HSAJET MICRON

USER GUIDE

A guide to operate the HSAJET MICRON controller

Firmware release 2.10

HSAJET MICRON user manual

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Current version numbers

Part / Software	Version / Date	
MICRON Firmware	2.10	10 Oct 2011
Microdraw	1.05	10 Oct 2011

Please also refer to the following

Manual	Purpose
MICRON QUICK START	Getting started with Micron
MICRODRAW USER GUIDE	About design of layouts for the MICRON.
MICRODRAW demo videos	Video demonstrations of MicroDraw. Available online

Table of Content

Introduction

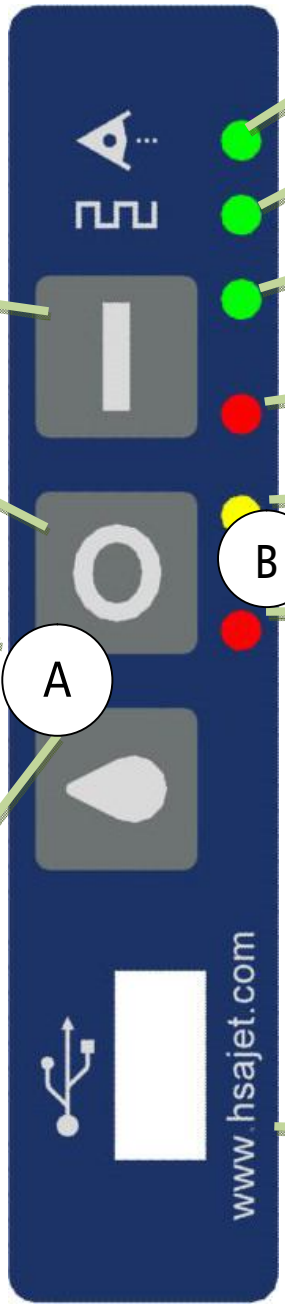
Congratulation on your purchase of the HSAJET MICRON. You have one of the easiest to integrate inkjet controllers available, yet powerful features are available out of the box.

Some features of the MICRON:

- Text, graphics, barcodes, variable counter and dates
- Fully UNICODE compatible layout software
- Counter and dates with digits in roman, arab, farsi or user defined characters
- Built-in sensor
- Support for external sensor and encoder included
- Low ink alarm with user-defineable level
- Print height 12,7mm (1/2" inch)
- User-defined resolution in print direction 75..600 dpi
- Ink reduction 0 to 50% (4 levels) for reduced costs
- Separation between design and operation. Nothing in the layout can be destroyed by the operator.
- Spit function to keep fast drying inks open
- Purge function can be activated remotely using digital input

These features make the MICRON ideal for integration in packaging lines and machines where simple text / date / counter printing is needed, as a replacement for CIJ machines or older date stamping equipment.

Operation



[1] Start sensor. Lit when signal is received

[2] Encoder sensor. Lit when signal is received

[3] SOLID = ON, ready
Blink slow = loading/saving job
Blink fast = adiust start distance

START PRINT button
Long push: Enter start distance mode.
Short: INCREASE start distance

[4] SOLID = PRINT MODE
Blink = confirm load / fault on load

RESET counter button
DECREASE start distance

[5] Confirm reset and
High bit indicator of step distance

A: Photocell adjust mode is entered when holding RESET + PURGE for 3 seconds.
START steps through the step values.

[6] Blink = No cartridge and
Low bit indicator of step distance

PURGE button. Change start distance step.
LED's next to RESET reads step value.

B: step value in start distance adjust, read as binary value.

STEP	YELLOW	RED
1 mm	OFF	OFF
5 mm	OFF	**ON**
25 mm	**ON**	OFF
100 mm	**ON**	**ON**

USB CONNECTOR
Insert stick with layout / clock file here
FAT or FAT32 format only

The MICRON provides signals to end users by LEDs. The meaning of LED signals are explained in the following pages.

Overview of LEDs and function

Function	Sensor (Green)	Encoder (Green)	ON (Green)	Print mode (Red)	Reset (yellow)	Cartridge (Red)
Startup - When machine is turned on *Controller will always try to load USB layout when turned on, thereafter from internal memory.*						
Startup			Blink slow			
Ready to use			Solid			
No layout present on USB			Blink slow	Blinking slow until USB removed, then load from internal memory		
Checksum error on USB			OFF	Blinking fast 2 sec / slow 1 sec until USB removed, then load from internal memory		
No internal layout. Please insert USB			Blink fast	Blink fast until USB is inserted		
Checksum error on internal file			OFF	Blinking Fast 2 sec / slow 1 sec until USB is inserted.		
During ready state (job is loaded) *From ready state, you can start print, reset counters and purge*						
Reset counters			ON		Blink fast 10 sec Press O again before timeout ON 1 second to confirm reset	
At power up (when connecting power cable) *Certain functions are only available while connecting power*						
Update clock file from USB HOLD O	ON Will try for 2 seconds to find clock file	ON Will try for 2 seconds to find clock file				
Update firmware HOLD I and	ON	ON	ON	ON	ON	ON

Function	Sensor (Green)	Encoder (Green)	ON (Green)	Print mode (Red)	Reset (yellow)	Cartridge (Red)
During print mode *In printing only interaction is for the low ink warning. Warning level is user definable in layout file*						
printing			ON	ON		
printing, sensor signal	ON		ON	ON		
printing, encoder signal		ON	ON	ON		
printing, encoder AND sensor signal	ON	ON	ON	ON		
printing but low ink warning			ON	ON	Blink slow until user presses RESET. Continue print and clear warning.	
During start distance setup *Hold START for 3 seconds to enter. Hold START for 3 seconds again to exit with new value. To increment value press START, to decrement press RESET, to change step size press PURGE. With each sensor trigger a vertical bar is printed at "print start" along with a visual readout of the start distance setting.*						
Step = 1 mm			Blink fast	OFF	OFF	Blink slow
Step = 5 mm			Blink fast	OFF	ON	Blink slow
Step = 25 mm			Blink fast	ON	OFF	Blink slow
Step = 100 mm			Blink fast	ON	ON	Blink slow
During internal photocell adjust *Hold RESET + PURGE for 3 seconds to enter. Hold RESET + PURGE for 3 seconds to exit. Press START to step through calibration of photocell. After 2'nd START the calibration is ended.*						
Sense with NO media in front					Blink slow until START	Blink slow Until START
Sense WITH media in front					Blink fast until START	Blink fast until START
Confirm measurement OK						
When cartridge is open (normal or during print) *User can actively reset ink level by pressing RESET within 5 seconds*						
Cartridge open			ON	ON (only printmode)		Blink slow until cartridge back
Cartridge closed again			ON	ON (only printmode)	Blink slow 5 sec Reset inklevel if RESET pressed	ON until timeout or reset
If speed exceeds maximum during print (15 kHz) *No action needed, but print will be stretched proportionally with speed.*						
Excessive speed					ON	
Speed OK					OFF	

USB Functions

Load a layout

When turned on the controller will detect if a USB key is inserted, and load a layout if possible. Otherwise, it will load from internal memory.

To load a new layout do the following:

- ❑ Make sure an ink cartridge is inserted and you are not in print mode.
- ❑ Insert USB stick with layout stored from Microdraw.
- ❑ If a correct layout is found, it will be loaded. Green LED [3] will blink slowly while loading.
- ❑ Once the layout is loaded, the machine will be ready to use. Green LED [3] will become active and constantly lit.

The job is now stored in internal memory, and the USB stick can be removed. You can start print with the new layout.

The layout will be remembered even when you turn off the controller.

Move a layout to another machine

To move a job from one machine to another machine:

- ❑ Insert an empty USB stick into the machine to be copied.
- ❑ After LED's stops blinking move the USB stick to another machine.
- ❑ It may be possible that start distance should be adjusted on the destination machine.

Load and save overview

Micron saves and stores layouts to both USB and internal memory.

For a complete overview of when layouts are stored and where, please refer to the table below:

Scenario			Load/Store job action				
	USB stick present		Load from USB	Load from memory	Store to USB	Store to memory	Error state
	with job	no job					
Boot 1	✓		✓				
Boot 2		✓					✓
Boot 3	No USB stick			✓			
USB remove 1	✓					✓	
USB remove 2		✓		✓			
USB insert, job **different** from loaded	✓		✓				
USB insert, job **same** as loaded	✓						
USB insert **no** job		✓			✓		
Print mode end 1	✓				✓		
Print mode end 2	No USB stick					✓	
Start dist adjust 1	✓				✓		
Start dist adjust 2	No USB stick					✓	

Print operations

Print a layout

To start the print function, press the  button. The red LED [4] will become constantly lit.

Notice: there is a maximum speed limit depending on the resolution set in Microdraw.
If you exceed the speed limit, the yellow led [5] will be lit, and the layout will be stretched. You may continue printing if this is desired (f.ex to get higher speed at same dpi)

While the print function is on, each activation of the product sensor (internal or external) will release one print. At the same time, output 1 is active.

To STOP print function, press the  button again. You can stop at any time, even within a print.

Purge

To purge the printer, press the  button and hold it as long as needed.

Reset counters

It is possible to reset counters to their start value. This is useful for counters that do not automatically reset during print start, example batch counters.

To perform a counter reset

- ❑ Press reset button O
- ❑ Yellow led [5] will blink
- ❑ Press reset button O again within a few seconds to confirm

Change cartridge

Change cartridge when you get a low ink alarm or when ink is empty. You may also take cartridge out to clean it or store for a production stop (prevent dryout)

- ❑ Open green latch
- ❑ Red led [6] will be ON
- ❑ Carefully take out cartridge, backwards then up
- ❑ Insert new cartridge, down then inwards
- ❑ Close green latch
- ❑ If you wish to reset ink level, press O within 5 seconds. Otherwise it will be assumed that you inserted the same cartridge, and ink counter will continue from same value.

Adjust, update and calibrate

Update time of internal clock

The Micron has an internal clock used to print date and time. As it does not know about Daylight Savings Time (where used), it may be necessary to adjust the clock every 6 months.

- ❑ Create a clock file on the USB using MicroDraw (press USB+CLOCK icon). File will be micron.clk
- ❑ Disconnect power from Micron
- ❑ Hold down O
- ❑ Connect power
- ❑ LEDs [1] AND [2] will light constantly while updating clock
- ❑ After updating clock the Micron will start normally

Adjust start distance

Start distance is the distance the product travels from product sensor has been activated until print is started.

This distance is normally set from design software. Typically it is not necessary to set from the controller. If you wish to select start distance anyway (for example, if the designer is far away from you), do the following:

- ❑ Hold the button for 3 seconds
- ❑ The green led [3] will blink fast.
- ❑ For each sensor signal a vertical line of 10 px is printed at current position, along with a readout of current value
- ❑ Press button to INCREASE distance
- ❑ Press button to DECREASE distance
- ❑ Press button to toggle distance step.
- ❑ EXIT setup by holding button 3 seconds again

Calibrate internal photo cell

If you use the internal photo cell, you may need to calibrate for different media. Do the following:

- ❑ Hold and for 3 seconds to enter. Leds [5] and [6] will blink.
- ❑ Remove the media in front of sensor
- ❑ Press
- ❑ Place the media to sense onto in front of sensor
- ❑ Press
- ❑ Test that calibration is OK by passing product by sensor

Update firmware on controller

On rare occasions it may be necessary to update the firmware (internal program) on the controller. Do this ONLY when directed from HSA SYSTEMS.

- ❑ Turn power off
- ❑ Insert USB stick with updated firmware files, as per direction. You need
  micronfp.frm
  and
  micronup.frm
- ❑ Hold  and  while you turn on power.
- ❑ Micron will signal firmware load mode with the 2 red LEDs ON.
- ❑ ALL LEDs will light up after some seconds and will stay ON while loading new firmware.
- ❑ When ALL LEDs turn OFF the update is done (Led [3] may start blinking).
- ❑ Recycle power to Micron to end firmware update.
- ❑ The update process normally takes around 1-2 minutes

Connector Wiring Diagrams

The following pages contain all recommended ways of connecting external equipment to your controller.

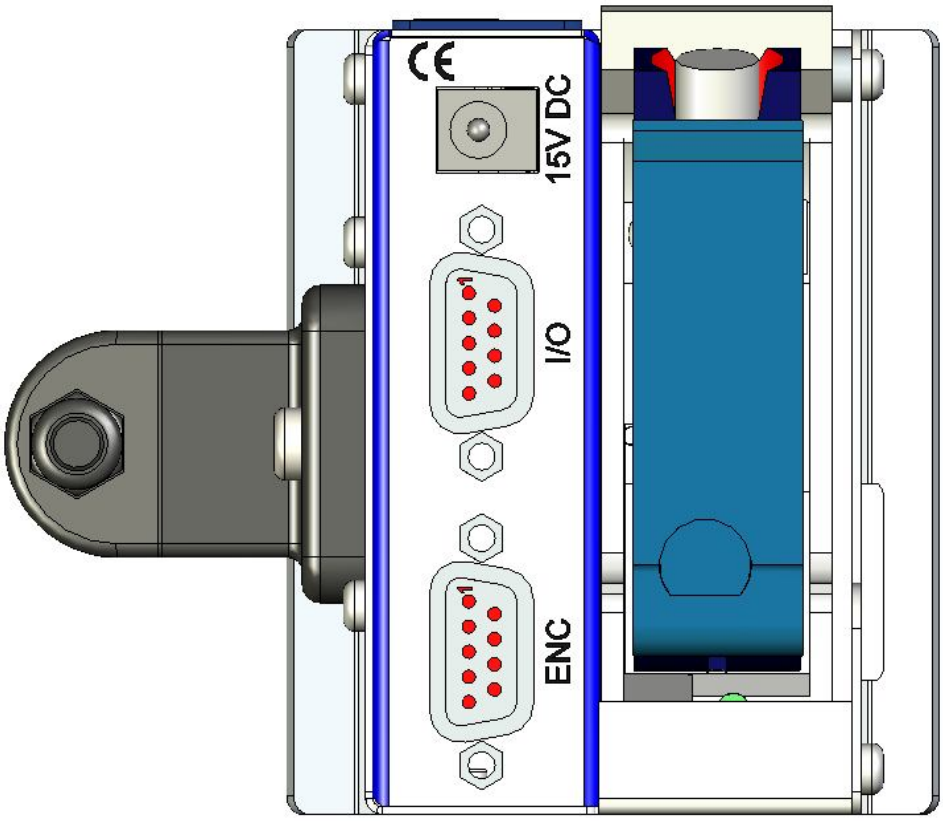
Almost all possible variants of encoders and sensors are supported.

Please ask if you are in doubt about how to wire connectors. Failure to wire correctly may damage your controller.

Connector overview

The Micron has 3 connectors:

- Power, 15 VDC
- I/O for external start switch and 2 input and 2 output
- Encoder



Fuses

The Micron has 2 fuses, both are located inside the unit.

- F1 is for the USB port the type is 0,5A SMD Fast acting.
- F2 is the main power fuse the type is 1A SMD Fast acting.

If there is no reaction at all when you turn on the unit please check these fuses.

You can buy the fuses from HSA or locally, if you choose locally make sure you get the right fuses, warranty does not cover replacement of burned PCB's because of wrong fuses.

Part number:

HSA	Farnell	Mouser
ACEL-Fuse-0,5A-SMD	9922156	576-0451.500MRL
ACEL-Fuse-1A-SMD	9922164	576-0451001.MRL

I/O connector

Main function for this connector is to provide the start signal, to begin print. In the same connector are also additional inputs as well as 2 output signals. It is located in the back of the printer, as a 9-pin female D-SUB connector.

- Output 1 = Active low in Print mode (open collector)
- Output 2 = Active low on low ink warning (open collector)
- Input 1 = Print start/stop negative edge trigger toggle function (trigger signal min. 50 mSec.)
- Input 2 = Purge active low level trigger

If the external sensor is enabled in the layout, you will not get a print without proper wiring of this connector.

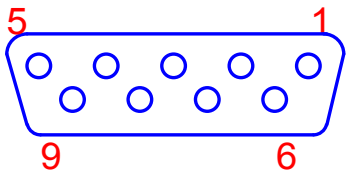
You can use either a simple mechanical switch or a photo cell for the start signal. The I/O connector can supply 5V and **15V** DC for the sensor but you can use any sensor in the 3-33V range if you connect an external power source.

You can buy an I/O-ENC test box set from HSA which enables you to test:

- I/O connector - Input 1, Input 2, Output 1, Output 2, Start signal input, 5V and 12V on the I/O connector and an adjustable automatically continuous start signal is available.
- Encoder connector - Enc A & Enc B channels, Low ink, 5V and 12V and an automatically continuous encoder pulse generator is available.

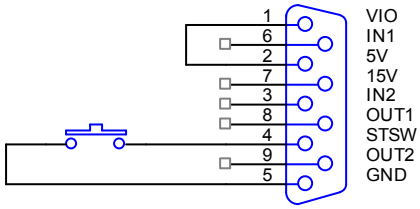
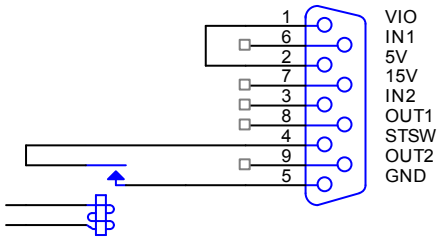
Part number:

HSA	Product category
I/O-ENC test box set	Electric spare parts

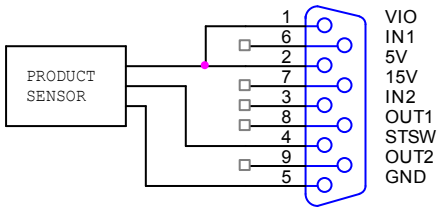
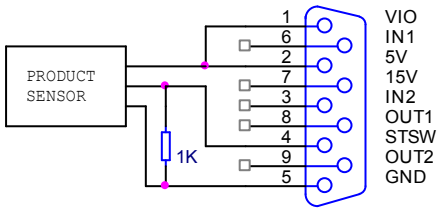


PIN	MEANING
1	V I/O
2	5 V
3	IN 2 - Purge
4	START
5	GND
6	IN 1 – Print start/stop
7	15 V
8	OUT 1 - Active low in print mode
9	OUT 2 - Active low on ink low warning

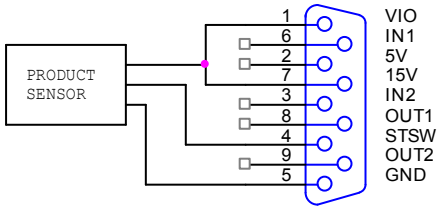
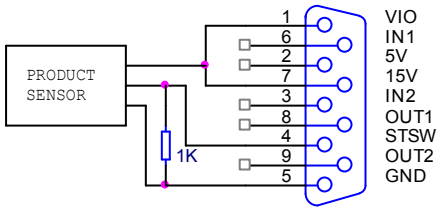
Mechanical start switch

	Pushbutton Loop pins 1-2 and connect the switch between pins 4 and 5 N/O contact setup layout to negative edge trigger N/C contact setup layout to positive edge trigger
	Relay Loop pins 1-2 and connect the switch between pins 4 and 5 N/O contact setup layout to negative edge trigger N/C contact setup layout to positive edge trigger

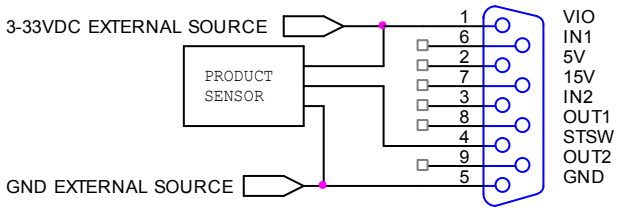
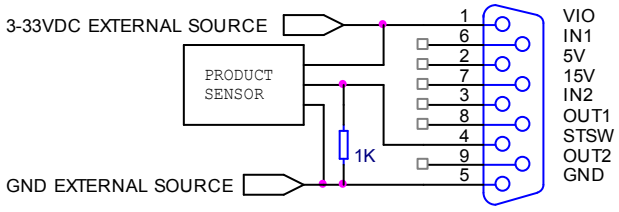
5V DC Sensor

	5 Volt NPN or PUSH/PULL sensor VCC to pins 1,2 Signal to pin 4 GND to pin 5
	5 Volt PNP sensor VCC to pins 1,2 Signal to pin 4 GND to pin 5 1 K resistor between pin 4 and 5

15V DC Sensor

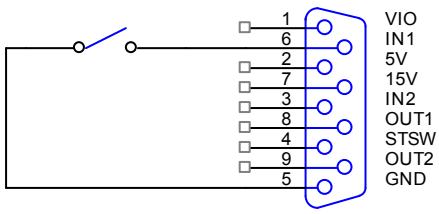
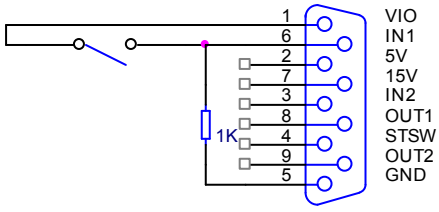
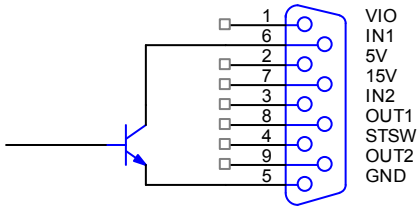
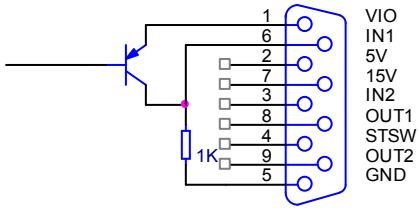
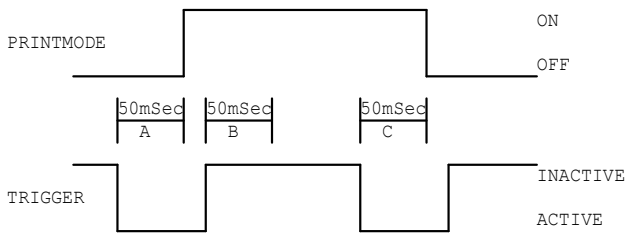
	15 Volt NPN or PUSH/PULL sensor VCC to pins 1,7 Signal to pin 4 GND to pin 5
	15 Volt PNP sensor VCC to pins 1,7 Signal to pin 4 GND to pin 5 1 K resistor between pin 4 and 5

3-33V DC Sensor with external power source

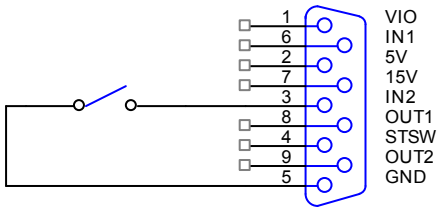
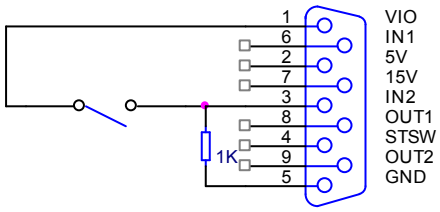
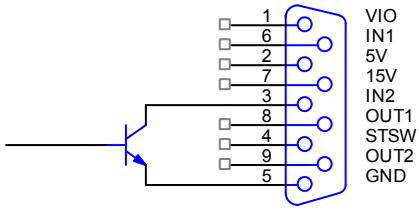
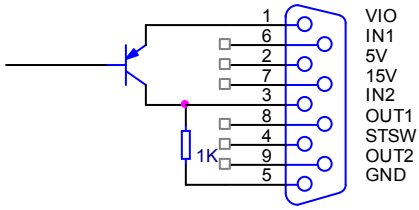
	NPN or PUSH/PULL sensor VCC to pin 1 Signal to pin 4 GND to pin 5
	PNP sensor VCC to pin 1 Signal to pin 4 GND to pin 5 1 K resistor between pin 4 and 5

Using inputs and outputs

Input 1 – Print start/stop negative edge trigger toggle function

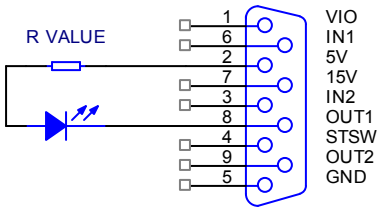
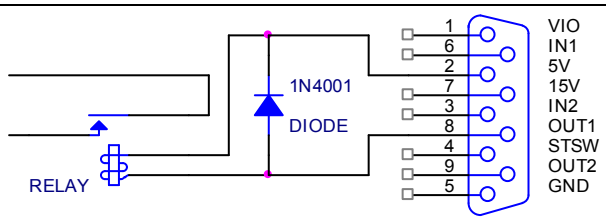
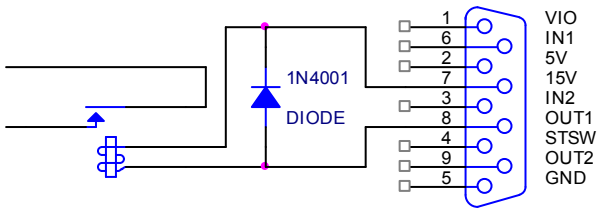
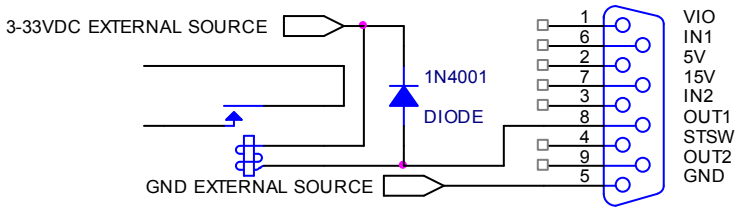
	N/O normal open mechanical switch or relay Connect the switch between pins 6 and 5
	N/C normal closed mechanical switch or relay Connect the switch between pins 1 and 6 1 K resistor between pin 6 and 5
	NPN or PUSH/PULL output trigger Signal to pin 6 GND to pin 5
	PNP output trigger VCC to pin 1 Signal to pin 6 1 K resistor between pin 6 and 5
	Signal timing and function The trigger signal must be at least 50 mSec for the input to toggle print mode start/stop. A = Trigger pulse >50mSec B = Locked period 50mSec after trigger is released, printing cannot be disabled in this period C = Trigger pulse >50mSec

Input 2 – Purge active low level trigger

	N/O normal open mechanical switch or relay Connect the switch between pins 3 and 5
	N/C normal closed mechanical switch or relay Connect the switch between pins 1 and 3 1 K resistor between pin 3 and 5
	NPN or PUSH/PULL output trigger Signal to pin 3 GND to pin 5
	PNP output trigger VCC to pin 1 Signal to pin 3 1 K resistor between pin 3 and 5

Output 1 = Active low in Print mode (open collector)

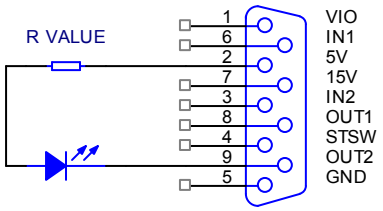
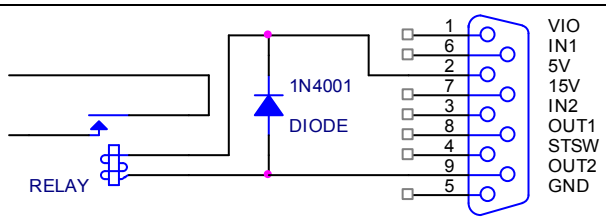
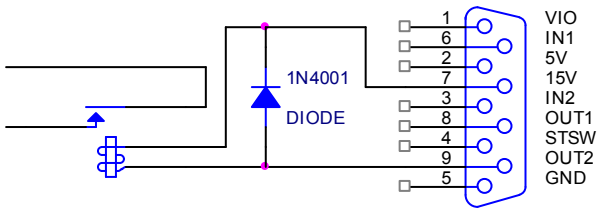
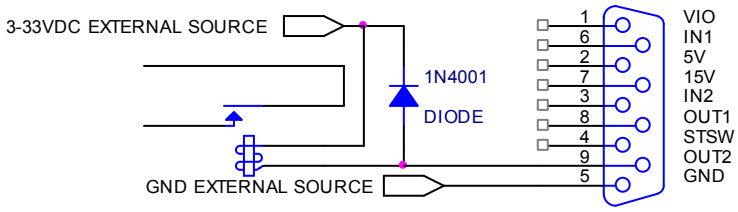
> Warning: Do not connect a relay with a higher voltage than the voltage already connected to the VIO pin1 you will damage the unit.

	LED indicator Connect the components between pins 2 and 8 The R value can be calculated using the equation below $R = \frac{5 - Ud}{Id}$ Where Ud is diode voltage and Id is diode current
	5V DC relay Connect the relay coil between pins 2 and 8 Some relays have a built in diode, if not please also mount the protection diode on the coil connections.
	15V DC relay Connect the relay coil between pins 7 and 8 Some relays have a built in diode, if not please also mount the protection diode on the coil connections.
	3-33V DC relay with external power source Connect the relay coil between external VCC and pin 8 Connect external GND to pin 5 Some relays have a built in diode, if not please also mount the protection diode on the coil connections.

> Warning: Do not connect a relay with a higher voltage than the voltage already connected to the VIO pin1 you will damage the unit.

Output 2 = Active low on low ink warning (open collector)

> Warning: Do not connect a relay with a higher voltage than the voltage already connected to the VIO pin1 you will damage the unit.

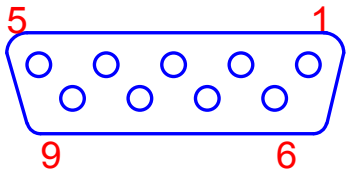
	LED indicator Connect the components between pins 2 and 9 The R value can be calculated using the equation below $R = \frac{5 - Ud}{Id}$ Where Ud is diode voltage and Id is diode current
	5V DC relay Connect the relay coil between pins 2 and 9 Some relays have a built in diode, if not please also mount the protection diode on the coil connections.
	15V DC relay Connect the relay coil between pins 7 and 9 Some relays have a built in diode, if not please also mount the protection diode on the coil connections.
	3-33V DC relay with external power source Connect the relay coil between external VCC and pin 9 Connect external GND to pin 5 Some relays have a built in diode, if not please also mount the protection diode on the coil connections.

> Warning: Do not connect a relay with a higher voltage than the voltage already connected to the VIO pin1 you will damage the unit.

Encoder port wiring

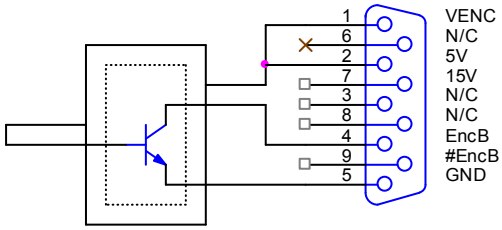
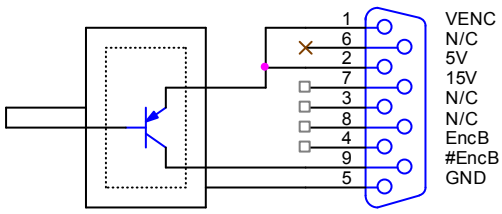
This connector is where the signals for the encoder are coming in.

The encoder connector can supply 5V and 15V DC for the encoder but you can use any encoder in the 3-33V range if you connect an external power source.

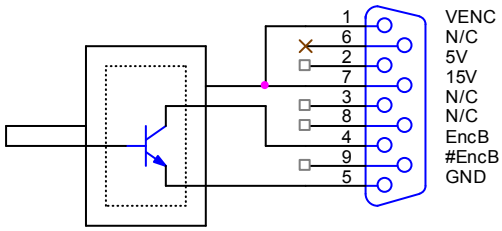
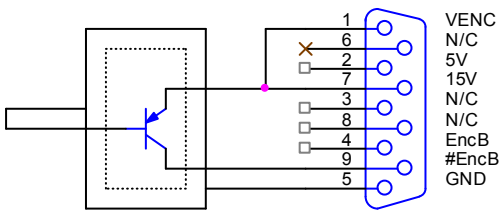


PIN	MEANING
1	V ENC
2	5 V
3	Not used
4	EncB
5	GND
6	Not used
7	15 V
8	Not used
9	/EncB

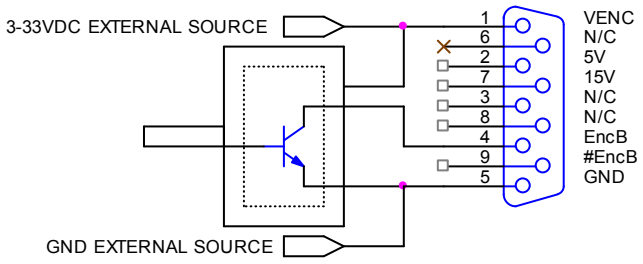
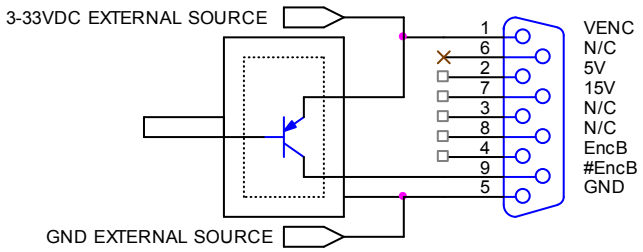
5V DC Encoder

	5V DC NPN or PUSH/PULL VCC to pins 1, 2 Signal to pin 4 GND to pin 5
	5V DC PNP VCC to pins 1, 2 Signal to pin 9 GND to pin 5

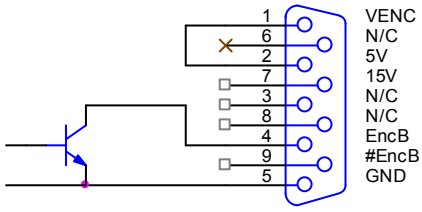
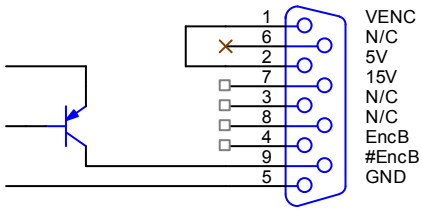
15V DC Encoder

	15V DC NPN or PUSH/PULL VCC to pins 1, 7 Signal to pin 4 GND to pin 5
	15V DC PNP VCC to pins 1, 7 Signal to pin 9 GND to pin 5

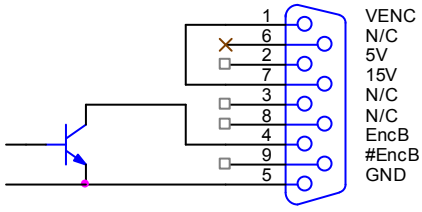
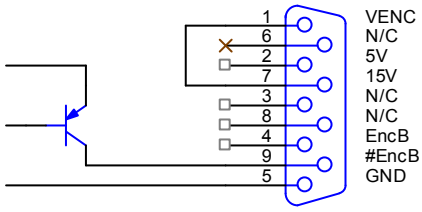
3-33V DC Encoder with external power source

	3-33V DC NPN or PUSH/PULL with external power source VCC to pin 1 Signal to pin 4 GND to pin 5
	3-33V DC PNP with external power source VCC to pin 1 Signal to pin 9 GND to pin 5

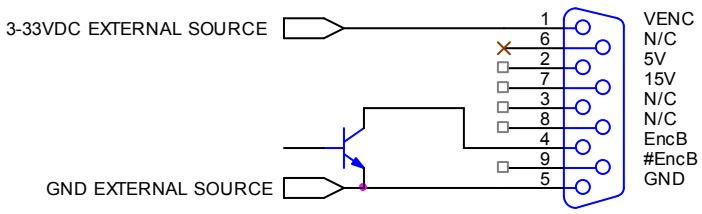
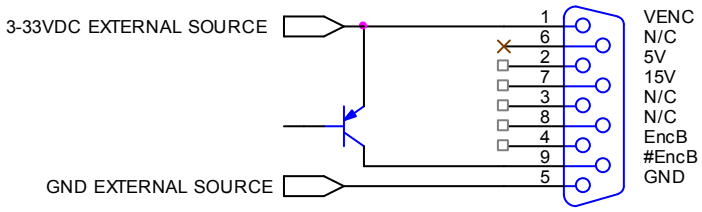
5V DC simulated encoder with external power source

	5V DC NPN or PUSH/PULL with external power source Loop pins 1-2 Signal to pin 4 GND to pin 5
	5V DC PNP with external power source Loop pins 1-2 Signal to pin 9 GND to pin 5

15V DC simulated encoder with external power source

	15V DC NPN or PUSH/PULL with external power source Loop pins 1-7 Signal to pin 4 GND to pin 5
	15V DC PNP with external power source Loop pins 1-7 Signal to pin 9 GND to pin 5

3-33V DC simulated encoder with external power source

	3-33V DC NPN or PUSH/PULL with external power source VCC to pin 1 Signal to pin 4 GND to pin 5
	3-33V DC PNP with external power source VCC to pin 1 Signal to pin 9 GND to pin 5

Support

EC Declaration of conformity

EC Declaration of Conformity

Manufacturer:

Company Name:	HSA Systems ApS
Address:	Mileparken 16
	DK 2740 Skovlunde
	Denmark
Tel	+45 44 94 02 22
Fax	+45 44 94 03 33

hereby declare that

Product

No.	MCHP
Name:	MCHP
Year:	2011

- is in conformity with

- COUNCIL DIRECTIVE of 3 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility (89/336/EEC)

- COUNCIL DIRECTIVE of 19 February 1973 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits (73/23/EEC)

was manufactured in conformity with the following national standards that implements a harmonised standard:

EN 50081-1
Electromagnetic compability - generic emission standard. Part 1: Residential, commercial and light industry.
EN 50081-2
Electromagnetic compability - generic emission standard. Part 2: Industrial environment.
EN 50082-1
Electromagnetic compability - generic immunity standard. Part 1: Residential, commercial and light industry.
EN 50082-2
Electromagnetic compability - generic immunity standard. Part 2: Industrial environment.
EN 55022
Limits and methods of measurement of radio disturbance characteristics of information technology equipment.
EN 60555-2
Disturbances in supply systems caused by household appliances and similar electrical equipment - Part 2: harmonics.
EN 60555-3
Disturbances in supply systems caused by household appliances and similar electrical equipment - Part 3: voltage fluctuations.
EN 60950
Safety of information technology equipment including electrical business equipment.

Position: Manager

Company: HSA Systems ApS

Name: Per Sørensen

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DK-2740 Skovlunde
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www.hsasystems.com

Support contact

For support on the MICRON please contact your local distributor.

Manufacturer: