



# **Rho 512R/312R**

## **Service Manual – Diagnostics**

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# 1 About this document

- u Make sure that this document is accessible at all times.
- u Insert all supplements received from Durst Phototechnik AG into this document.
- u 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/HS range of Durst Phototechnik AG and should be referred to by the following personnel:





- n Durst service engineers (service engineer Durst group)
- n General service technicians (service technician distributor)
- n Trained customer's technicians (in-house technician)

## 1.2 Revisions

Edition of the document	What is new?
18.06.2015	First edition

Tab. 1: Revision index

## 1.3 Symbols and markers

Symbol	Meaning
ü	Pre-requirement for an action
u	Request for a single-step action
1.	Step within a request for a multi-step action
Ê	Result of an action sequence
	Note for easier or safer work
à	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.
 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.

w Measures for avoiding the hazard.

u Read the warning and comply with it.

## 2 Emergency operation

- i** 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.”.
  - w 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

- ü It must be known which UV bulb is not operational.
- ü The signal “shutter closed” must be operational for both UV lamps
- ü The necessary software must be installed:

#### 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

- i** 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

- u Bridge the “shutter closed” signal at the connection unit of the UV system (relays K4 and K5).
- i** w 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 RhoUVLampEmergencyOperation
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.



## 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.

Name	Description / Data	Command	Answer
Back Mark Query	Sets the searching area for the next back mark in Micrometer. The next back mark will be searched for 300mm from the set distance. Time-out : < 1 sec	.10BMDa a	.01BMDx x = Distance in Micrometer (Integer-Number)
Back Mark Query	Queries the position of back mark Time-out : < 1 sec	.10BMQ	.01BMQxy x = Difference to expected position in micrometer y = 0 No Error y = 10C2 Back mark not found y = 10C3 Back mark not yet reached
Config Data Read	Reads the saved values for print plane Offset and Head Media Distance Offset (Time-out: < 1 sec)	.10CDR	.01CDRxxxxxyy000zzz0000 x = Offset Reference position carriage (in Pixel) y = HeadMediaDistance (in 1/10mm) z = BackmarkSensorOffset (in 1/10mm)
Config Data Write	Sets the values for different offsets to compensate mechanical tolerances. Time-out : < 1 sec	.10CDWaaabbbccdd0000 aaa = bbb = ccc = ddd =	.01CDWx x = No Error Offset reference position carriage (in Pixel) Print plane offset (in 1/10 mm)(in Pixel) ???? Backmark Sensor Offset (in 1/10 mm)
Clamp Roll	Opens/closes the clamp rollers Time-out : < 1 sec	.10CRab a = a = 0 a = 1 b = b = 0 b = 1	.01CRxy x = Roller (1 Sign) x = 0 Front roll x = 1 Back roll y = Open/Close (1 Sign) y = 0 Close y = 1 Open
Calibrate	Fine Adjustment of Media	.10CMAab	.01CMAxy

Media Advance	Advance. One feeding pass of 35mm will be adjusted by yyy micrometer Time-out: < 1 sec	a = Encoder (1 Sign) b = Feeding correction in micrometer (integer, 5 signs)	x = Encoder (1 Sign) y = Feeding correction in micrometer (integer, 5 signs)
Check Pressure Status	Query Status of different pressures	.10CPS	.01CPSxyz x = Status Purge pressure x = 0 OK x = 1 Not OK y = Status Meniscus pressure y = 0 OK y = 1 Not OK z = Status Lung negative pressure z = 0 OK z = 1 Not OK
Check Textile Switch	Position of the Textile Switch	.10CTS	.01CTSx x = Status x = 0 Open x = 1 Arrester x = 2 Blocked
Switch Ionizer		.10CSI<on>	
Drop Fly Time Compensation	Sets the values for the drop fly time compensation Answer : < 1 sec	.10DFTCabcccc a = 0 Cyan a = 1 Magenta a = 2 Yellow a = 3 Black b = Printing direction b = R Right à Left b = L Left à Right cccc = Difference in 1/10 Pixel	.01DFTC
Set Drop Number		.10DROP<nr>	
Door Safety Position Relais	Locks/Unlocks doors Time-out : < 10 sec	.10DSPRa a = Command a = 0 Lock a = 1 Unlock	.01DSPRx x = Answer à When locking: x = 0 No error, doors locked x = 1 Doors not locked x = 2 Carriage motor not ready à When unlocking: x = 0 OK, doors locked x = 1 Sledge movement active, doors could not be unlocked

Door Safety Position Switch	Query, if doors are open/close Time-out : < 1 sec	.10DSPS	.01DSPSxy x = 0 Doors closed x = 1 Doors open
Expose with 2 UV Lamps	For better curing in backlit mode this printing mode with both lamps simultaneously can be used.	.10EWTULa a = Parameter (1 Sign) a = 0 Both lamps a = 1 Only following lamp a = 2 Only leading lamp (Glossy Mode) a = 3 No Lamp (for testing only)	.01EWTULx x = Parameter (1 Sign) x = 0 Both lamps x = 1 Only following lamp x = 2 Only leading lamp (Glossy Mode) x = 3 No Lamp (for testing only)
Feature Data Read	Gives information about installed HW options.	.10FDR	.01FDRtuvwxy00z0 t = Rho type (1 sign) t = 0 CMYK t = 1 CMYK+Spot1 t = 2 CMYK+Spot2 t = 3 CMYK+Spot1+2 t = 4 CMYK+Light t = 5 CMYK+Light+Spot1 t = 6 CMYK+Light+Spot2 t = 7 CMYK+Light+Spot1+2 u = UV lamp type (1 sign) u = 1 Dr. Hönle Test Mode v = Amount print heads / Color (1 sign) v = 4 4 print heads / Color w = Type Print heads (1 sign) w = 1 2 Print heads / Color (Twin Tank) x = Ink circulation (1 sign) x = 0 No circulation x = 1 Spot 1 circulating x = 2 Spot 2 circulating x = 3 Spot 1+2 circulating x = 5 Spot 1+2 is white, but pump only running for Spot 1 y = Ionizer option (1 sign) y = 0 No ionizer y = 4 Ionizer z = Transport Option (1 sign) z = 0 standard z = 1 dual roll option z = 2 triple roll option z = 3 dual + triple roll option z = 4 textile option z = 5 textile + dual roll option z = 6 textile + triple roll option z = 7 textile + dual roll + triple roll option

Feature Data Write	Sets Information to the installed HW-Options When receiving non valid Parameters a '*' is the answer	.10FDWabcdef00g0 a = Rho type (1 sign) a = 0 CMYK a = 1 CMYK+Spot1 a = 2 CMYK+Spot2 a = 3 CMYK+Spot1+2 a = 4 CMYK+Light a = 5 CMYK+Light+Spot1 a = 6 CMYK+Light+Spot2 a = 7 CMYK+Light+Spot1+2 b = UV lamp type (1 sign) b = 1 Dr. Hönle Test Mode c = Amount print heads / Color (1 sign) c = 4 4 print heads / Color d = Type Print heads (1 sign) d = 1 2 Print heads / Color (Twin Tank) e = Ink circulation (1 sign) e = 0 No circulation e = 1 Spot 1 circulating e = 2 Spot 2 circulating e = 3 Spot 1+2 circulating e = 5 Spot 1+2 is white, but pump only running for Spot 1 f = Ionizer option (1 sign) f = 0 No ionizer f = 4 Ionizer g = Transport Option (1 sign) g = 0 standard g = 1 dual roll option g = 2 triple roll option g = 3 dual + triple roll option g = 4 textile option g = 5 textile + dual roll option g = 6 textile + triple roll option g = 7 textile + dual roll + triple roll option	.01FDWtuvwxyz00z0 t = Rho type (1 sign) t = 0 CMYK t = 1 CMYK+Spot1 t = 2 CMYK+Spot2 t = 3 CMYK+Spot1+2 t = 4 CMYK+Light t = 5 CMYK+Light+Spot1 t = 6 CMYK+Light+Spot2 t = 7 CMYK+Light+Spot1+2 u = UV lamp type (1 sign) u = 1 Dr. Hönle Test Mode v = Amount print heads / Color (1 sign) v = 4 4 print heads / Color w = Type Print heads (1 sign) w = 1 2 Print heads / Color (Twin Tank) x = Ink circulation (1 sign) x = 0 No circulation x = 1 Spot 1 circulating x = 2 Spot 2 circulating x = 3 Spot 1+2 circulating x = 5 Spot 1+2 is white, but pump only running for Spot 1 y = Ionizer option (1 sign) y = 0 No ionizer y = 4 Ionizer z = Transport Option (1 sign) z = 0 standard z = 1 dual roll option z = 2 triple roll option z = 3 dual + triple roll option z = 4 textile option z = 5 textile + dual roll option z = 6 textile + triple roll option z = 7 textile + dual roll + triple roll option
Get Error	Answer: last error code of Error Stack. Time-out : < 1 sec	.10GE	.01GExy x = Error Code y = Amount in Stack
Get JSP Parameter		.10GJSP	.01GJSP<dd><ll>
Get Channel Puls length		.10GCPL<C><S>	.01GCPL<C><S><ppp><ddd><jjj>
Get Firepuls		.10GFP	.01GFP<lll><ddd>

Get Log text		.10GL	.01GL<nr, text>
Get Roll diameter		.10GRD<n>	.01GRD<n,diam>
Get Windup state		.10GWSa a = axis	.01GWSxyz x = Axis number y = State y = 2 Off (not moving) y = 4 On (moving) z = Error State z = 0 No Error
Head Media Distance Query	Queries printing height Time-out : < 1 sec	.10HMDQ	.01HMDQxxxxy x = Position in 0.1 mm (4 sign) y = State y = 0 Sledge is on hold y = 1 Sledge is moving y = 2 Error
Head Media Distance Set	Sets head media distance Time-out : < 1 sec	.10HMDSaaaa a = Position in 0.1 mm (4 sign) Range 10 .. 760	.01HMDSx x = Error x = 0 No error x = 1 Invalid position
Header Tank Ink Level	Switching On/Off the ink regulation in the header tanks Time-out : < 1 sec	.10HTILa a = Command (1 sign) a = 0 On a = 1 Off	.01HTILx x = Command (1 sign) x = 0 On x = 1 Off
High Voltage	Switching on/off 150V for print heads Time-out : < 1 sec	.10HVa a = New Status a = 0 On a = 1 Off	.01HVx x = New Status x = 0 On x = 1 Off
Ink Circulation Control		.10ICC<stat><int><dur>	.01ICC<stat><int><dur>
Init Flag Read	Queries, if the printer is initialized Time-out : < 1 sec	.10IFR	.01IFRx x = State x = 0 OK x = 1 Not OK
JSP		.10JSP<dd><ll>	.01JSP<dd><ll><err>
Ink Error Header Tank	Query, if ink level in print head tank is correct Time-out : < 2 sec	.10IEHTa a = Color (1 sign) a = 0 Cyan a = 1 Magenta a = 2 Yellow	.01IEHTwxyz0000 w = State Printhead 1 (1 sign) w = 0 OK w = 1 Timeout when

		a = 3	Black		refilling
		a = 4	Spot 1	w = 2	Ink temperature out of range (+/- 2 °C)
		a = 5	Spot 2	w = 3	Short Circuit LOIS
		a = 6	Spot 3	w = W	Pumping
		a = 7	Spot 4	x =	State Printhead 2 (1 sign) à Like head 1
				y =	State Printhead 3 (1 sign) à Like head 1
				z =	State Printhead 4 (1 sign) à Like head 1
Ink Error Main Tank	Query ink level in main tank Time-out : < 1 sec	.10IEMTa		.01IEMTxyyy	
		a =	color (1 sign)	x =	color (1 sign)
		a = 0	Cyan	x = 0	Cyan
		a = 1	Magenta	x = 1	Magenta
		a = 2	Yellow	x = 2	Yellow
		a = 3	Black	x = 3	Black
		a = 4	Spot 1	x = 4	Spot 1
		a = 5	Spot 2	x = 5	Spot 2
		a = 6	Spot 3	x = 6	Spot 3
		a = 7	Spot 4	x = 7	Spot 4
				y =	ink amount in percent (3 signs)
				y = 000	< 2 lt
				y = 020	2.0 – 4.0 lt
				y = 040	4.0 – 6.2 lt
				y = 060	6.2 – 8.4 lt
				y = 080	8.4 – 10.1 lt
				y = 100	> 10.1 lt
Ink Error Waste Tank	Query ink level in waste tank Time-out : < 1 sec	.10IEVT		.02IEVTxxx	
				x =	ink amount in percent (3 signs)
				x = 000	< 2 lt
				x = 020	2.0 – 4.0 lt
				x = 040	4.0 – 6.2 lt
				x = 060	6.2 – 8.4 lt
				x = 080	8.4 – 10.1 lt
				x = 100	> 10.1 lt
Load End	Ends the loading of flexible media If front clamp roller and back clamp rollers are closed and the media is loaded then the media will be tensioned. Answers if all rollers are closed Time-out : < 1 sec	.10LE		.01LExyz	
				x =	Back Clamp (1 sign)
				x = 0	closed
				x = 1	open
				y =	Front Clamp (1 sign)
				y = 0	closed
				y = 1	open
				z =	Media (1 sign)
				z = 0	available
				z = 1	not loaded
Load Media	Activates the loading of	.10LM		.01LM	

flexible media.  
 All clamps will be opened  
 and the keyboard for manual  
 advancing/reversing will be  
 activated.  
 Time-out : < 1 sec

Set LOIS Offset		.10SLOF<color><head><offset>	.01SLOF<color><head><offset>
Load Query	The same as Load End, but only queries the status.	.10LQ	.01LQxyz x = Back Clamp (1 sign) x = 0 closed x = 1 open y = Front Clamp (1 sign) y = 0 closed y = 1 open z = Media (1 sign) z = 0 available z = 1 not loaded
Media Detect	Query Medium Sensors Time-out : < 1 sec	.10MD	.01MDx x = Medium Sensor (1 sign) x = 0 Medium present x = 1 left sensor free x = 2 right sensor free x = 3 both sensors free (no Media)
Media Tension Set	Sets the media tension Time-out : < 1 sec	.10MTSa a = tension on media in percent Range 10 .. 100	.01MTSx x = tension on media in percent Range 10 .. 100
Paper Advance Line	Starts media advance with the width of one line. The value of the advance movement is set with the command „Set Line Micrometer”. Time-out : < 1 sec	.10PAL	.01PAL The answer to the command is immediately, even if the media advance has not been finished yet. The query if media advance has been finished must be done using the command „Paper Advance Query“
Paper Advance Mark	Starts the media advance until the next backside mark. Searching area are the next 300 mm. Time-out : < 1 sec	.10PAM	.01PAM The answer to the command is immediately even if the paper advance is not yet executed. The query if the media advance has been finished, has to be done using the command „Paper Advance Query“.

Paper Advance Query	Query if media advance has been executed. Time-out : < 1 sec	.10PAQ	.01PALx x = State x = 0 Last paper advance finished x = 1 Paper advance active x = 2 Error
Paper Advance Slowly	Starts slow paper advance Time-out : < 1 sec	.10PASL	.01PASL The media advance must be stopped with the command „Paper Advance Stop”
Paper Advance Stop	Stops slow media advance forward or backward	.10PAST	.01PAST
Print Carriage Cleaning Cycle	Purging and wiping the print heads	.10PCCabcdehghi a = type of cleaning cycle (1 sign) a = 0 Long Purge a = 1 Short Purge b = Row 1 (1 sign), Lc/Lm left b = 0 no purging b = 1 purging c = Row 2, YM left à Like Row 1 d = Row 3, CK left à Like Row 1 e = Row 4, Spot 1+2 left à Like Row 1 f = Row 5, Spot 1+2 right à Like Row 1 g = Row 6, CK right à Like Row 1 h = Row 7, YM right à Like Row 1 i = Row 8, Lc/Lm right à Like Row 1	.01PCCrstuvwxy r = type of cleaning cycle (1 sign) r = 0 Long Purge r = 1 Short Purge s = Row 1 (1 sign), Lc/Lm left s = 0 no purging s = 1 purging t = Row 2, YM left à Like Row 1 u = Row 3, CK left à Like Row 1 v = Row 4, Spot 1+2 left à Like Row 1 w = Row 5, Spot 1+2 right à Like Row 1 x = Row 6, CK right à Like Row 1 y = Row 7, YM right à Like Row 1 z = Row 8, Lc/Lm right à Like Row 1
Print Carriage Move	Starts print carriage movement to set position Time-out : < 1 sec	.10PCMa a = position from purge side in 0.1 mm steps range 0 .. 51000	.01PCMx x = Error State
Print carriage park		.10PCP	.01PCPx x = State x = 0 In park position and initialized x = 1 Not in park position or moving x = 2 Not initialized
Print Carriage	Query status print sledge	.10PCQ	.01PCQxyyyyyy



Query	Time-out : < 1 sec		x = Status (1 sign) x = 0 sledge still x = 1 sledge moves x = 2 Crash Sensor activated during last movement x = 3 Error on SPii x = 4 Print Sledge not initialized x = 5 Print Encoder Error y = Position of print sledge purge side in 1/400 inch (-11000 .. 90000)
Printhead Heater Control	Ink Heater On / Off	.20PHHCabbb	.02PHHCxyyy
		a = Status (1 sign) a = N ink heater on a = F ink heater off b = ink temperature in 0.1 °C range 400 .. 600 (40 °C .. 60 °C) (3 signs)	x = Status (1 sign) x = N ink heater on x = F ink heater off y = ink temperature in 0.1 °C range 400 .. 600 (40 °C .. 60 °C) (3 signs)
Printhead Heater Query	Queries Status Ink Heater Time-out < 2 sec	.10PHHQa	.01PHHQwxyz
		a = color (1 sign) a = 0 Cyan a = 1 Magenta a = 2 Yellow a = 3 Black a = 4 Spot 1 a = 5 Spot 2 a = 6 Spot 3 a = 7 Spot 4	w = State Head 1 (1 sign) w = 0 Temperature +/- 2 °C w = 1 Control switched off w =C Head too cold w =H Head too hot w =S short circuit on NTC w =P cable broken on NTC w =X Timeout or Head not available x = State Head 2 (1 sign) à like Head 1 y = State Head 3 (1 sign) à like Head 1 z = State Head 4 (1 sign) à like Head 1
Printhead Temperature Query	Query print head temperature	.10PHTQ<color><head>	.01PHTQxyzzz
		a = Color (1 sign) a = 0 Cyan a = 1 Magenta a = 2 Yellow a = 3 Black a = 4 Spot 1 a = 5 Spot 2 a = 6 Spot 3 a = 7 Spor 4 b = Head (tank) (1 sign) b = 0 Head 1 b = 1 Head 2 b = 2 Head 3 b = 3 Head 4	x = Color (1 sign) x = 0 Cyan x = 1 Magenta x = 2 Yellow x = 3 Black x = 4 Spot 1 x = 5 Spot 2 x = 6 Spot 3 x = 7 Spor 4 y = Head (tank) (1 sign) y = 0 Head 1 y = 1 Head 2 y = 2 Head 3 y = 3 Head 4 zzz = print head

			temperature (3 signs) number .. temperatur in 0.1°C XXX .. Error
Print Head Voltage Set (Single Slot)	Sets the amplitude of the FIRE pulse on the printhead Time-out < 2s	.10PHVSabcd a = Color (1 sign) b = Head (1 sign) c = Slot (1 signs) d = Volt (1 signs)	.01PHVSwxyz w = Color (1 sign) x = Head (1 sign) y = Slot (1 signs) z = Volt (1 signs)
Paper Reverse Slowly	Paper Reverse Slowly	.10PRSL	.01PRSL
Query dual roll		.10QDR	.01QDRxy x = unroll x = 0 Single roll x = 1 Dual roll y = windup y = 0 Single roll y = 1 Dual roll
Query heater control status		.10QHCS	.01QHCS<e><s><ttt>
Query ionizer alarm		.10QIA	.01QIA<e>
LOIS Offset Query	To read out the set switching point of the ink level sensor (LOIS). Time-out : < 1 sec	.10QLOFabc a = Color (1 sign) a = 0 Cyan a = 1 Magenta a = 2 Yellow a = 3 Black a = 4 Spot 1 a = 5 Spot 2 a = 6 Spot 3 a = 7 Spot 4 b = Head (1 sign) 0 oder 1 c = Tank (1 sign) c = 0 Color 1 c = 1 Color 2	.01QLOFwxyzzz w = Color (1 sign) w = 0 Cyan w = 1 Magenta w = 2 Yellow w = 3 Black w = 4 Spot 1 w = 5 Spot 2 w = 6 Spot 3 w = 7 Spot 4 x = Head (1 sign) 0 oder 1 y = Tank (1 sign) y = 0 Color 1 y = 1 Color 2 z = Offset for switching point in 10mV Steps (3 sign)
Query Quality Mode	Query about number of passes etc. Time-out < 1 sec	.10QMQ	.01QMQxy x = Number of Passes, which are set at the time (2 sign) y = Spot Mode (1 sign) y = 0 No spot Colors in use y = 1 Spot Colors in use

Set Quality Mode	Sets Interlaced Mode	.10QMaab a = Number of Passes, which are set at the time (2 sign) b = Spot Mode (1 sign) b = 0 No spot Colors in use b = 1 Spot Colors in use	.01QMxy x = Number of Passes, which are set at the time (2 sign) y = Spot Mode (1 sign) y = 0 No spot Colors in use y = 1 Spot Colors in use
Query purge switch		.10QPS	.01QPSx x = State x = 0 Purgetray closed x = 1 Purgetray opened
Reference Positions Query	With this you can check which actors have reached the ref. positions. Time-out : < 1 sec	.10RPQ	.01RPQw0x00y00z w = Status reference query (1 sign) w = 0 done w = 1 Positioning running x = Head Media Distance (1 sign) x = 0 Reference found x = 1 Reference not yet found y = Paper advance (1 sign) y = 0 Reference found y = 1 Reference not yet found z = Print Sledge (1 sign) z = 0 Reference found z = 1 Reference not yet found
Reference Positions Set	Starts Initialization. Following parts will be set to reference: Sledge (Height), Sledge (Width), Paper advance motor With this command only the initialization process will be started, if the Initialization is finished has to be read out with the command „Reference Position Query“: The length of the initialization can take up to 2minutes. Time-out : < 1 sec	.10RPS	.01RPS
Set axis mode		.10SAM<a><r>	.01SAM<a><r>
Start Adress	Printing starts	.10SASAaaaaabbbbbc	.01SASAxxyyyyyy

Stop Address	Receives data for the next line Time-out : < 1 sec	a = Image Data Start Address (5 signs) b = Image Data Stop Address (5 signs) c = Linebuffer No. 1 / 2 (1 signs) d = Parameter (1 sign) d = 0 not first line d = 2 first line	x = Image Data Start Address (5 signs) y = Image Data Stop Address (5 signs)
Signal buzzer lamp		.10SBL<s>	.01SBL<s>
Set fire puls		.10SFP<lll><ddd>	.01SFP<lll><ddd>
Set channel puls length		.10SCPL<c><s><lll><ddd><jjj>>	.01SCPL<c><s><lll><ddd><jjj>,<err>
Set channel JSP length		.10SCJL<c><s><lll><ddd><jjj>>	.01SCJL<c><s><lll><ddd><jjj>,<err>
Set double firepuls		.10SDFP><lll><ddd><jjj>	.01SDFP><lll><ddd><jjj>,<err>
Set JSP puls		.10SJSP><lll><ddd><jjj>	.01SJSP><lll><ddd><jjj>,<err>
Set data load delay		.10SDLD<ddd>	.01SDLD<ddd>,<err>
Start data transfer		.10SDT	.01SDT<r>
Switch Elge off		.10SEO	.01SEO
Set LOIS offset		.10SLOF<c><h><t><ooo>	.01SLOF<c><h><t><ooo>
Set Line Width Micrometer	Sets the width of the media advance in Micrometer. Time-out < 1 sec	.10SLMa a = Amount of feeding Micrometer	.01SLMx x = Amount of feeding Micrometer
Set print velocity		.10SPV<n><v.v>	.01SPV<e>,<v.v>
Set queue parameter		.10SQP<a><bbbb><uuu><ww><i>	.01SQP<a><bbbb><uuu><www><i>
Set	Sets the resolution for the	.10SRESa	.01SRESx

Resolution for Printing	print	a = Resolution	x = Resolution
Set Roll Width	Sets the media width	.10SRWaaaa a = Width range (1000 – 3200)	.01SRWxxxxy x = Width range (1000 – 3200) y = Error Code y = 0 no error
Textile Bar Query	Query, if the bars for textile print are mounted.	.10TBQ	.01TBQx x = Status textile bar x = 0 not mounted x = 1 front bar x = 2 back bar x = 3 both bars
Table Vakuum Fan	Sets the rpm for the vacuum fan below the printplane Time-out : < 1 sec	.10TVF<Step> x = Step (2 signs) Range x = 0 0 .. Fan on x = 16 16 .. Fan off	.01TVFxx x = Step (2 signs) Range x = 0 Fan on x = 16 Fan off
Transmit Next Line	Queries readiness for the next line. The system is answering only after the last lines has been printed. If the wind-up motor is OFF, you will always receive y=0 If the wind-up motor is ON, it will be checked if the wind-up motor works cyclic and sends back y = 1 if the motor is not switching off. The emergency flag stands for a head crash during printing. The stacker flag shows, that the stacker cannot take the next board Time-out: < 10 sec	.10TNL	.01TNLwxyz w = 0 Not Paper End w = 1 Paper End x = 0 Wind Up OK x = 1 Wind Up NOK y = 0 Not Emergency Stop y = 1 Emergency Stop z = 0 Stacker OK z = 1 Stacker NOK
Unidirectional Curing Parameter	Configures the curing during the back-movement of the print sledge in the unidirectional print mode	.10UCPabccc a = Setting for leading lamp (1 sign) a = 0 leading lamp on a = 1 leading lamp off b = Setting for following lamp (1 sign) b = 0 following lamp on b = 1 following lamp off c = delay time before back-movement in sec (3 sign)	.01UCPxyzzz x = Setting for leading lamp (1 sign) x = 0 leading lamp on x = 1 leading lamp off y = Setting for following lamp (1 sign) y = 0 following lamp on y = 1 following lamp off z = delay time before back-movement in sec (3 sign)
Unidirectional	Activates the unidirectional	.10UDPa	.10UDPx

Printing	printing mode. Thereby the print sledge moves back during the paper advance	a = Parameter (1 sign) a = 0 Unidirectional Printing a = 1 Unidirectional Printing off	x = Parameter (1 sign) x = 0 Unidirectional Printing x = 1 Unidirectional Printing off
Unroll Direction		.10URD<axis><dir>	.01URD<axis><dir>,<error>
UV Lamp Control	When switching on the UV-lamp the shutter will be closed and the UV-lamps ignited; when switching off, the shutter open Time-out : < 1 sec	.10UVLCab a = lamp1 (1 sign) a = 0 0 .. lamp on a = 1 1 .. lamp off b = lamp2 (1 sign) b = 0 0 .. lamp on b = 1 1 .. lamp off	.01UVLCx x = Error x = 0 No Error x = 1 Error
UV Lamp Intensity	Sets the intensity of the UV-lamp. If the intensity of lamp2 is not set, automatically the intensity of lamp 1 will be used. Time-out < 1 sec.	.10UVLIab a = lamp1 (2 signs) range : 0 (min.) - 15 (max.) b = lamp2 (2 signs) range : 0 (min.) - 15 (max.)	.01UVLI<ee> x = Error x = 0 No Error x = 1 Error
UV Lamp Status	Query actual UV lamp status Time-out : < 1 sec	.10UVLS	.01UVLSvwxyz v = 0 Left Lamp ready, v = 1 Left Lamp not ready w = 0 Right Lamp ready, w = 1 Right Lamp not ready x = 0 Left Lamp OK, x = 1 Left Lamp Error y = 0 Right Lamp OK, y = 1 Right Lamp Error z = 0 safety device OK z = 2 safety device Error
Version Number	Version No. of uProcessor PCB	.10V	.01Vxxxxxxxxxx xxxxxxxxxx Version No. Of uProcessor PCB Time-out : < 1 sec
Windup Force		.10WUFabbb a = Axis b = Percent 25% – 100%	.01WUFxyyyz a = Axis b = Percent 25% – 100% c = Error c = 0 No Error c = 1 Error
Enable Windup		.10WUPab a = Axis b = State b = 0 Off b = 1 On	.01WUFxyz x = Axis y = State y = 0 Off y = 1 On z = Error z = 0 No Error

z = 1 Error

---

*Tab. 4: 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. 5: Meaning of the bits for the "Status of Spii Carriage and Transport Belt Controller"



## 3.2 Error code list

Code	Description	Possible solution
0	No Error	No Error
1001	Printcollector program not started	
2001	Printer not initialized	
2203	Printplane distance reference not found.	
2204	Head media distance reference not found.	
2210	Print carriage reference not found.	
2211	Vacuum motor 1 reference not found.	
2212	Vacuum motor 2 reference not found	
2214	Media advance failed	
2269	Switching printhead heater ON or OFF failed	
2276	Printhead carriage position offset not programmed	
2281	Printhead carriage reference position offset not programmed.	
2283	Printplane distance offset not programmed	
2284	Head media distance reference not found	
2287	Initialization Reference Positions timeout.	
2288	Crash sensor detected! Unlock doors, remove the media, move the print carriage to park position and reload media!	
2289	Backmark sensor configuration mismatch.	
2290	Color configuration mismatch.	
2291	UV-Lamp configuration mismatch.	
2292	Inktank configuration mismatch	
2293	Configured number of print heads mismatch.	
2294	Ink circulation configuration mismatch.	
2295	Valve type configuration mismatch.	
2296	Gear configuration mismatch.	
2299	Configuration mismatch	
2301	Ionizer option mismatch	
2310	Unable to start ink level controller	
2311	Lois offset not programmed.	
2313	Send number of printheads per color failed	
2315	Send serial command failed	
2320	Communication port not configured.	

Code	Description	Possible solution
2327	UV lamp 1 switched off	
2328	UV lamp 1 cooling down	
2329	UV lamp 1 switching on	
2330	UV lamp 1 blocked	
2331	UV lamp 2 switched off	
2332	UV lamp 2 cooling down	
2333	UV lamp 2 switching on	
2334	UV lamp 2 blocked	
2341	UV lamp shutter 1 not working	
2342	UV lamp shutter 2 not working	
2344	UV lamp 1 not ready	
2345	UV lamp 2 not ready	
2346	UV lamp 1 error	
2347	UV lamp 2 error	
2348	UV lamp safety device error	
2351	UV lamp shutter 1 error	
2352	UV lamp shutter 2 error	
2371	Insufficient ink in the main tank.	Refill ink
2380	Insufficient ink in the main tank.	Refill ink (Cyan)
2381	Insufficient ink in the main tank.	Refill ink (Magenta)
2382	Insufficient ink in the main tank.	Refill ink (Yellow)
2383	Insufficient ink in the main tank.	Refill ink (Black)
2384	Insufficient ink in the main tank.	Refill ink (Spot 1)
2385	Insufficient ink in the main tank.	Refill ink (Spot 2)
2386	Insufficient ink in the main tank.	Refill ink (Spot 3)
2387	Insufficient ink in the main tank.	Refill ink (Spot 4)
2700	PDF file not found	
2701	Movie file not found	
2702	Movie player not installed correctly	
2703	Movie player is running	
2750	Day And Night Job missing	
2752	Printjob missing	
4010	Error sending print parameters	
4011	Send print parameters interrupted	

Code	Description	Possible solution
4012	Send print parameters failed	
4014	Send print parameters stopped	
6001	Printer not working.	Check the cable connections and initialize the printer
6002	Print carriage movement not finished.	Retry and if not successful re-initialize the printer
6003	UV Lamp not working.	Check cooling system and UV Lamp system
6008	ERROR_PRINT_DATA_LOCK	
6010	Printer sledge SPII overcurrent	
6011	Printer sledge in progress	
6014	Print sledge not initialized.	
6015	Print sledge encoder error	Switch off/on printer and initialize
6016	Light trap open, please close	
6017	Printer sledge valve switching fault.	
6018	Printer sledge HDM fault.	
6019	Printer sledge undefined state.	
6601	Windup not working	
6602	No media detected, load media	
6604	The clamp rollers are open.	Close them by pressing the load buttons
6607	Set windup/unwind force failed	
6608	Check textile switch	
6611	Data transfer not ready.	
8215	Printer Type not configured.	
8230	Fusion Board DataLink 0 (OPEN FAILED)	
8231	Fusion Board DataLink 1 (OPEN FAILED)	
8232	Fusion Board DataLink 2 (OPEN FAILED)	
8233	Fusion Board DataLink 3 (OPEN FAILED)	
8234	Fusion Board (INVALID CHANNEL)	
8235	Fusion Board (WRITE FAILED - EFAULT)	
8236	Fusion Board (WRITE FAILED - EIO)	
8237	Fusion Board (WRITE FAILED - ETIMEDOUT)	
8238	Fusion Board (WRITE FAILED - EINTR)	
8239	Fusion Board (WRITE FAILED)	


Code	Description	Possible solution
8245	Fusion Board temperature too high	
8300	Purge-Timeout	
8301	Doors are open, close doors	
8302	Impossible to lock the doors. Try to close the doors properly. Close the purge tray properly	
8303	Impossible to unlock the doors. Try again and if error persists switch off and re-initialize the printer	
8306	Purge tub is closed	
8308	Set media width failed	
8310	Sending „backmark distance“ command failed	
8312	Send „advance to backmark“ command failed	
8313	Backmark not found	
8314	Backmark not reached	
8320	Install media guide bars	
8321	Remove media guide bars	
9010	Reading Image File	
9013	Writing File to FIFO failed	
9022	Sending Drop Fly Time Compensation failed	
9024	Media end detected, load a media roll	
9026	Send encoder offset failed. Check cable connection and try again	
9029	Start Load Media failed. Try again and if error persists switch off and re-initialize the printer	
9030	Loaded media out of position. Check that the media is loaded in the center, read the right edge position of the media and enter the correct value	
9031	Media Id already exists. Enter a non existing Id	
9032	Actual loaded media changed, reload media	
9045	Move print carriage failed	
9049	Start purge cycle failed	
9061	Print next line failed	
9064	Set print quality failed	
9066	Set printplane distance failed	
9068	Set print line width failed	
9069	Set printing resolution failed	
9080	Switching on the table fans failed	

Code	Description	Possible solution
9081	Switching off the table fans failed	
9086	Set head voltage failed. Try again and if error persists switch off and re-initialize the printer	
9087	Switch head voltage failed	
9103	Set uni-/bidirectional printing mode failed	
9104	Set two lamp curing failed	
9105	Set trailing lamp curing failed	
9106	Set leading lamp curing failed	
9108	Set curing delay for unidirectional and glossy printing failed	
9120	Media advance for one line failed	
9124	Open back clamp roller failed	
9125	Close back clamp roller failed	
9126	Open front clamp roller failed	
9127	Close front clamp roller failed	
9141	Set heat PWM failed	
9142	Ink level control for color header tank not working.	
9143	Ink level sensor defect.	
9144	One of the color heads has not reached the nominal temperature. Wait a few minutes and try again	
9145	Timeout error caused by ink level sensor of one color head	
9146	Check ink level sensor in main ink tanks	
9150	Purge pressure not OK. Check pressure/vacuum system	
9151	Meniscus pressure not OK. Check pressure/vacuum system	
9152	Lung pressure not OK. Check pressure/vacuum system	
9153	Pressure system not OK. Check pressure/vacuum system	
9160	Waste tank full. Recycle the waste ink according the regulations by law	
9188	Internal SMS-Alert transfer failed. Check SMS module	
9209	ERROR_SWITCH_IONIZER	

Code	Description	Possible solution
9500	ERROR_FILLED_EXPIRED_MAIN_INK	
9502	ERROR_FILLED_WRONG_MAIN_INK	
9999	Unknown error	
10001	Purge cycle finished	
10002	Daily Shutdown done, now it is safe to switch off the printer!	
10005	Daily Shutdown done Switch off machine by main switch and wipe the printheads with cleaning towel	
10007	Printer initialized	
10010	Queue cycle finished	
10020	Hardware error message	
12501	Filled ink [main ink 0   Cyan]	
12502	Filled ink [main ink 1   Magenta]	
12503	Filled ink [main ink 2   Yellow]	
12504	Filled ink [main ink 3   Black]	
12505	Filled ink [main ink 4   Spot1]	
12506	Filled ink [main ink 5   Spot2]	
12507	Filled ink [main ink 6   Spot3   light cyan]	
12508	Filled ink [main ink 7   Spot4   light magenta]	
20010	Check free space on disks	
20371	Warning: Main ink expired	
20380	Warning: Main ink expired [ink 0   cyan]	
20381	Warning: Main ink expired [ink 1   magenta]	
20382	Warning: Main ink expired [ink 2   yellow]	
20383	Warning: Main ink expired [ink 3   black]	
20384	Warning: Main ink expired [ink 4   Spot 1]	
20385	Warning: Main ink expired [ink 5   Spot 2]	
20386	Warning: Main ink expired [ink 6   light cyan]	
20387	Warning: Main ink expired [ink 7   light magenta]	
20800	Warning: Head voltage out of range	

Tab. 6: List of the error codes

### 3.3 GetError <.10GE>

 The GetError command returns a 4-digit hexadecimal number in the format GSEE. The first character G denotes the function group, where the error occurred. The 2nd point S denotes the subgroup, and the last two digits of the error type.

Function group	Specific subgroup	Description
0		Generically
1		Electronic (Rack)
	8	Linebuffer PCB
	9	Hotlink PCB
	A	IO Control PCB
	B	Head Driver PCB
2		Paper advance
	8	Transport motor
	9	Tension motor
	A	Transport encoder
	B	Fan control PCB
3		Carriage
	8	Carriage motor
	9	Carriage encoder
4		HMD
	8	HMD motor
5		Ink heater
	4	Heater Control PCB
6		Ink control
	8	Blockvalve PCB
	9	Meniscus control PCB
	A	Inkpump PCB
7		Pressure supply
	8	Pressure Control PCB
8		Windup/Unroll
	4	RS485 Converter PCB
	8	Unroll Motor
	9	Windup Motor
9		UV Lampe
	4	UV Control PCB

Function group	Specific subgroup	Description
A		Pilz
B .. E		Free
F		Res.

Tab. 7: Main groups and subgroups



The subgroups are divided into generic / (for all functional groups) and specific (only for certain group).

Digits < 8 characterize generic subgroups

For the numbers of the subgroups see the table above.

Subgroup	Description
0	Generically
1	Operating system
2	SpilPlus Controller
3	PosiDrive Controller
4	RS-485 Bus
5	M-Drive

Tab. 8: Subgroups

Number	Description	Declaration
01	Invalid type	Invalid selection (mostly entry errors)
02	Not initialized	Movement or action could not be performed because unit not yet initialized
04	Aborted by user	Demolition
05	Bad response	Unit has returned invalid response
06	Bad command	Unit has command not accepted (check sum error, invalid command etc.)
07	Checksum error	Checksum wrong (transmission errors, faults on the control line)
08	Zero not found	Not found reference
10	Semaphore timeout	In the firmware a Resource was released on time, possibly software error
11	Timeout error	Addressed unit has not responded to the command (unit or cable defective)
12	Not turning	Motor does not rotate
13	In limit switch	Reached limit
14	Too near	Print head gap is too small
15	No media	No media loaded



Number	Description	Declaration
16	Loading error	Loading error
20	Out of range	Range error, software error or operator error
30	No power	Unit is not locked, action can not be executed
40	Config data not valid	Configuration memory invalid (fault of the processor card, battery defect on processor card configuration data never charged)
50	Could not stop	Movement could not be stopped (error in firmware, controller does not respond ...)
60	Emergency stop	Emergency stop, crash sensor has been activated
61	Media crash	Crash sensor has been activated
70	SIO, no buffers	Firmware error
71	SIO, SP condition	Special Condition interrupt on SIO (interference on data line, mass problem)
72	SIO, SP condition	Special Condition interrupt on SIO (interference on data line, mass problem)
80	Task busy	Action can not be executed because unit already active
81	No semaphore	Firmware error
90	Fault	Generic error
91	SpII Fault	Error SpII Controller
C0	No Acknowledge	Received NAK Character
F0	Encoder not OK	Encoder Error
E1	Difference too large	Difference too large
FF	Motor does not work	Motor Error

Tab. 9: Error type

Number	Name	Description
10C2	Media Advance, Backmark not found	Backmark not found
10C3	Media Advance, Backmark not reached	Backmark not reached
3211	SpII Timeout	The controller is either not ready or defective wired incorrectly.
4511	MDrive Timeout	The motor is either not ready or defective wired incorrectly.

Tab. 10: Important error messages

### 3.4 Pilz safety controller

#### 3.4.1 Pin/LED assignment for the program MA2641P1\_0Z.mpnz

ü ACS controller type PNOZ m1p is used in printer

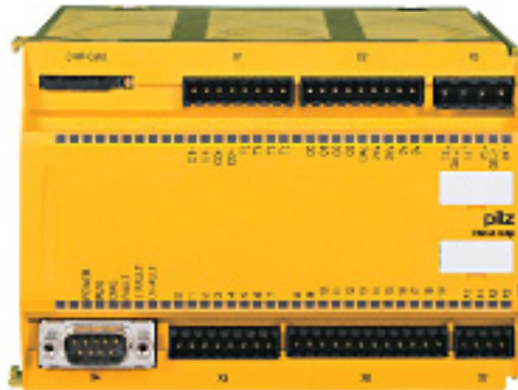


Fig. 1: Overview of the Pilz safety controller

#### -A103 Base module

Designation	Terminal	Name	Description	Contact
X1	T0	Test Pulse Output	Led ON	
	T1	Test Pulse Output	Led ON	
	T2	Test Pulse Output	Led ON	
	T3	Test Pulse Output	Led ON	
X2	O1	Main Supply (BP0 K3)		
	O2	Main Supply (BP0 K4)		
	O3	Emergency Stop		
	O4	Emergency Stop		
X3	13	24V		
	14			
	23			
	24	Out put for K2 (BP0)		

Designation	Terminal	Name	Description	Contact
X5	I0	Lamp ON		
	I1	Out A (Motion Sensor)	Led Blinking if carriage is moving	
	I2	Out B (Motion Sensor)	Led Blinking if carriage is moving	
	I3	Out C2 (Park position Sensor L)	Led ON if carriage is in left park position	
	I4	UV Stb.		
	I5	Out D2 (Park position Sensor R)	Led ON if carriage is in right park position	
	I6	Out D1 (Park position Sensor R)	Led ON if carriage is in right park position	
	I7	Out C1 (Park position Sensor R)	Led ON if carriage is in left park position	
X6	I8	Safety Sensor (Roller)		
	I9			
	I10	Emergency (S2 – S6, S7, S9)	Led ON if no Emergency switch is active	
	I11	Emergency (S2 – S6, S7, S9)	Led ON if no Emergency switch is active	
	I12	Light Trap (8)	Led ON if Light Trap is closed	
	I13	Light Trap (8)	Led ON if Light Trap is closed	
	I14	Door Switch (S43)	Led ON if door is closed	
	I15			
	I16	Temp. Sensor Sledge Motor		
	I17			
X7	A1	24V		
	A1	24V		
	A2	GND		
	A2	GND		

Tab. 11: Pin/LED assignment PNOZ m1p

3.4.2 Meaning of LEDs on the PNOZ m1p

Symbol	Meaning
	LED off
	LED flashing
	LED on

Tab. 12: 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. 13: LED displays on the PNOZ m1p (Pilz safety controller)

### 3.5 Posidrive (Windup + Winddown)

#### 3.5.1 Operator Panel

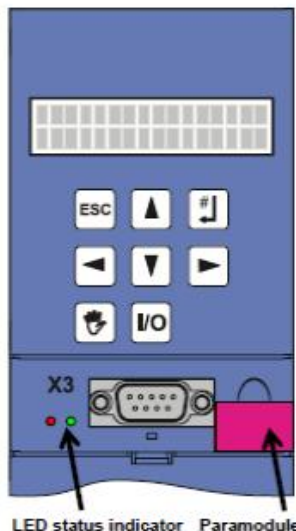


Fig. 2: Parameter structure

#### 3.5.2 Parameter structure

- i** Parameters perform various tasks in the inverter system.
  - w Adjust the application to exterior conditions such as motor type
  - w Indicate values such as the current speed or the torque
  - w Trigger actions such as store the values or the phase test

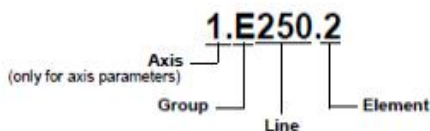


Fig. 2: Parameter structure

Parameter Group	Subject Area/Dependency
A.. Inverter	Inverter, bus, cycle time
B.. Motor	Motor
C.. Machine	Speed, torque
D.. Reference Value	Speed ref. Values, reference value generator
E.. Display Value	Indication for device and application
F.. Control Interface	Analog inputs/outputs binary inputs/outputs, brake
G.. Technology	Depends on the application
H.. Encoder	Encoder
I.. Positioning	Only with positioning applications
J.. Process Blocks	Only with positioning applications

Parameter Group	Subject Area/Dependency
L.. PLC open Reference Values	Only with positioning applications
N.. Posi Switches	Only with positioning applications
P.. Customer-specific parameters	Only with “free, graphic programming” option
Q.. Customer-specif parameters, dependent on instance	Only with “free, graphic programming” option
R.. Production data	Production data of inverter, only visible during online operation
T.. Scope	Scope parameters
U.. Protection functions	Parameterizing the results
Z.. Fault counter	Fault Counter of events

Tab. 14: Parameter Structure

### 3.5.3 Change an application by exchanging the Paramodule

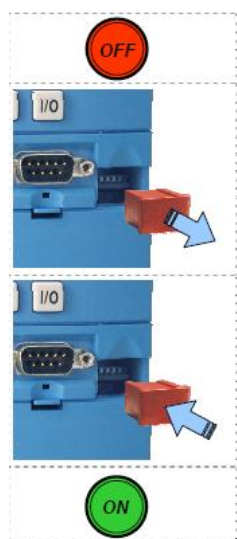


Fig. 3: Changing an application

1. Turn the power supply of the inverter off.
2. Remove the Paramodule from the inverter.
3. Install the new Paramodule on the inverter.
4. Connect the power supply.

### 3.5.4 LEDs

**i** The LEDs on the front of the inverter give you a quick overview of the state of the inverter. A green and a red LED which light up in different combinations and frequencies provide information on the device’s status based on the following table.

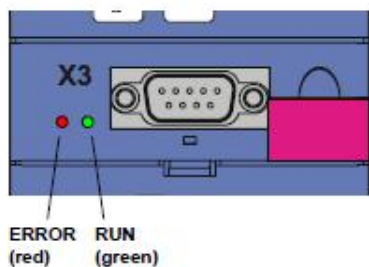


Figure 4-4 LED


Fig. 4: Overview of the Posidrive

LEDs		State of the inverter	
ERROR Red	●	OFF	No power
ERROR Green	●	OFF	
ERROR Red	●	OFF/ON	Device initialization (startup phase) or data action (A00 is active) Paramodule is not installed correctly.
ERROR Green	◐	Flashing at 8 Hz	
ERROR Red	●	OFF	Ready for operation (not enabled)
ERROR Green	◐	Flashing at 1 Hz	
ERROR Red	●	OFF	Operation (enabled)
ERROR Green	☉	ON	
ERROR Red	◐	Flashing at 1 Hz	Warning
ERROR Green	◐	On or flashing	
ERROR Red	☉	ON	Fault
ERROR Green	●	OFF	
ERROR Red	◐	Flashing at 8 Hz	No configuration active
ERROR Green	●	OFF	

Tab. 15: Status LEDs



### 3.6 ACS Controller

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

#### 3.6.1 Preparing the SpiiPlus MMI Application Studio

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

#### 3.6.2 Safety and Faults Monitor

##### Overview

Axis: 0 (X)				
Axis Faults				
	Inversion (SAFINI)	Inspection (FMASK)	Response (FDEF)	Indication (FAULT)
Hardware Right Limit	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Hardware Left Limit	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Network Error		<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Motor Overheat	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Software Right Limit		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Software Left Limit		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Encoder 1 Not Connected		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Encoder 2 Not Connected		<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Drive Fault	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Encoder 1 Error		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Encoder 2 Error		<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Non-Critical Position Error		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Critical Position Error		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Velocity Limit		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Acceleration Limit		<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Overcurrent		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Servo Processor Alarm		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
HSSI Not Connected		<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Fig. 2: Safety Configurator

Safety Inputs (SAFIN)	Description
Hardware Right Limit	Red – OK (switch connected and not triggered) Green – not OK (switch not connected or triggered)
Hardware Left Limit	Red – OK (switch connected and not triggered) Green – not OK (switch not connected or triggered)
Network Error	
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.
Software Right Limit	

Safety Inputs (SAFIN)	Description
Software Left Limit	
Encoder 1 Not Connected	
Encoder 2 Not Connected	
Drive Fault	Green – OK (Drive ready/enabled) Red – not OK (Drive not ready/enabled)
Encoder 1 Error	
Encoder 2 Error	
Non Critical Position Error	
Critical Position Error	
Velocity Limit	
Acceleration Limit	
Overcurrent	
Servo Processor Alarm	
HSSI Not Connected	

Tab. 16: Safety Configurator

	Inversion (S_SAFINI)	Inspection (S_FMASK)	Response (S_FDEF)	Indication (S_FAULT)
ACSPL + Program Error		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Memory Overflow		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
MPU Overuse		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Hardware Emergency Stop	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Servo Interrupt		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
File Integrity		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Component Failure	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Fig. 3: System Faults

System Faults (S_FAULT)	Description
ACSPL + Program Error	
Memory Overflow	
MPU Overuse	

System Faults (S_FAULT)	Description
Hardware Emergency Stop	Green – OK (no emergency stop) Red – not OK (emergency stop)
Servo Interrupt	An emergency stop can be initiated by:
File Integrity	<ul style="list-style-type: none"> <li>n Key lock switch</li> <li>n Door switches</li> <li>n Light trap security switch</li> <li>n Media security switches / Crash sensors</li> <li>n Print carriage temp sensor (30seconds delayed signal)</li> </ul>
Component Failure	

Tab. 17: Description of ACS Controller system faults

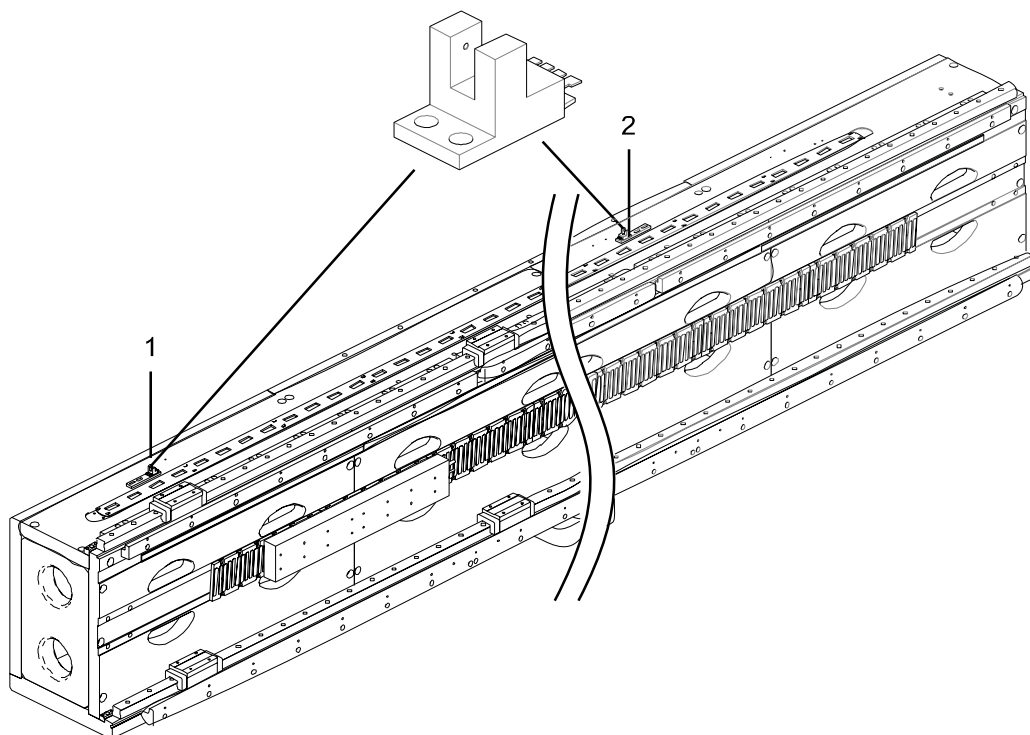


Fig. 4: Print carriage limit switches (seen from printer's output side)

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

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

### 3.7 RS232 Bus

PCBs	S1	S2	S3	S4
Ink-Pump Control PCB	0	0	0	1
Head Heater PCB-1	0	0	0	0
Head Heater PCB-3	1	0	0	0
Head Heater PCB-5	0	1	0	0
Head Heater PCB-7	1	1	0	0
Block Valve PCBs (CM)	0	0	0	0
Block Valve PCBs (YM)	1	0	0	0
Meniscus Valve PCB	0	0	0	0
Fan Control PCB	0	0	0	1
Pressure Control PCB	0	0	0	0
Bus Converter PCB	0	0	0	0
	0	0	0	0
IO Control PCB	0	0	0	0
PCB Head Driver C1 .. C4	0	0	0	0
PCB Head Driver K1 .. K4	1	0	0	0
PCB Head Driver Y1 .. Y4	0	1	0	0
PCB Head Driver M1 .. M4	1	1	0	0
PCB Head Driver 5/1 .. 5/4	0	0	1	0
PCB Head Driver 6/1 .. 6/4	1	0	1	0
PCB Head Driver c1 .. c4	0	1	1	0
PCB Head Driver m1 .. m4	1	1	1	0

Tab. 18: DIP-Switches configuration

### 3.8 Fusion board

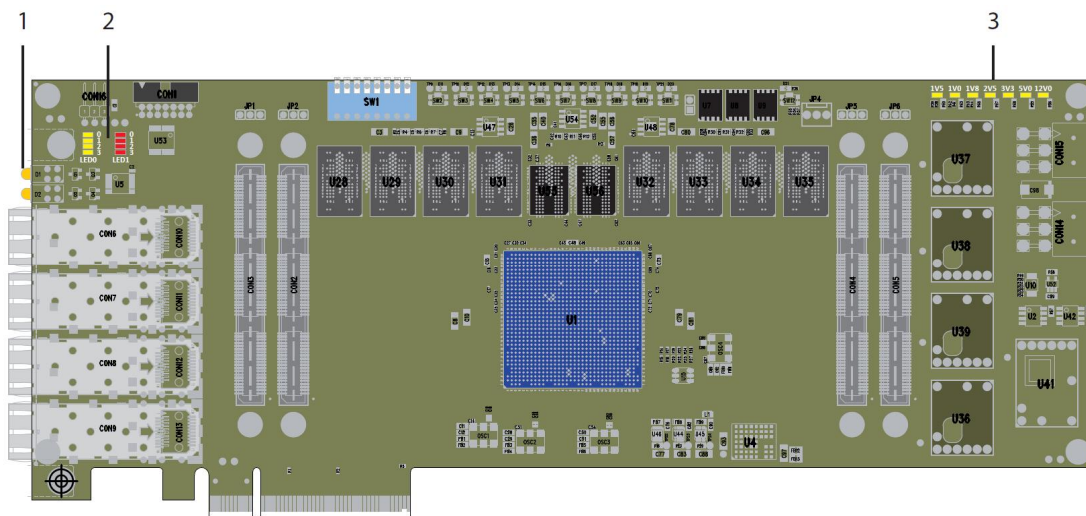
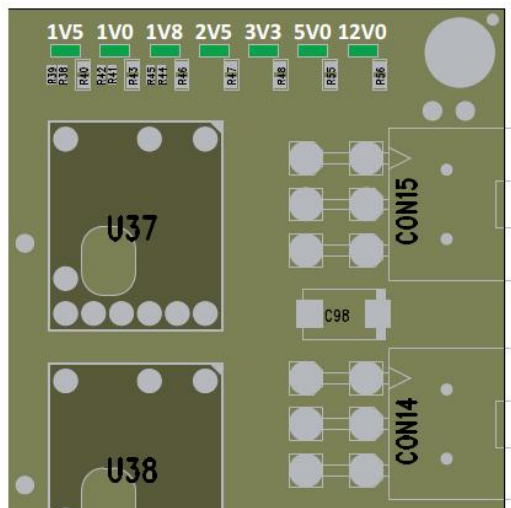


Fig. 5: Overview of the fusion base PCB

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

#### 3.8.1 Checking the internal power supply to the printed circuit board



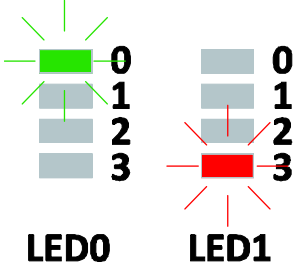
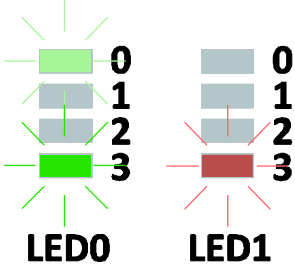
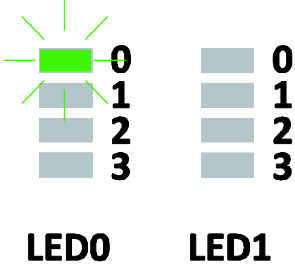
With the printer switched on / workstation switched on, all power LEDs must light up continuously.

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

- u Exchange the printed circuit board.

### 3.8.2 Checking that the fusion boards have 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;"><b>LED0      LED1</b></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;"><b>LED0      LED1</b></p>	<ul style="list-style-type: none"> <li>n The bottom LED in the first row flashes a few times (LED 0.3; green).</li> <li>n The bottom LED in the first row stops flashing and stays lit continuously (LED 0.3; green).</li> </ul>
3.	 <p style="text-align: center;"><b>LED0      LED1</b></p>	<ul style="list-style-type: none"> <li>n The bottom LEDs in both rows go out (LED 0.3; green and LED 1.3; red).</li> <li>n The fusion board has booted up correctly if only the top LED in the first row lights up (LED 0.0; green).</li> </ul>

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 between fusion board and workstation is displayed by the large 3-mm Data-LEDs on the Fusion Base PCB in the Workstation and the Fusion Base PCB on the Fusion Boards.

- ü The fusion board must be booted up correctly (à Chapter 3.8.2, p. 46)
- ü The power LEDs must be OK
- ü Printer is turned on
- ü Workstation is turned on

**Checking the data connection between workstation and Fusion board**

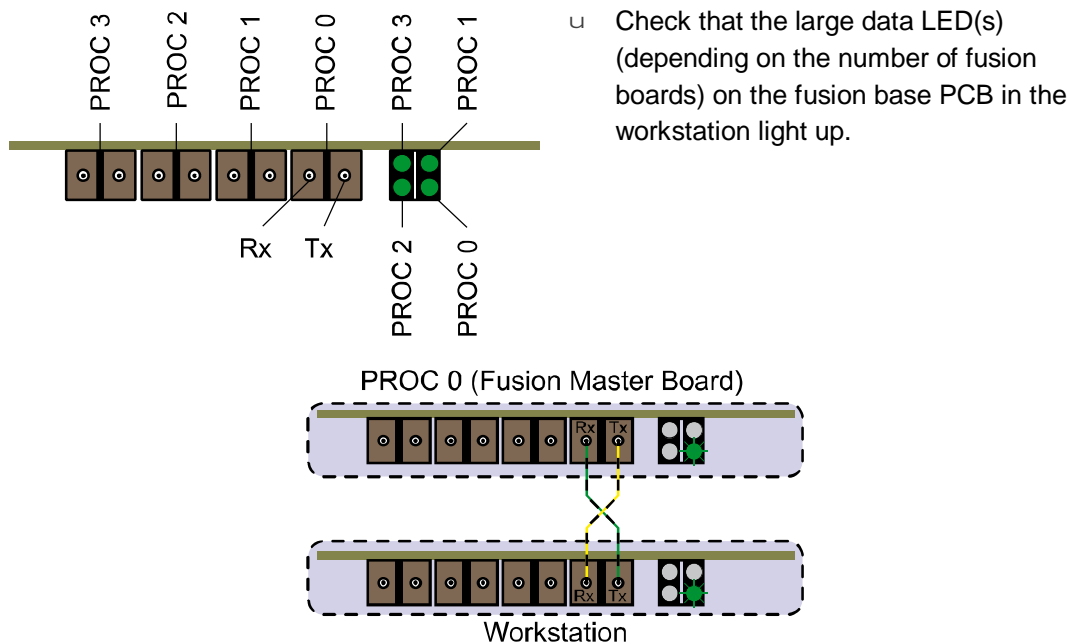


Fig. 6: Workstation – Fusion data connection of standard version

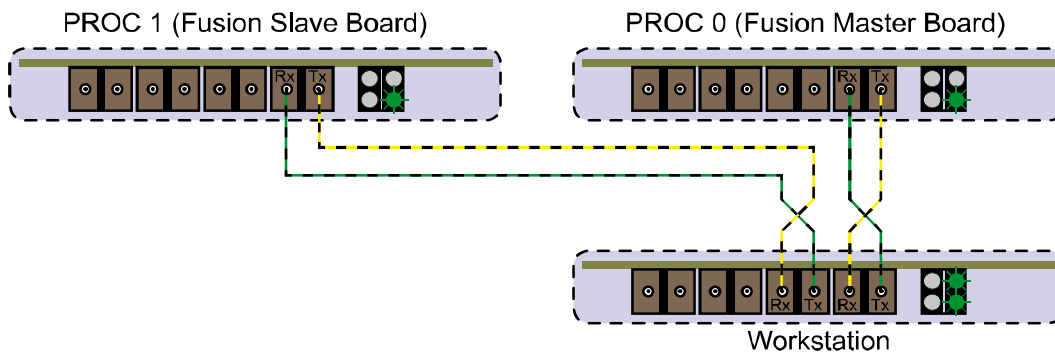


Fig. 7: Workstation – Fusion data connection of HS version

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:**

- In the printer software: Select the **Printer** tab.
- 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 master board**

- Ü The fusion board must be booted up correctly (à Chapter 3.8.2, p. 46)
  - Ü The data connection must be correct (à Chapter 3.8.3, p. 46)
1. In the printer software: Select the **Communication** tab.
  2. Send serial command QMST.
  3. Evaluate the response of the printer (à Chapter 3.1.1, p. 9).

**3.8.5 Checking the quality of the signal in the light guide**

- Ü The fusion board must be booted up correctly (à Chapter 3.8.2, p. 46)
  - Ü The data connection must be correct (à Chapter 3.8.3, p. 46)
1. In the printer software: Select the **Communication** tab.
  2. Send the following command to check the quality of the signal to PROC 0  
YQSFP
  3. Send the following command to check the quality of the signal to PROC 1  
YS2P.20YQSFP
  4. Evaluate the response of the printer (à Chapter 3.1.1, p. 9).

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

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



## 3.9 Ink circuit

### 3.9.1 Measuring the ink flow rate

**! WARNING! Contact with inks!**

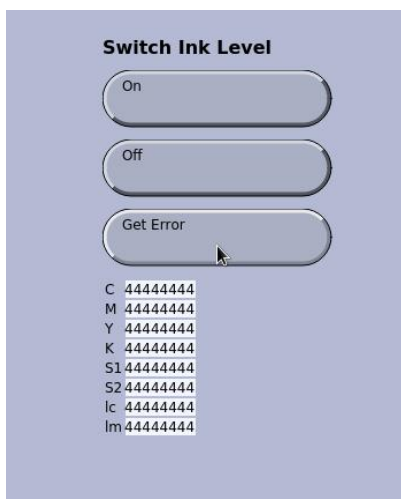
Risk to health if inks are allowed to come into contact with skin or eyes or if inks are breathed in.

- w Wear safety gloves.
- w Wear safety glasses.
- w Avoid allowing the ink to come into contact with skin or eyes.

ü Have the necessary tools to hand:

- New syringe
- Tube piece

1. Select the **LOIS Ink Level** tab.
2. Switch off the ink level



*Fig. 8: ink level control*

3. Pull the ink tube for the color to be measured off the ink distribution block and cap it at the print head side.
4. Connect the piece of tube to the ink distribution block and connect the open end of the tube to the syringe. When doing this, be sure to push the syringe through its full travel.
5. Select the **Pumps and Valves** tab

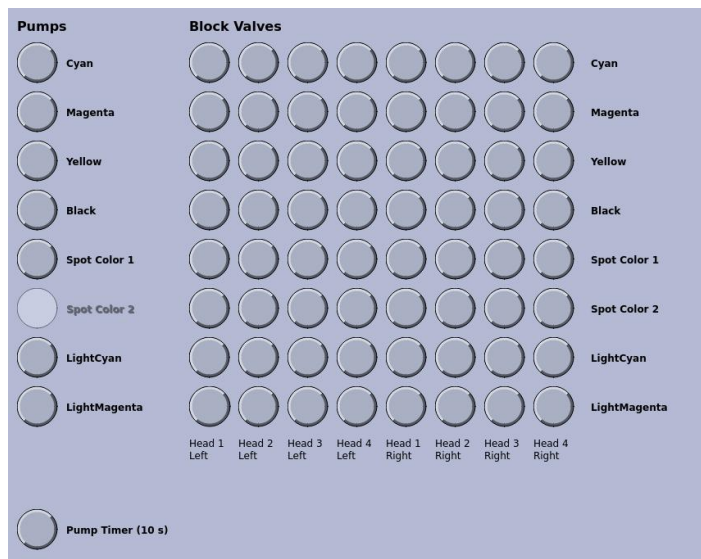


Fig. 9: Pumps and Valves

6. Open the valve on the ink distribution block.
7. Select the Pump Timer (10 seconds).
8. Switch on the pump for the color to be measured.  
The pump will switch off again after 10 s.
9. Check how much ink is in the syringe.
10. Pull the piece of tube off the ink distribution block and reconnect the ink tube.
11. Switch on the ink level.

### 3.10 Pressures

ü The printer must be initialized

1. Select the **Commands** tab.
2. To query the status of lung, meniscus and purge pressure send the serial command  
.10CPS

Response from the printer: .01CPS<purg><men><lung>

purg = 0 -> Purge pressure ok

purg = 1 -> Purge pressure not ok

men = 0 -> Meniscus pressure ok

men = 1 -> Meniscus pressure not ok

lung = 0 -> Lung vacuum ok

lung = 1 -> Lung vacuum not ok

### 3.10.1 Checking the lung vacuum

- ü Pressure gauge (range: 0bar to -1bar)

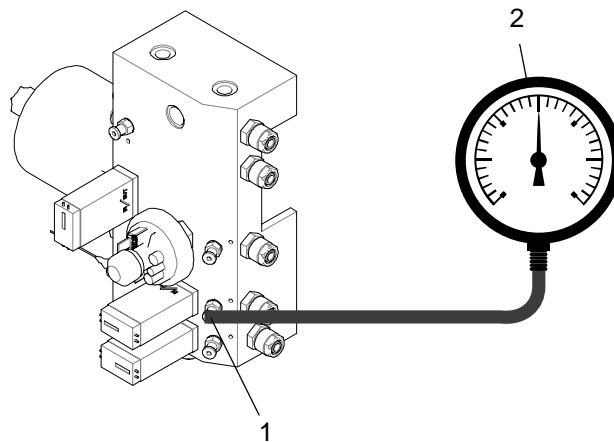


Fig. 10: Checking the lung pressure

- 1 Y2012 – Measuring point for Lung pressure
- 2 Pressure gauge

#### Pressure build-up time

1. Turn off the fuse F1 for the power supply of the pressure control unit.
2. Disconnect the lung pressure supply hose at the lung filter on the print carriage.
3. Wait until the pressure dropped completely.
4. Set the pressure gauge to zero.
5. Connect the pressure gauge to the measuring point for the Lung pressure Y2012 (1).
6. Turn on the fuse F1.  
The lung pump will turn on.
7. Measure the time until the target pressure is reached:  
Lung pressure: = -700 mbar (+0,-100mbar)  
**Time to create vacuum: < 150 s**
8. Disconnect the pressure gauge and close the fitting.

#### Extended leak tightness test

1. Set the pressure gauge to zero.
2. Connect the pressure gauge to the measuring point for the Lung pressure Y2012 (1).
3. Wait until the target pressure is reached.
4. Make sure that the pump does not start up during the test.  
**Pressure drop over 1 h: max. 20 mbar**
5. Disconnect the pressure gauge and close the fitting.

### 3.10.2 Checking the meniscus vacuum

- ü Pressure gauge (range: 0mbar to -20mbar)

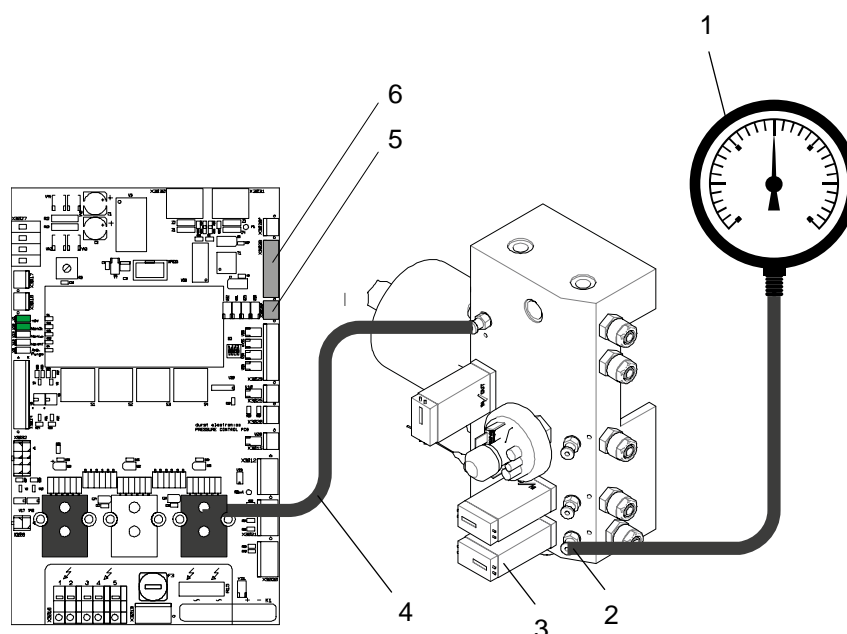


Fig. 11: Checking the meniscus pressure

- |   |   |
|---|---|
| 1 Pressure gauge                            | 4 Pressure line for digital pressure sensor |
| 2 Y2006 - Measuring point for Lung pressure | 5 Connector of meniscus pump X3029          |
| 3 Blow off valve                            | 6 Connector for blow off valve X3028        |

#### Pressure build-up time

1. Set the pressure gauge to zero.
2. Connect the pressure gauge to Y2006 (2).
3. Disconnect the meniscus pump at the connector X3029.
4. Disconnect the meniscus line (4) at the digital pressure sensor.  
The meniscus pressure drops to 0mbar.
5. Reconnect the meniscus line (4) to the digital pressure sensor.
6. Connect the meniscus pump at the connector X3029 and measure the time until the target pressure is reached.


Meniscus pressure:  $-10.5 \pm 0.2$  mbar

**Time to create vacuum: < 25 s**


#### Extended leak tightness test

1. Set the pressure gauge to zero.
2. Connect the pressure gauge to Y2006 (2) at the L-M-P distributor.
3. To disconnect the blow off valve withdraw plug X3028.
4. Create a vacuum of -20 mbar but crushing the hose on the digital pressure sensor (4).  
**Pressure drop over 1 h: max. 1 mbar.**
5. Insert plug X3028 to connect the blow off valve.  
**Time for vacuum to drop to -10.5 mbar: < 150 s**
6. Disconnect the pressure gauge and close the fitting.

### 3.11 UV unit

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

### 3.12 Print head

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

