeding unit error - Feeding timeout detected	
20185	Feeding unit error - Media thickness limit exceeded	
20186	Eject unit error - 'Stacker full' detected	
20187	Eject unit error - Stacker failure	
20188	Eject unit error - Eject unit communication failed	
20189	Eject unit error - Eject unit motor failure	
20190	Eject unit error - Eject timeout detected	
20191	Eject unit error - Congestion detected	
20192	Failed to query media coating unit	
20193	Media coating unit error detected	
20194	Feeding unit error - Congestion detected	
20195	Failed to set lift cylinder configuration	
20196	Heavy roll tool error	
20197	Heavy roll tool error - Tension/release timeout	
20198	Failed to start or stop spillover control task	
20199	Failed to query status of spillover control task	
20200	Printer device was unable to handle command	
20201	Unexpected command argument(s)	
20202	Commands were not read or interpreted properly. Please check your configuration	
20203	Printer startup still running. Please try again in a few seconds	
20204	Failed to set registration table adjust mode	
20205	Failed to set ionizer boost mode	
20250	Loading door is open	
20251	Maintenance door is open	
20252	Back door is open	
20253	MC4U EtherCAT error	

Code	Description	Possible solution
20300	This is an unexpected error, usually a runtime exception	
20301	Null Pointer - Internal programming error	
20302	Illegal Argument - Internal programming error	
20303	The feature is not implemented yet	
20304	Illegal State - Internal programming error	
20305	Illegal Argument - Internal programming error	
20306	Configuration Error - Internal programming error	
20308	General Communication Error. Please check if the printer is switched on and properly connected	
20309	Generic database error occurred	
20310	Could not open database	
20311	Unexpected error during motor control	
20312	The feature is not supported by this type of printer	
20401	Failed to query status of environment	
20402	Check of printer system environment failed. - Please switch the printer off and on again.	
20403	Configuration area	
20404	Printhead address	
20405	Vacuum fans	
20406	UV lamps	
20407	Inkcontrol system	
20408	M-Drive motors	
20409	Vacuum relais	
20410	Fire pulse	
20411	Jet straightening pulse	
20412	Proc termination	
20413	Ionizer	
20414	Disable jet straightening pulse	
20415	Security control unit version	
20416	Security control unit communication	
20417	Proc firmware versions different	
20418	Proc communication	
20419	Init signal tower	
20430	Failed to switch printhead testmode on or off	

Code	Description	Possible solution
20431	Failed to switch UV lamp on or off	
20432	Failed to switch UV lamp standby / full power	
20433	Failed to initialize head media distance	
20434	Failed to initialize media feed roll distance	
20435	Please check the cooling system of the fusion card(s) as soon as possible, otherwise damage will occur!	
20436	Failed to set motor distance	
20437	Failed to query motor distance	
20438	Failed to initialize motor distance	
20439	SPii Plus controller communication failed	
20440	Failed to initialize media eject roll distance	
20441	Failed to switch UV lamps water chiller emergency mode on or off	
20442	Failed to query UV lamps water chiller emergency mode	
20443	Emergency mode configuration mismatch. - Please update configuration or printer	
20445	Failed to set vacuum zone limit	
20446	Failed to set queue printing status	
20450	Failed to query status of capping unit filling cycle	
20451	Failed to switch refill valve on or off	
20452	Failed to switch valve on or off	
20453	Failed to switch secondary circulation pump on or off	
20454	Failed to set hardware spitting parameter	
20455	Failed to read errors	
20456	Please check expiration date of ink(s) as soon as possible, otherwise the printheads will be damaged!	
20457	Please check expiration date of ink(s) as soon as possible, otherwise the printheads will be damaged!	
20458	Unable to set table vacuum fan intensity	
21001	Unable to switch off the head voltage	
Code	Description	Possible solution

Code	Description	Possible solution
2001	Printer not initialized	Initialise the printer in the Maintenance tab.
2002	Capping unit is moved out. Please initialize printer	
2190	Failed to backup printer configuration	
2194	Unable to start purging cycle	
2215	Error switching on safety relais	
2217	Error switching off safety relais	
2222	Failed to set media feed roll distance	Make sure all safety doors are closed, and attempt to initialise the motor. Check the limit switches, cable connections and supply voltage.
2223	Failed to set head media distance	
2228	Front encoder not working	Check the cable connections and supply voltage; check the encoder for mechanical damage.
2233	Printhead carriage not working	
2246	Table vacuum fan does not react	
2247	Error switching table fan	
2253	Light trap emergency switch check failed	
2254	Print carriage status check failed	
2255	Timeout waiting for printhead carriage	
2256	Light trap is not inserted	
2257	Cover emergency switch check failed	Check the cable connections. Check the switch for correct operation.
2258	Printer cover open	
2259	Invalid printhead carriage status	
2260	Timeout waiting for print table	
2261	Invalid print table status	
2267	Unable to start ink heating system	
2268	Unable to query printhead target temperature	
2270	Waste ink tank full. Please empty ink tank	Empty the ink waste bin.
2271	Failed to control sledge heating system	
2272	Unable to query printhead temperature	
2273	Ink heating system error: Heater control switched off	
2274	Ink heating system error: Heating voltage fault	

Code	Description	Possible solution
2276	Ink heating system error: NTC shorted	
2277	Ink heating system error: NTC open	
2278	Ink heating system error: Heater control timeout	
2279	Ink heating system error: Printhead query failed	
2280	Configuration data mismatch. - Please update configuration or printer	
2302	Unable to calibrate the front encoder	
2307	Unable to switch the rimless print	
2308	Unable to teach media stop sensor	
2309	Unable to send the feeding offset	
2311	Lois offset not programmed	
2312	Lois offset not programmed	
2313	Lois voltage not programmed	
2320	Workstation was unable to communicate with printer device	
2381	Error querying main ink tank	Check the connection to the ink sensor in the main tank. Check the ink sensor in the main tank for correct operation. Fill the main tank with ink.
2382	Insufficient ink in main tank. Please refill ink	
2451	Head voltage data differ from saved configuration. Please update configuration	
2700	PDF file not found	
2701	Movie file not found	
2702	Movie player not installed correctly	
2703	Movie player is running	
2704	PDF viewer is running	
2705	PDF file not specified	
2706	Movie file not specified	
6001	Printer not working	
6002	Sledge control unit failed	
6003	Printing Error - please check the UV lamps	
6004	Printing Error - Data transfer failed - Please check the optical data link interface - (link status, cable, correct driver installation). - If the error persists, shutdown and restart the workstation	
6005	Printing Error - Sledge start failed	

Code	Description	Possible solution
6008	Printing Error - Sledge check failed - - Please check the serial interface	
6009	Printhead carriage uninitialized	
6020	Sledge control failed. Advance out of range	
6021	Sledge print encoder failed	
6022	Purge vacuum pump failed	
6023	Purge up/down motor failed	
6024	Purge in/out motor failed	
6025	Purge head media distance wrong	
6026	Cover open	
6027	Purge tub open	
6028	Purge security switch active	
6029	Key lock active	
6030	Sledge temperature fault	
6600	Crash sensor of the print carriage detected	
6600	Crash sensor detected	
6600	Crash sensor detected during printing. - Please remove the medium and press "Ok"	
6600	Crash sensor detected during test pattern printing. - Please remove the medium and press "Ok"	
6600	Crash sensor detected during purge cycle. - Please remove the medium and press "Ok"	
6619	Security unit not ready	
6630	Sledge control unit failed	
6631	Printhead carriage uninitialized	
6632	Crash sensor detected	
6633	Sledge print encoder failed	
6634	Print carriage check failed. Security unit not ready	
6635	Print carriage check failed. Cover or purge tub open	

Tab. 10: List of the error codes

3.3 Pilz safety controller

3.3.1 Pin/LED assignment for the program LH4010P6

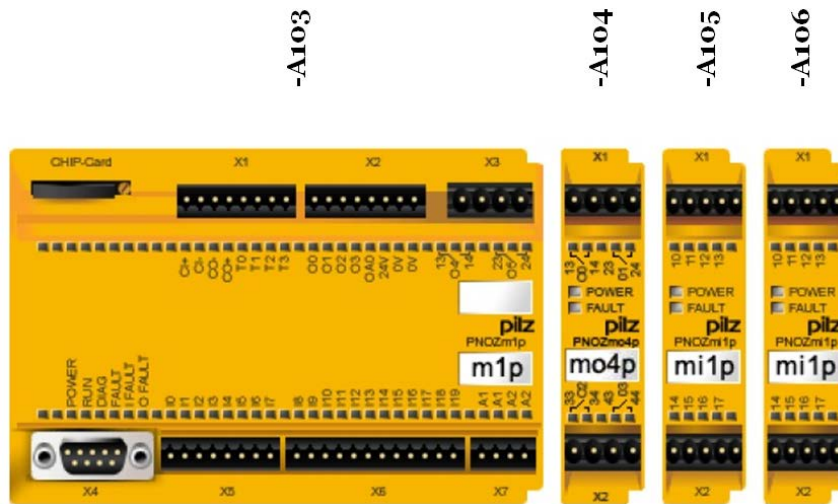


Fig. 3: Overview of the Pilz safety controller

-A103 Base module

Designation	Terminal	Name	Description	Contact
X1	T0	Clocked output for security switches		
	T1	Clocked output for security switches		
	T2	Clocked output for security switches		
	T3	Clocked output for security switches		
X2	O0	Emergency relays –Q2 (Connection Unit)	Power relays for main supply of UV-System	
	O1	Emergency relays –Q3 (Connection Unit)	Power relays for main supply of ACS Controller MC4U	
	O2	Autostart signal for unloading unit		
	O3	Autostart signal for feeding unit		
X3	O4	Emergency Stop for ACS Controller	The relay O4 is in series with the crash sensors and the media security switch(es) Open contact will start a controlled electrical brake sequence of all axis.	NO
	O5	Undervoltage circuit breaker of Q1 (Main switch)		NO

Designation	Terminal	Name	Description	Contact
X5	I0	Initialization done	Signal source is Input Output Control PCB Signal is switched via K1 on Security Control con. PCB Input is high if sledge is initialized	
	I4	Shutter closed (UV-Standby)	If both shutters are closed, Input is high	
	I1	Sensor A (Balluf UV Motion Sensor)	Detecting the status of the print carriage for UV system safety switch off.	
	I2	Sensor B (Balluf UV Motion Sensor)		
	I3	Sensor C2 (Balluf UV End Position Sensor right)	Criteria for keeping emergency relais Q2 for the UV system on: <ul style="list-style-type: none"> ■ Print carriage in right park positions: <ul style="list-style-type: none"> – Initialization done – Shutter closed on – Input I7 and I3 on ■ Print carriage in left park position: <ul style="list-style-type: none"> – Initialization done – Shutter closed on – Input I5 and I6 on ■ Print carriage is moving: <ul style="list-style-type: none"> – Initialization done – Shutter closed off – Input I1 and I2 must pulsate For safety reason the sensors are mounted in pairs	
	I5	Sensor D2 (Balluf UV End Position Sensor left)		
	I6	Sensor D1 (Balluf UV End Position Sensor left)		
	I7	Sensor C1 (Balluf UV End Position Sensor right)		
X6	I8	Loopback –Q2		Emergency relais for main supply of UV-System
	I9	Loopback –Q3	Emergency relais for main supply of ACS controller	NC
	I10	Emergency Stop Switches (channel 1)	Clocked signal	
	I11	Emergency Stop Switches (channel 2)		
	I12	Safety switch light trap 1 (channel 1)		

Designation	Terminal	Name	Description	Contact
	I13	Safety switch light trap 2 (channel 2)		
	I14	Always ON (bridged signal)		
	I15	Always ON (bridged signal)		
	I16	Print carriage linear motor temperature error	<p>The temperature of the linear motor is too high.</p> <p>The resistance of the temperature sensor (PTC) is too high or sensor is not connected.</p> <p>High input will turn off the output -X3:O4 (Emergency Stop for ACS Controller) after a delay of 30 seconds.</p> <p>Resistance of print carriage temperature sensor (PTC) = 60Ohm @20°C</p>	NO
	I17	Print carriage linear motor temperature pre-warning	<p>The temperature of the linear motor is high.</p> <p>High input will generate a warning in the printer software.</p>	NO
	I18	Always ON (bridged signal)	Clocked signal	
	I19	Always ON (bridged signal)		

Tab. 11: Pin/LED assignment -A103 base module

-A104 PNOZ mo4p 4N/O

Designation	Terminal	Name	Description	Contact
X1	O0	Feeding Unit Channel 1	Enable signal for safety controller on Feeding side	_____
	O1	Feeding Unit Channel 2		
X2	O2	Unloading Unit Channel 1	Enable signal for safety controller on Unloading side	_____
	O3	Unloading Unit Channel 2		

Tab. 12: Pin/LED assignment -A104 PNOZ mo4p 4N/O

-A105 PNOZ mi1p 8I

Designation	Terminal	Name	Description	Contact
X1	I0	Emergency Switch cover back right (CH1)		_____
	I1	Emergency Switch cover back right (CH2)		
	I2	Emergency Switch cover back middle right (CH1)		
	I3	Emergency Switch cover back middle right (CH2)		
X2	I4	Emergency Switch cover back middle left (CH1)		_____
	I5	Emergency Switch cover back middle left (CH2)		
	I6	Emergency Switch cover back left (CH1)		
	I7	Emergency Switch cover back left (CH2)		

Tab. 13: Pin/LED assignment -A105 PNOZ mi1p 8I

-A106 PNOZ mi1p 8I

Designation	Terminal	Name	Description	Contact
X1	I0	Loopback –Q1 (main switch)		NO
	I1	Loopback feeding unit	ON: Unit connected and -A104:X1:O1 off OFF: Unit not connected or -A104:X1:O1 on	
	I2	Loopback feeding unit	Signal source: A103-X2:O3 ON: feeding unit connected and O3 on OFF: feeding unit not connected or O3 off	
	I3	Loopback unloading unit	ON: Unit connected and -A104:X1:O3 off OFF: Unit not connected or -A104:X1:O3 on	
X2	I4	Loopback unloading unit	Signal source: A103-X2:O2 ON: unit connected and O2 on OFF: unit not connected or O2 off	
	I5	Keylock switch in Pos. 1 (CH1)	Clocked signal (from -X1:T3 on main unit)	
	I6	Keylock switch in Pos. 1 (CH2)		
	I7	Keylock switch in Pos. 2	Clocked signal (from -X1:T2 on main unit)	

Tab. 14: Pin/LED assignment -A106 PNOZ mi1p 8I

3.3.2 Meaning of LEDs on the PNOZ m1p

Symbol	Meaning
	LED off
	LED flashing
	LED on


Tab. 15: Legends for the LEDs on the PNOZ m1p

Base						Exp.		Error		
Input Ix	RUN	DIAG	FAULT	IFAULT	OFAULT	CI	CO	FAULT	IN/OUT	
										The existing user program has been deleted.
										External error on the base unit, leading to a safe condition, e.g. terminator not connected.
										External error leading to a safe condition, e.g. short across the contacts or error at safety mat input.
										External error on the base unit outputs, e.g. short across the contacts, leading to a safe condition.
										External error leading to a safe condition, e.g. short across the contacts.
										External error on the output.
										External error on the base unit.
										Internal error on the base unit.
										Internal error on the base unit.
										Internal error on the expansion module.
										Base unit in a STOP condition.
										External error on the base unit inputs which does not lead to a safe condition, e.g. partially operated.
										External error on the base unit outputs which does not lead to a safe condition, e.g. feedback input defective.

Base						Exp.		Error	
Input Ix	RUN	DIAG	FAULT	IFault	OFAULT	CI	CO	FAULT	IN/OUT
									External error on the inputs which does not lead to a safe condition, e.g. partially operated, feedback input defective.
									The fieldbus module has not been recognized. OR The base unit has been identified via the PNOZmulti Configurator.
									Error on cascading input; unit remains in a RUN condition.
									Error on cascading output; unit remains in a RUN condition.

Tab. 16: LED displays on the PNOZ m1p (Pilz safety controller)

3.4 ACS Controller

 The SpiiPlus MMI Application Studio can be used for diagnostics and run the media transport belt and the print carriage independent from the printer software.

3.4.1 Preparing the SpiiPlus MMI Application Studio

1. Connect the ACS controller to the notebook (→ Service Manual - Workstation & Controller).
2. Open the software tools (→ Service Manual - Workstation & Controller):
 - Safety and Faults Monitor
 - Motion Manager
 - Program Manager

3.4.2 Safety and Faults Monitor

Overview

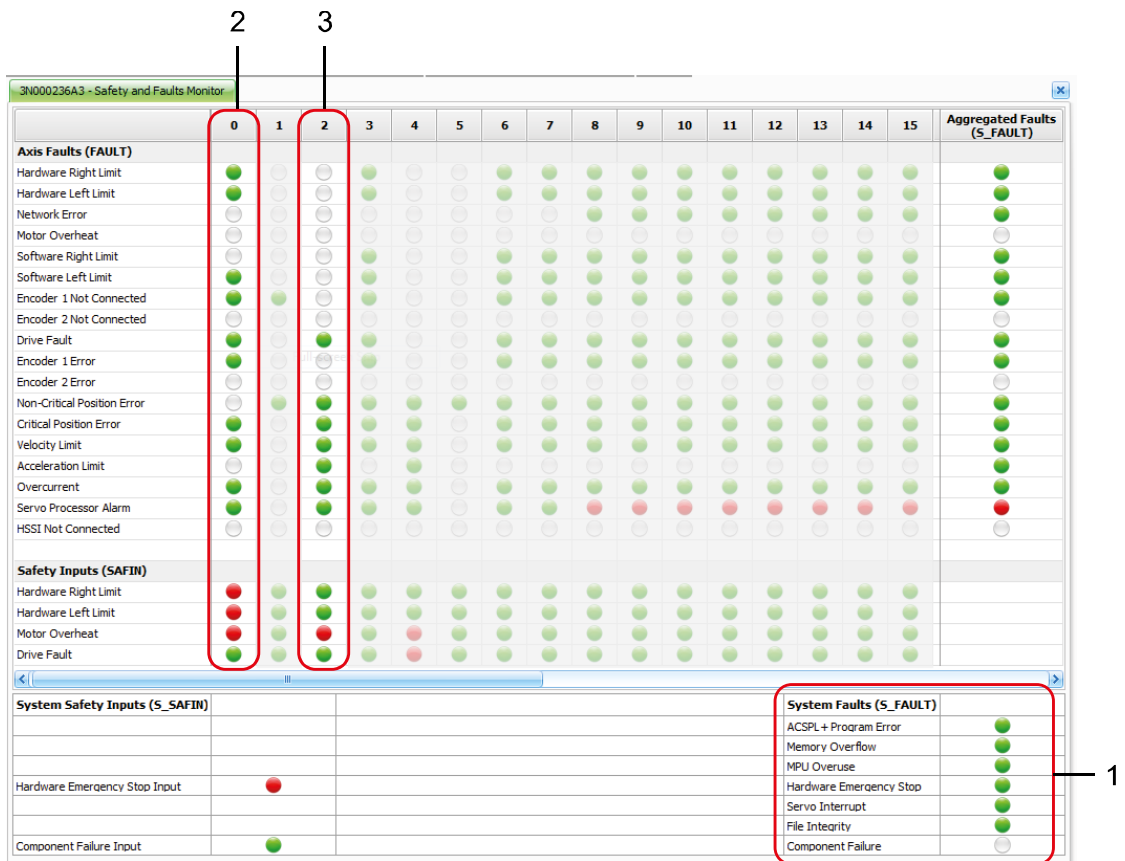


Fig. 4: Safety and Faults Monitor (after successful initialization procedure)

- 1 System Faults (S_FAULT) – general faults
- 2 Axis Faults and Safety Inputs of print carriage
- 3 Axis Faults and Safety Inputs of media transport

General system faults








System Faults (S_FAULT)	
ACSPL+ Program Error	
Memory Overflow	
MPU Overuse	
Hardware Emergency Stop	
Servo Interrupt	
File Integrity	
Component Failure	

Fig. 5: System Faults

System Faults (S_FAULT)	Description
Hardware Emergency Stop	<p>Green – OK (no emergency stop) Red – not OK (emergency stop)</p> <p>An emergency stop can be initiated by:</p> <ul style="list-style-type: none"> ■ Key lock switch ■ Door switches ■ Purge tray security switch ■ Media security switches / Crash sensors ■ Print carriage temp sensor (30seconds delayed signal)

Tab. 17: Description of ACS Controller system faults

Media transport faults

Safety Inputs (SAFIN)	Description
Hardware Right Limit	Not used
Hardware Left Limit	
Motor Overheat	
Drive Fault	<p>Green – OK (Drive ready/enabled) Red – not OK (Drive not ready/enabled)</p>

Tab. 18: Description of media transport faults

Print carriage faults

Safety Inputs (SAFIN)	Description
Hardware Right Limit	Red – OK (switch connected and not triggered)
Hardware Left Limit	Green – not OK (switch not connected or triggered)
	(→ Fig. 6, p. 49)
Motor Overheat	Not used! The temperature sensor of the linear motor is connected to the security control connector PCB. The temperature error and the warning is generated by the Pilz safety controller.
Drive Fault	Green – OK (Drive ready/enabled) Red – not OK (Drive not ready/enabled)

Tab. 19: Description of print carriage faults

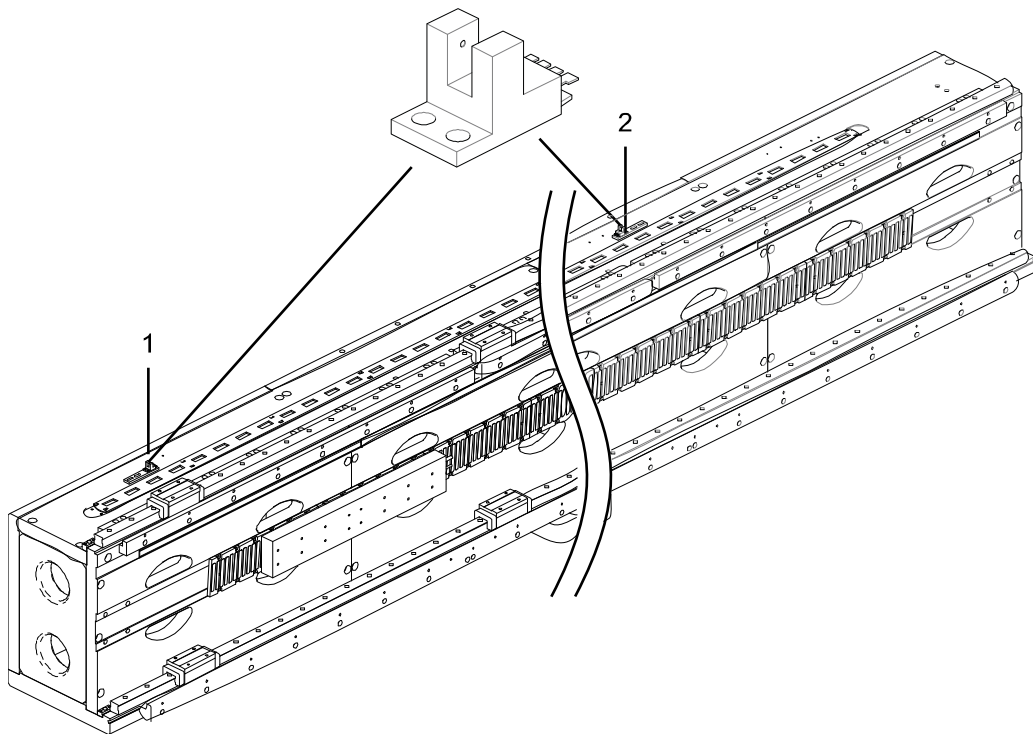


Fig. 6: Print carriage limit switches (seen from printer's output side)

- 1 Hardware left limit switch
- 2 Hardware right limit switch



The resistance of the motor phases of the linear motor is approximately 7,5Ohm.

3.4.3 Print carriage motion test

NOTE! Damage to the print carriage!

The carriage can crash into media or corrugated skins.

- ▷ Initialize the head media distance to go to the highest position.
- ▷ Make sure that the carriage can move free.

Enabling the motor

1. Turn off the printer
2. Turn on the printer
3. Prepare the SpiiPlus MMI Application Studio (→ Chapter 3.4.1, p. 47)
4. Select the **Printer > Service > Other** tab in the printer software
5. Turn on **Power Control**
The power relay –Q3 in the connection unit must turn on

Starting the initialization

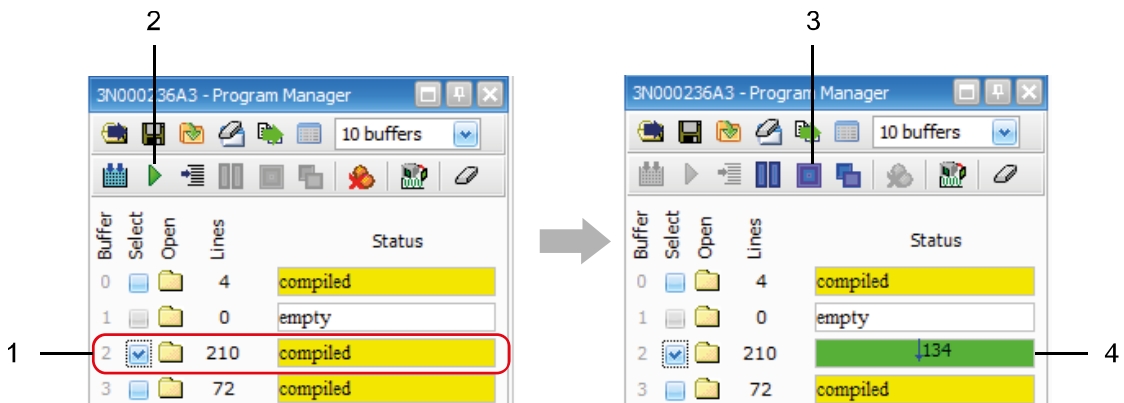


Fig. 7: Working with the Program Manager

- | | |
|--------------------|--|
| 1 Buffer selection | 3 Stop Buffer(s) |
| 2 Run Buffer(s) | 4 Status of the buffer (green – ok, red – error) |

6. Start the Program Manager in the SpiiPlus MMI Application Studio
7. Select **Buffer 2**
8. Start Buffer with button Run Buffer(s)
The carriage will initialize. The carriage stops in the middle after reading the reference mark of the encoder ruler

Starting the motion test

9. Select **Buffer 3**
10. Start Buffer with button Run Buffer(s)
The carriage will move left and right until the buffer will be stopped

3.4.4 Media transport belt initialization

NOTE! Damage of the transport belt!

- ▷ Make sure that nothing block the transport belt.


Enabling the motor

- ▶ Enable the motor for the media transport belt (→ Chapter 0, p. 50)

Starting the initialization

1. Start the Program Manager in the SpiiPlus MMI Application Studio
2. Select **Buffer 6**
3. Start Buffer with button Run Buffer(s)
The media transport belt will initialize.


3.5 Media transport analysis

 The media transport analysis allows a check on whether part of the media transport system (transport belt, gearbox, coupling or advance motor) is working properly or not.

3.5.1 Preparing the media transport analysis

1. Connect the ACS controller to the notebook (→ Service Manual - Workstation & Controller).
2. Open the software tools (→ Service Manual - Workstation & Controller):
 - Communication Terminal
 - Scope
 - Motion Manager
 - Program Manager

Determining the axis number

 The axis and encoder numbers of the advance motors are required for the settings in the “Scope” software tool in order to determine the gear play and the belt breakthrough.

✓ The printer must be initialised

1. In the printer software: Select the **Communication** tab.
2. Send the serial command `YQSPV`.

Response from the printer:

- `YQSPVx, LyyyyyPy.yZ`
 X = 0: OK
 X = 1: Fault
 Y: Version of the user program on the controller

Version of the user program (Durst application)	Axis number	Encoder number
LE3011P	1	4
LE4011P	1	4
LE4011P1	2	2
LE4211P	1	4
LE5011P	4	4
LE5011P1	2	2
LE5012P	4	4
LE2511P	1	1
LH2017P	5	5
LH2017P1	2	2

Tab. 20: Software version of user program, axis number and encoder number

Scope settings

- ✓ The notebook must be connected to the ACS SPii Plus controller
 - ✓ The software tools must be opened
1. In the “Scope” software tool: Perform the necessary settings.

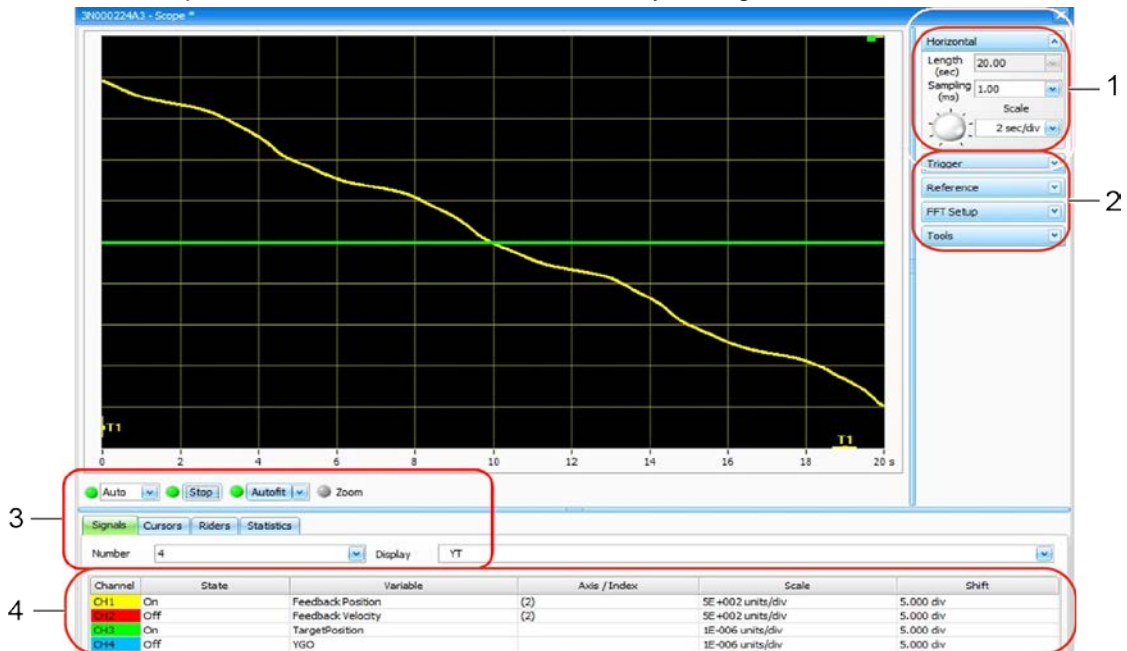


Fig. 8: Scope

- | | |
|------------------------------------|--------------------|
| 1 Settings for the horizontal axis | 3 Signal settings |
| 2 Trigger settings | 4 Channel settings |

Option	Setting
Sampling	Manual 1 ms
Scale	2 sec/div

Tab. 21: Settings for the horizontal axis

Option	Setting
Source	CH1
Mode	Auto
Slope	Rising

Tab. 22: Trigger settings

Option	Setting
Number	4
Display	YT
Autofit	Permanent Fullscreen

Tab. 23: Signal settings

Channel	Status	Variable	Axis
CH1	On	Feedback Position	(→ Chapter 3.5.1, p. 52, determining the axis number)
CH2	On	Feedback Velocity	
CH3	On	Global Variables – Target Position	
CH4	On	Global Variables – YGO (or MGO)	

Tab. 24: Channel settings

3.5.2 Testing the encoder during printing

Printing the test pattern

- ✓ The media transport analysis must have been prepared (→ Chapter 3.5.1, p. 52)
- ✓ The printer must be ready to print

1. Load suitable medium.

Area	Settings
Media type	Roll media Alternatively: Slide in board media of 4.5 m length and boards end to end
Media width	Maximum possible width
HMD	2 mm
Vacuum	Maximum
Media feed roll unit distance	10 mm ▶ Make sure that the rolls do not touch the material.

Tab. 25: Media settings for the encoder test

2. In the “Communication Terminal” software tool: Press the **Show Messages** button.
3. In the printer software: Select the **Test pattern** tab.

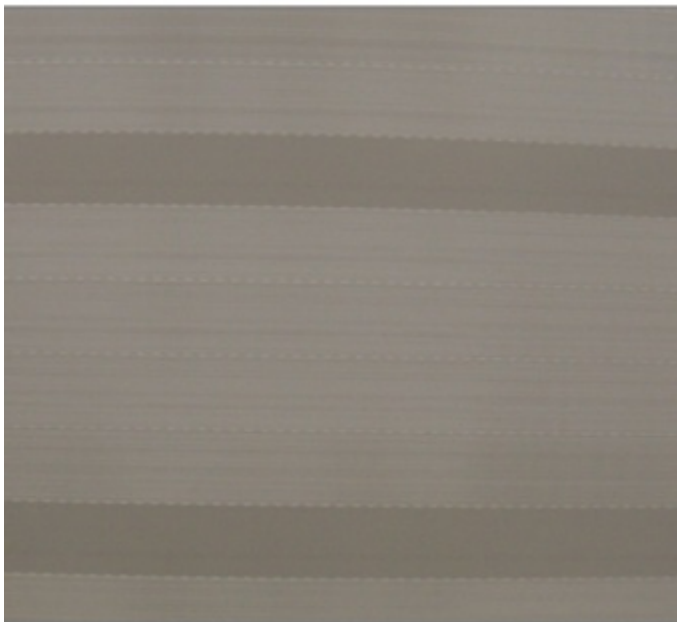
4. Print the test pattern with the following settings:

Area	Settings
Colors and Slots	K S1 O
Print Quality Mode	Testpattern
Testpattern	Fullpattern
Heads	1
Options	High Resolution Encoder Control Encoder comp. Check PH Temp. Check UV Lamps
Paper Advance	512
Number of Advances	130

Tab. 26: Print settings for the encoder test

Evaluating the test pattern

i The first pass of the test pattern is invalid because the transport belt is not yet under tension when printing is being performed.



Example

The density is not the same over the entire length of the print, since the advances of the transport belt are not identical.

Check the possible causes and if necessary rectify them:

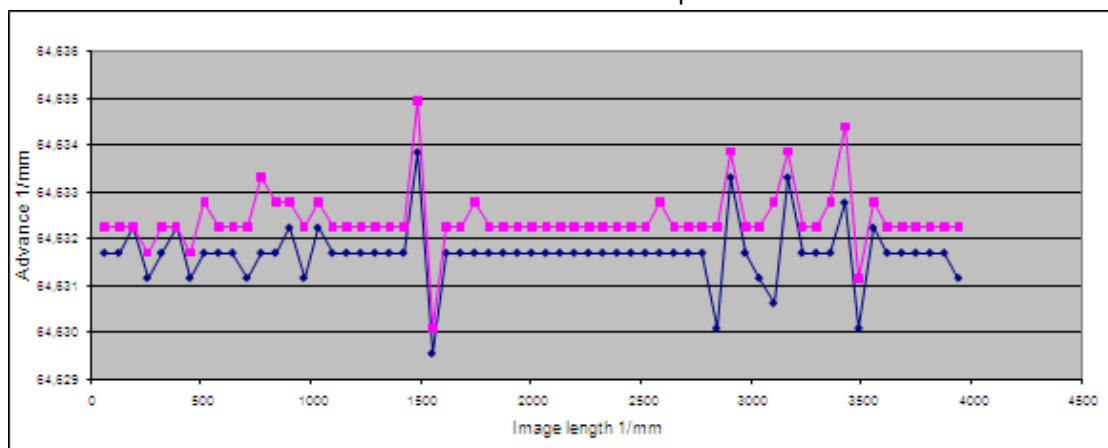
- Transport belt slipping on the drive roll (belt tension not OK; increased friction between the transport belt and print boards)
- Heavy dirt on the print boards (under the transport belt)

Optimum setting

All passes have the same density and the advances by the transport belt are identical.

Evaluating the data in the “Communication Terminal” software tool

1. Download the “Advance Check” Excel file from the Durst FTP server.
2. Open the Excel file.
3. Open the **Values for Encoder Test** spreadsheet.
4. Select the type of the printer.
5. In the “Communication Terminal” software tool: Highlight and copy all the recorded values.
6. In the Excel file: insert the values into cell A2 of the spreadsheet.



7. Check the diagram:
The maximum deviation (distance between the lowest and highest value) must be less than 10 μm .



If deviations exceed the maximum permissible values or variations in density occur within the test pattern:

- ▷ Perform further measurements.
- ▷ Notify Durst Service.

3.5.3 Testing the belt breakthrough

Measurement

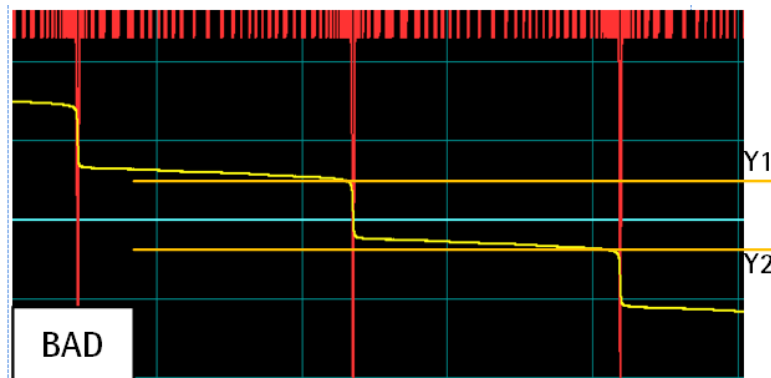
- ✓ The media transport analysis must have been prepared (→ Chapter 3.5.1, p. 52)
 - ✓ The printer must be initialised
1. To reboot the controller, right click on the controller and select **Controller reboot**.
 2. Load a medium which covers the entire width of the transport belt (such as a roll medium with the maximum permissible width).
 3. Set the vacuum to “maximum”.
 4. In the “Scope” software tool: Press the **Stop** button to stop data recording.
 5. In the “Program Manager” software tool: Select buffer 5 and start it.
 6. In the printer software: Select the **Other** tab.
 7. Switch on the vacuum

8. In the "Communication Terminal" software tool: Enter the command `testmode=2` into the command line and press the **Send** button to start the procedure.
The transport belt performs an advance and is tensioned.
The transport belt moves forward very slowly (imperceptibly).
9. In the "Scope" software tool: 10 seconds after the procedure was started was, press the **Run** button to start the data recording.
10. As soon as the results are displayed (after approx. 20 seconds), press the **Stop** button.
11. In the printer software: Select the **Other** tab.
12. Switch off the vacuum.

Evaluating the data

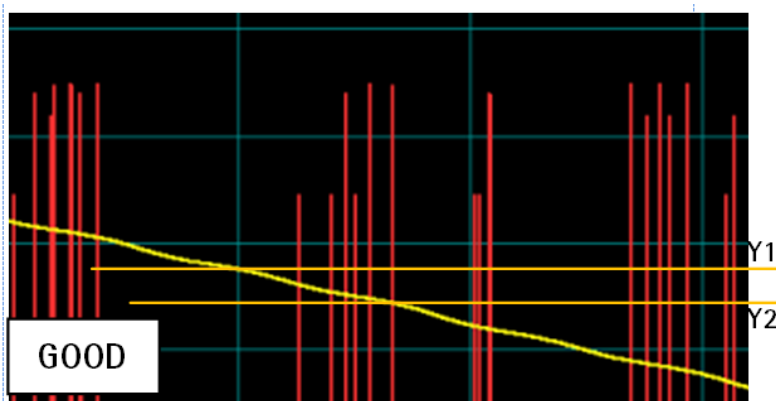
- ▶ In the "Scope" software tool: Check the display.

Example



Definite steps can be seen in the display, caused by a belt breakthrough.

Optimum setting



No steps can be seen.

Evaluation

1. In the "Scope" software tool: Select the **Cursors** tab.
2. Select **Cursors related to CH1**.
3. Set the cursor markings so as to measure the differences in time and height between the steps.
4. If clear steps can be seen, inform Durst Service.

5. Create a screenshot in which the entire software can be seen.
6. Save the screenshot under the name "Stair_900xxxx.jpg". When doing this, replace xxxx with the system number of the printer (type and number).

3.5.4 Testing the gear play

Measurement

- ✓ The media transport analysis must have been prepared (→ Chapter 3.5.1, p. 52)
 - ✓ The printer must be initialised
1. To reboot the controller, right click on the controller and select **Controller reboot**.
 2. Load a medium which covers the entire width of the transport belt (such as a roll medium with the maximum permissible width).
 3. Set the vacuum to "maximum".
 4. In the printer software: Select the **Other** tab.
 5. To switch on the vacuum, press the **On** button in the **Table Fan** area.
 6. In the "Motion Manager" software tool: Press the **Move Back and Forth** button.
 7. Make sure that only one axis is open in the window:
 - Choose the axis appropriate to the application program (→ Chapter 3.5.1, p. 52).
 - Point A = 0
 - Point B = 30000
 8. Press the **Enable Motor** button.
 9. Press the **Start Motion** button.
The transport belt moves back and forwards.
 10. In the "Scope" software tool: press the **Run** button to start data recording.
 11. As soon as the results are displayed (after approx. 20 seconds), press the **Stop** button.
 12. In the "Motion Manager" software tool: Press the **Stop Motion** button.
 13. In the printer software: Select the **Other** tab.
 14. Switch off the vacuum.

Evaluating the data

i The curve can be shown spread out for better evaluation.
 ▶ In the “Scope” software tool: Select the **Scale** parameter.

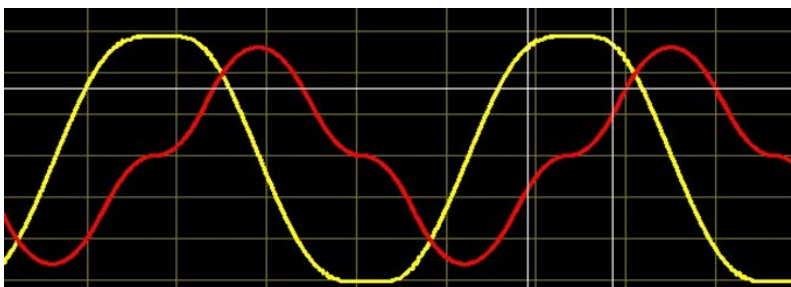
▶ In the “Scope” software tool: Check the display.

Example



No clear lines can be seen. Overshoots can be seen at the points of changeover from forward to reverse movement of the transport belt.

Optimum setting



The yellow curve (channel 1, feedback position) shows a clear line.

Evaluation

1. In the “Scope” software tool: Select the **Cursors** tab.
2. Select **Cursors related to CH1**.
3. Set the cursor markings so that the flat areas at the upper ends of the yellow curve (time) can be measured.
 The time should be less than 200 ms.
4. If an overshoot occurs and the time is more than 200 ms, inform Durst Service.
5. Create a screenshot in which the entire software can be seen.
6. Save the screenshot under the name “Gear_900xxxx.jpg”. When doing this, replace xxxx with the system number of the printer (type and number).

3.5.5 Testing the sine error

Measurement

- ✓ The media transport analysis must have been prepared (→ Chapter 3.5.1, p. 52)
 - ✓ There must be no medium on the transport belt
 - ✓ The transport belt must not be blocked
 - ✓ The printer must be initialised
1. To reboot the controller, right click on the controller and select **Controller reboot**.
 2. In the “Communication Terminal” software tool: Press the **Show Messages** button.
 3. Press the **Continuous Save** button.
 4. Save the sine error file on the desktop with the name “Sinuserror_<machine-no.>.txt.
When doing this, replace <machine-no.> with the number of the printer.
 5. In the “Program Manager” software tool: Start buffer 5.
 6. In the “Communication Terminal” software tool: Enter the command `testmode=1` into the command line.
The drive roll executes a full rotation.
 7. Once the measurement is completed, press the **Stop Saving** button.

Evaluating the data

1. Open the “Advance Check” Excel file.
2. Select the **Values for Sine Error** spreadsheet.
3. Open the saved sine error file on the desktop.
4. Highlight and copy all the recorded values.

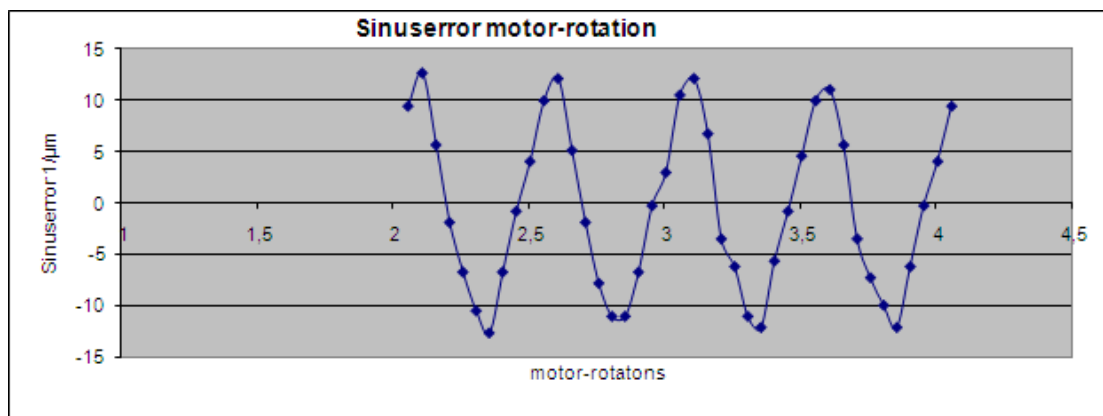


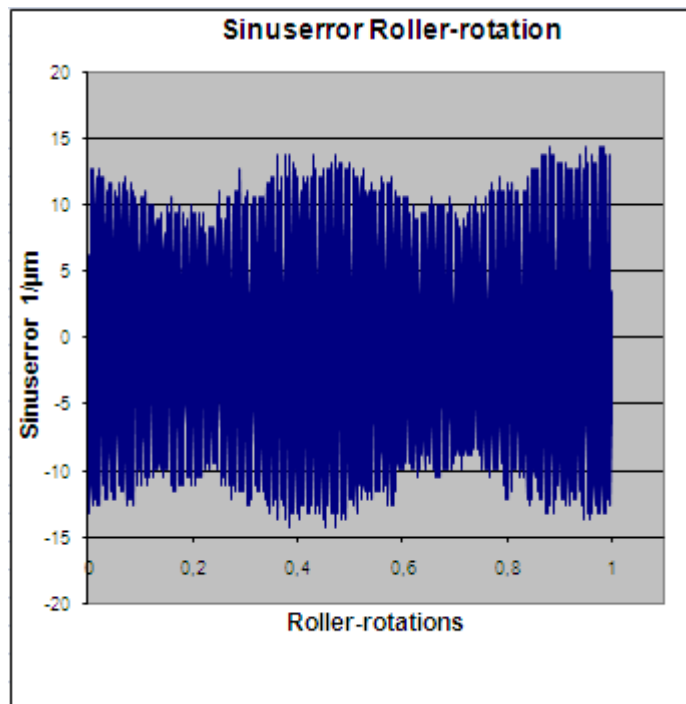
If the first value is 0:

- ▷ delete the value.

Otherwise the diagram will be displayed incorrectly.

5. Insert the values into cell A2 of the Excel file.
The values must be within the range from A2 to A2000.





6. Check the diagrams.

The sine error (distance between the lowest and highest value and the zero line) must be less than $\pm 25 \mu\text{m}$.



If deviations exceed the maximum permissible values:

- ▷ Notify Durst Service.

7. To reboot the controller, right click on the controller and select **Controller reboot**.

3.6 HMD motor (M-drive troubleshooting)

	Serial command	Motor address	Response/description
Checking communication	YCMDxPR DN	x: a – HMD Motor	YCMD"x" communication OK
Calling up an error flag	YCMDxPR EF	b – MFR Motor	These must be read before the error number, since reading the error number resets the error flag
Reading the error number	YCMDxPR ER		YCMD 00 No error
Calling up the IMS motor firmware version	YCMDxPR VR		
Status of reference switch	YCMDxPR I1		YCMD00 switch not triggered YCMD01 switch triggered
Status of lower limit switch	YCMDxPR I2		

3.6.1 Checking communication

- ▶ To test the communication between the motor and the fusion board, send a serial command YCMDxPR DN.

Possible causes for a lack of communication:

- LP M-drive connection to the PCB defective/no supply voltage
- Motor defective
- Cable defective

3.6.2 Reading the error number

- ▶ To read the error number, send serial command YCMDxPR ER.
Refer to the explanations for error numbers (→ Chapter 3.6.4, p. 64).

3.6.3 Interrogating the reference switch / limit switch

- ▶ To interrogate the reference switch, send serial command YCMDxPR I1.
- ▶ To interrogate the limit switch, send serial command YCMDxPR I2.
- HMD motor

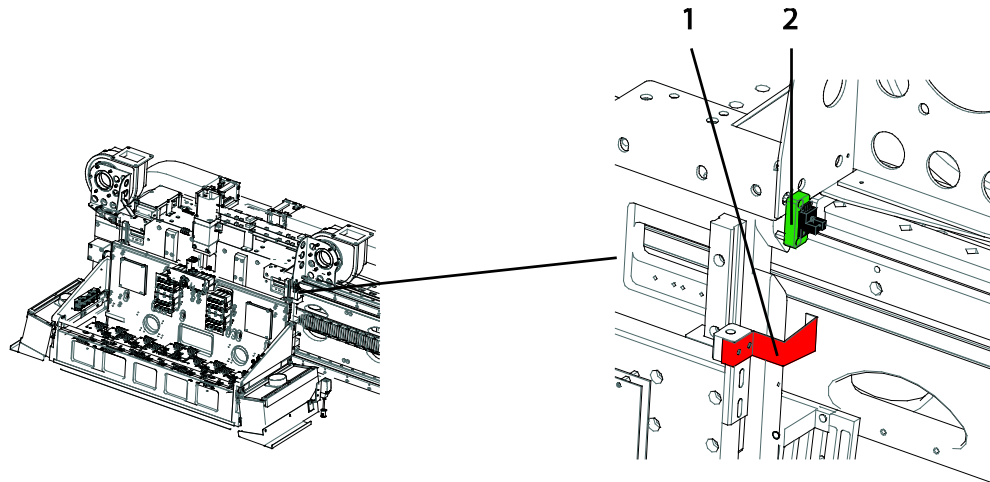


Fig. 9: Position of the switch flag and the reference switch on the print carriage

- 1 Switch flag
- 2 Reference switch

- Media feed roll motor

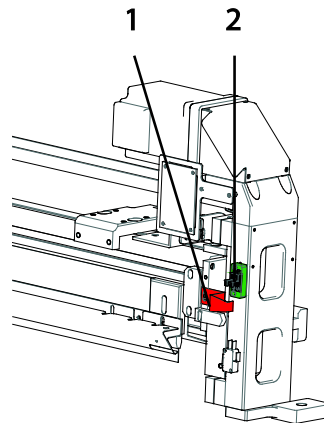


Fig. 10: Position of the switch flag and the reference switch on the media feed roll unit

- 1 Switch flag
- 2 Reference switch

Possible causes for incorrect feedback:

- Sensor
- Cable
- LP M-drive PCB connection

3.6.4 M-drive error code list

I/O (Input/Output) errors

Error code	Meaning
1	1Fault
2	2Fault
3	3Fault
4	4Fault
5	5Fault
6	An Input/Output for this type has already been set. Not usable for general I/O.
7	Attempt to set an input or to define an I/O.
8	Attempt to set an I/O as an incorrect I/O type.
9	Attempt to write to an I/O that is set as input or is of type "TYPED".
10	Impermissible I/O number.
11	Incorrect CLOCK type.
12	Impermissible trip/capture

Tab. 27: M-drive I/O errors

Data errors

Error code	Meaning
20	Unknown variable or flag was set. ► Check the input for write errors.
21	Incorrect value was set. The value is not within the specified value range.
22	VI (initial velocity) is greater than or equal to VM (maximum velocity). VI must be less than VM.
23	VM is less than or equal to VI. VM must be greater than VI.
24	Impermissible data which the System does not understand was input.
25	Variable or flag was set to "Read Only". Read-only flags and variables are not permitted.
26	The variable or flag cannot be increased (IC) or decreased (DC) incrementally. This applies for instance to version data or Baud rates.
27	Activation request for a trip that has not yet been defined.

Error code	Meaning
28	Attention! Attempt to change a program identification or a variable. This happens when a program is downloaded although it has already been saved. <ul style="list-style-type: none"> ▶ Before the download, input <FD> and confirm it with "ENTER" in order to reset the system to the factory settings. ▶ Input <CP> and confirm it with "ENTER" in order to reset the program.
29	Attempt to change a specified command, a specified variable or flag.
30	Unknown identification or user variable. Attempt to link an undefined variable or identification, or to call it up.
31	The directory for the program identifications or user variables is full. The directory has a capacity of max. 22 identifications and/or variables.
32	Attempt to provide an identification with a value. No value for a variable can be assigned to an identification.
33	Attempt to specify an instruction.
34	Attempt to execute a variable or flag.
35	Attempt to print an impermissible variable or flag.
36	Impermissible ratio of motor steps to encoder steps.
37	Command, variable or flag are unavailable on the motor.
38	Missing delimitation parameters.
39	Trip at position and trip at relative distance are not permissible in conjunction.

Tab. 28: M-drive data errors

Program errors

Error code	Meaning
40	Program not running. HOLD (H) was input in the immediate mode and no program is running.
41	n.a.
42	Impermissible program address. Attempt to delete, call up or execute an incorrect program address.
43	Attempt at program stack overflow. A sub-routine or trip-routine was called up without response.
44	The program is blocked. User programs can be blocked with the command <LK>. The program can no longer be listed or processed in any way.
45	Attempt at program space overflow.
46	No in program mode.

Error code	Meaning
47	Attempt to write to an impermissible flash address.
48	Execution of the programs stopped by I/O.

Tab. 29: M-drive program errors

Communications errors

Error code	Meaning
60	n.a.
61	Attempt to set an impermissible Baud rate. Only the following Baud rates are permissible (see also IMS Terminal, Properties Page): 4,800; 9,600; 19,200; 38,400; 115,200
62	IV already present or IF flag already set the status TRUE.

Tab. 30: M-drive communications errors

System errors

Error code	Meaning
70	FLASH checksum error.
71	Internal temperature warning: Only 10 °C to cutout.
72	Internal error: Temperature too high. Motor has tripped out.
73	SAVE command executed whilst the motor was moving.

Tab. 31: M-drive system errors

Movement errors

Error code	Meaning
80	Reference point (HOME) not defined. Attempt to perform a HOME sequence, even though the reference point is not defined.
81	Reference point (HOME) not defined. A HM and/or HI command was programmed, but either not provided with a type or provided with an impermissible type. Permitted types are 1; 2; 3; 4
82	Both limit switches were reached but the reference point (HOME) was not found. ▶ Check the circuit and sensors for defects.
83	The upper limit switch was reached. The limit switch was triggered in the plus direction. ▶ Interrogate the limit switch (→ Chapter 3.6.3, p. 63).
84	The lower limit switch was reached. The limit switch was triggered in the minus direction. ▶ Interrogate the limit switch (→ Chapter 3.6.3, p. 63).

Error code	Meaning
85	MA and MR not permitted whilst the motor is moving. No second MOVE command can be programmed whilst the motor is moving.
86	Stall detected. The stall flag (ST) was set to 1. Possible causes: <ul style="list-style-type: none"> ■ Unit is stiff or mechanically blocked ■ The brake was not released
87	JOG is not permitted in Clock mode.
88	Consequential error.
89	Reserved.
90	Movement variables too low; switch over to EE=1
91	Execution of the programs stopped by I/O.

Tab. 32: M-drive movement errors

3.7 Testing the media detection sensor



Perform a test for the following cases:

- The media detection sensor trips although no medium is loaded.
 - The machine is printing on the transport belt.
 - The image position is wrong.
- ▶ Check the operation and adjustment of the sensors (→ Service Manual - Settings and exchange of components).

If there are problems with edge detection or with the edge detection tripping when no medium is loaded:

- ▶ Check on the status of the transport belt (→ Service Manual - Maintenance).

3.8 Fusion board

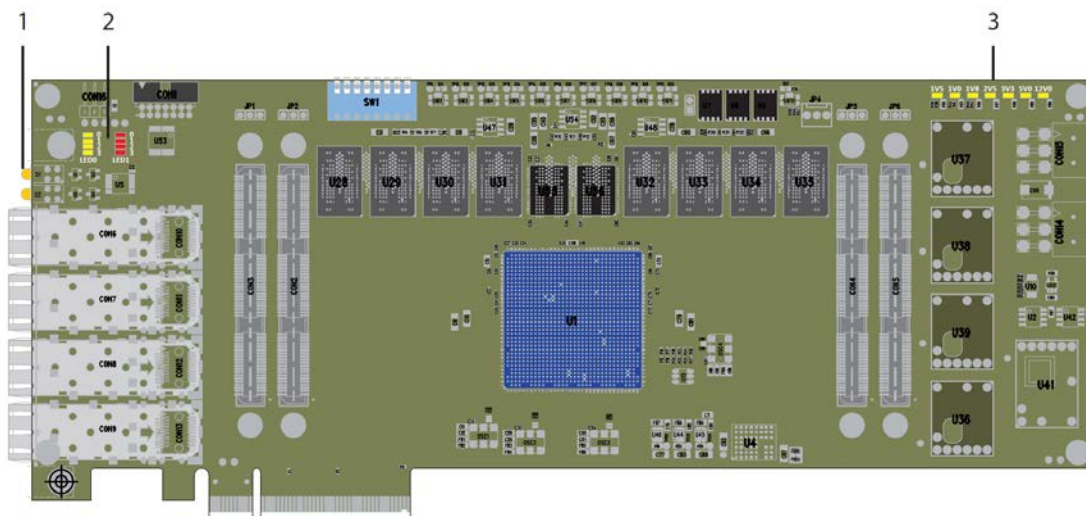
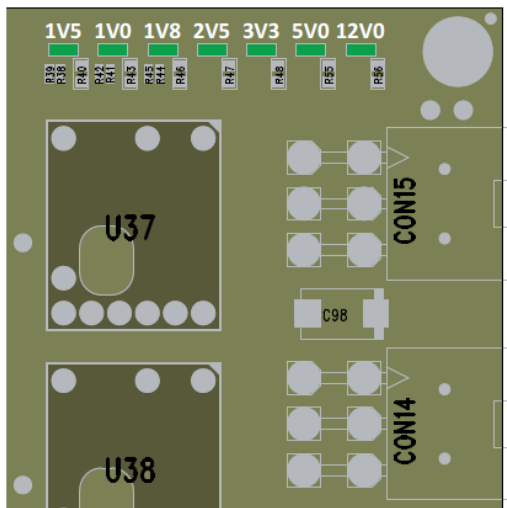


Fig. 11: Overview of the fusion base PCB

- 1 Data LEDs
- 2 Status LEDs
- 3 Power LEDs

3.8.1 Checking the internal power supply to the printed circuit board



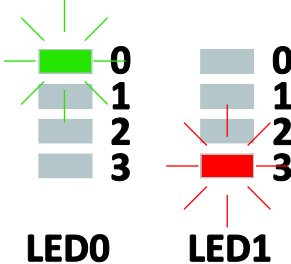
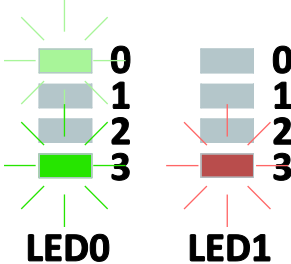
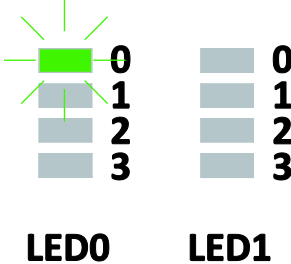
With the printer switched on / workstation switched on, all power LEDs must light up continuously.

If any LED does not light up, that power supply is defective:

- ▶ Exchange the printed circuit board.

3.8.2 Checking that the fusion board has booted up correctly

When the fusion board is booting up correctly, the status LEDs follow the following sequence:

Step	Status LEDs	Meaning
1.	 <p style="text-align: center;">LED0 LED1</p>	<p>The top LED in the first row lights up (LED 0.0; green) and the bottom LED in the second row lights up (LED 1.3; red).</p>
2.	 <p style="text-align: center;">LED0 LED1</p>	<ul style="list-style-type: none"> ■ The bottom LED in the first row flashes a few times (LED 0.3; green). ■ The bottom LED in the first row stops flashing and stays lit continuously (LED 0.3; green).
3.	 <p style="text-align: center;">LED0 LED1</p>	<ul style="list-style-type: none"> ■ The bottom LEDs in both rows go out (LED 0.3; green and LED 1.3; red). ■ The fusion board has booted up correctly if only the top LED in the first row lights up (LED 0.0; green).

If the fusion board neither skips to the boot-loader nor starts up (no status LEDs light up):

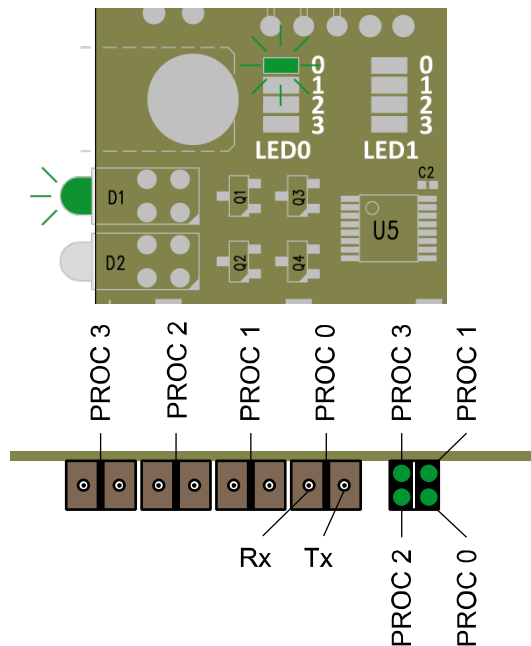
1. Switch off the printer for approx. 10 minutes so that all components can be discharged.
2. Restart the printer.
3. If the problem still persists, contact Durst Service.

3.8.3 Checking the correct data connection

The operational data connection via the fibre optic cable to the workstation is displayed by one of the large 3-mm Data-LEDs on the Fusion Base PCB in the Workstation and the Fusion Base PCB on the Fusion Master Board.

- ✓ The fusion board must be booted up correctly (→ Chapter 3.8.2, p. 69)
- ✓ The power LEDs must be OK
- ✓ Printer is turned on
- ✓ Workstation is turned on

Checking the data connection between workstation and Fusion board



- ▶ Check that the large data LED on the fusion base PCB on the Fusion board light up.

- ▶ Check that the large data LED(s) (depending on the number of fusion boards) on the fusion base PCB in the workstation light up.

If the data LED does not light up, the following are the options for error recovery.

- ▶ Reboot the workstation.
- ▶ Restart the printer.
- ▶ Cables for data transmit and data receipt could be transposed.
- ▶ Check the fibre optic cable and if necessary exchange it.
- ▶ Check the SFP modules and if necessary exchange them.
- ▶ Exchange the fusion base PCB in the workstation or fusion board.

Checking the communication to the printer:

1. In the printer software: Select the **Printer** tab.
2. Press the **Get Version** button.
If there is no data connection, an error message is displayed. Otherwise the current firmware version is displayed.

3.8.4 Checking the temperature of the fusion board

- ✓ The fusion board must be booted up correctly (→ Chapter 3.8.2, p. 69)
 - ✓ The data connection must be correct (→ Chapter 3.8.3, p. 69)
1. In the printer software: Select the **Communication** tab.
 2. Send serial command QMST.
 3. Evaluate the response of the printer (→ Chapter 3.1.1, p. 14).

3.8.5 Checking the quality of the signal in the light guide

- ✓ The fusion board must be booted up correctly (→ Chapter 3.8.2, p. 69)
 - ✓ The data connection must be correct (→ Chapter 3.8.3, p. 69)
1. In the printer software: Select the **Communication** tab.
 2. Send serial command YQSFP
 3. Evaluate the response of the printer (→ Chapter 3.1.1, p. 14).

Assessing the signal quality via the tab value 117 (response is parameter a):

- 0x00 – signal quality normal
- 0x20 – signal quality not OK
- 0x40 – signal quality not OK

3.9 UV unit



If there are faults on the UV unit: → Service Manual UV Unit.

3.10 Print head



If there are faults on the print head: → Service Manual - Print Head.