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DieMark Electric Inker Controller 350-0028 User Guide 820-0338

Overview

The 350-0028 Electric Inker Controller is designed to power a Xandex Electric Inker. It is intended for uses where a wafer prober or other actuation signal is not present or is not configured to drive the actuator.

Note: For Electric Inker operation instructions, see Xandex manual 820-0325 at:

<https://www.xandexsemi.com/products/manuals.html>

The unit is powered by an external 24VDC power supply and automatically detects the actuator upon the first triggered pulse after power up. It then sets the output signal to either 24V or 48V depending on the actuator coil detected. The output signal can be triggered by a wafer prober signal, a foot / hand switch, or serial data commands. The input signal is received by a microcontroller unit (MCU) and a programmable duty cycle pulse is generated at the required coil voltage level. The default controller cycle on-time is 17ms with 150ms off-time, this allows for placement of up to 6 dots per second. The controller can also be programmed and triggered by sending USB serial commands from a PC. See Table 5 for a list of the programmable commands.

Controls, Ports, and Indicator LEDs

Table 1. Controls, Ports and LEDs

ID	Control / Port / Indicator	Description
1	Power Switch - Control	Turns power On/Off.
2	+24VDC Power Input Port	Connect 24V power supply with 2.5mm X 5.5mm barrel connector with positive center to +24VDC power in, connect power cord to power brick and to AC outlet.
3	Signal – Input Signal Port	Xandex type C cable attached to a prober, or a Xandex 350-0010 foot switch. Plug prober or foot switch into Signal jack.
4	Switch – Input Signal Port	Plug switch with 1/8 inch / 3.5mm TS Mono connector into Switch jack.
5	USB-C – Input Signal Port	Plug into PC to send commands from a serial terminal. Set to 115200 baud, 8N1. See Table 5. USB C port is data only, no power capability.
6	Inker – Output Signal Port	Connect Xandex Electric Inker Actuator equipped with a Type C cable connector.
7	Left Status LED Indicator	Dot mode status. See Table 2.
8	Right Status LED Indicator	Voltage mode status See Table 3.

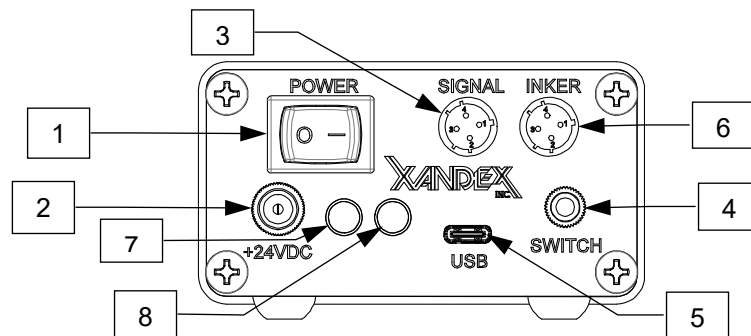


Figure 1. Controls, Ports and LEDs

Left LED Status Indicator

The Left Status LED flashes every time a dot pulse is generated. The LED color indicates the source of the last pulse. Green is the default color displayed on unit power up.

Table 2. Left LED Status

LED Color	Status Description
GREEN	Dot was triggered by an external switch connected to the "SWITCH" port or a DieMark foot switch connected to the "SIGNAL" PORT. This is the default LED color displayed when unit is powered up.
MAGENTA	Dot trigger was from a serial 'D' command. See Table 5 for Serial Command List and programing instructions
TEAL	Dot trigger was from a prober signal or a serial 'T' command. See Table 5 for Serial Command List and Programing instructions

Right LED Status Indicator

The Right Status LED color indicates the current Voltage mode setting.

Table 3. Right LED Status

LED Color	Status Description
BLUE	Indicates 24V actuator coil mode.
YELLOW	Indicates 48V actuator coil mode.
RED	Indicates an error condition. Turn power off for 10 seconds and then turn back on. If the LED stays red, check the actuator, it may be disconnected, shorted or otherwise damaged. See the Troubleshooting section for more information.

Troubleshoot

Table 4. Troubleshooting LEDs

Problem	Solution
Right Status LED blinks RED one or more times	<ol style="list-style-type: none"> 1. Check that external power supply is plugged in to 100/120/220/240 Volts AC @ 50/60 Hz and connected to +24VDC port. 2. Check that the power switch is turned ON. 3. Check that actuator is attached to INKER output port.
Right Status LED still Red	<ol style="list-style-type: none"> 1. If USB port is being used, unplug USB cable and turn off power switch. Wait 10 seconds, turn power back on and then reconnect USB cable.
No LEDs on, Right Status LED flashes on then off	<ol style="list-style-type: none"> 1. Check that the external power supply is connected. 2. Check that the power switch is turned on.
USB not detected by Windows 7	<ol style="list-style-type: none"> 1. Try installing Adafruit Feather M0 driver: https://learn.adafruit.com/adafruit-arduino-ide-setup/windows-driver-installation 2. MacOS and Linux do not require drivers. 3. For Windows 10 and 11 the drivers should be included (only Windows 7 may need the driver in item 2 installed).

Serial Command Programming Reference

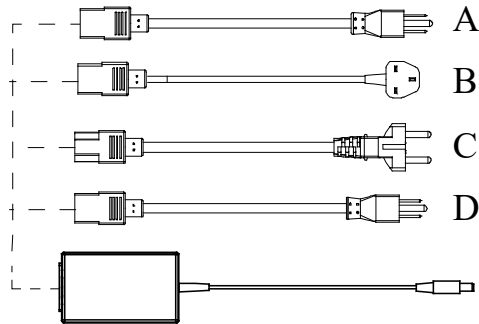
The Electric Inker Controller can be controlled / programmed by sending serial commands from a PC. This can be done using a terminal program such as Tera Term, or custom programs written in LabVIEW or other languages. Set the connection for 115200 baud, 8N1. Default On / Off times are set to 17ms on 150ms off. Xandex coils are in the fully down position within 10-12ms of signal application. Depending on inking needs the ON time can be adjusted to stay ON up to 50ms. OFF time is the time until another signal can be sent. The minimum OFF time should be 5x the ON time, providing a maximum duty cycle of 20%.

Table 5. Serial Command List

COMMAND	SHORT DESCRIPTION	FULL DESCRIPTION
I	Identify device	The I command reports information about the firmware, this could be used when making a custom program, it could be called and checked to make sure you are communicating with the expected device.
H	Help	The H command shows the serial commands in the terminal.
C	Count display	The C command shows the Dot Count.
L	List current settings	The L command will display the current settings.
T	Trigger single dot	The T command will send a single dot pulse.
D#####	Dots to run	The D command followed by an integer 1 to 99999 will start a sequence of pulses. Once a D command is sent, any further commands sent should halt the dot sequence, otherwise it will continue sending dot pulses until the dot count is reached. The pushbutton can also be used to halt the dot sequence.
O##	Ontime set (5-50ms)	The O command followed by a number from 5 to 50 will set the On time.
F###	oFftime set (100-995ms)	The F command followed by a number of 100 to 995 will set the Off time.
R	Reset dot count to 0	The R command resets the Dot Count to 0.
S	Set settings to factory defaults	The S command will reset the settings to the factory default settings.
V	Voltage display	The V command will show the actuator voltage being measured by the MCU. This would likely be between 22V and 24V or 46V and 48V depending on the actuator connected. If outside of this range, there could be something wrong with the actuator, such as a short, an open or not connected.
2	24V on	The 2 command sets the output pulse voltage mode to 24V. Used with the M command to set Voltage mode manually.
4	48V on	The 4 command sets the output pulse voltage mode to 24V. Used with the M command to set Voltage mode manually.
A	Auto Voltage mode	The A command turns on the Auto Voltage mode.
M	Manual Voltage mode	The M command turns the Auto Voltage mode off. When in this mode the voltage mode can be set by sending a “2” command to turn the 24V mode on, or “4” command to turn 48V mode on.

AC Power Cable

One (1) AC power cable for the 24V Power Supply is shipped with each Electric Controller. Specify at ordering.

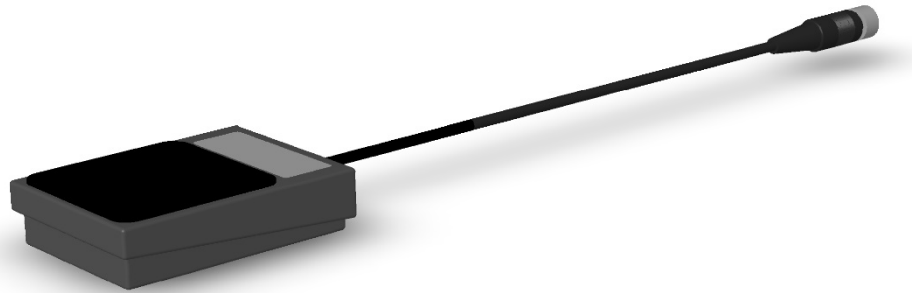


- A. AC Power Cord (USA)
Part No. 158-0051
- B. AC Power Cord (UK)
Part No. 158-0408
- C. AC Power Cord (Europe)
Part No. 158-0407
- D. AC Power Cord (PSE-Japan)
Part No. 158-0727

Options

Foot Switch Option

An optional foot switch is available with a Xandex Type C connector that connects to the Signal port. The foot switch will initiate an “ink” signal to the Inker port each time it is depressed. The foot switch cable is 72 inches (1.8 meters) long.



Order Part Number 350-0010.

The Switch port on the controller is intended for use with a hand switch (not supplied or available through Xandex). There are many options available and preferences (size, color, etc.) vary. Purchase a switch with a 1/8 inch / 3.5mm TS Mono connector for use with this port.

The foot switch and hand switch can be connected and used at the same time to accommodate individual user needs.

Signal Connector Options

The Signal port can be connected to a wafer prober or other wafer inking / inspection equipment that outputs an “Ink” signal. The Electric Controller will then output either a 24VDC or 48VDC signal (dependent on inker coil voltage) to the DieMark Inker connected to the Inker port. The output signal from the Electric Controller will either use the default ON / OFF time, or the ON time programmed into the Controller via serial programming.

Xandex has several optional cable assemblies to connect between the Controller’s Signal port, which has a Xandex Type C connector, and the inker port on common wafer probers. The list includes a cable with a Xandex Type C connector (for connection to the Signal port) that is unterminated on the other end for addition of a user specific connector. All cables are 72 inches (1.8 meters) long. See Table 6.

If you need a custom cable not listed in the table, contact Xandex Customer Service.

Table 6. Optional 72 Inch Signal Port Cables

SIGNAL PORT CONNECTOR	PROBER SIDE CONNECTOR	ORDER CABLE PART NUMBER
 <p>Xandex Type "C" Hirose 4 Pin Connector</p>	 <p>Xandex Type "A" Winchester Miniature 4 Pin Connector EG, PWS, R&K, Teradyne & LTX Lasers</p>	<p>210-0109 A-C Cable</p>
 <p>Xandex Type "C" Hirose 4 Pin Connector</p>	 <p>Xandex Type "C" Hirose 4 Pin Connector KLA</p>	<p>210-0110 C-C Cable</p>
 <p>Xandex Type "C" Hirose 4 Pin Connector</p>	 <p>Xandex Type "J" Hirose 5 Pin Bayonet Connector TSK / ACCRETECH</p>	<p>210-0114 J-C Cable</p>
 <p>Xandex Type "C" Hirose 4 Pin Connector</p>	 <p>Xandex Type P8 TEL P8, P12 Hirose 5 Pin Connector</p>	<p>210-0120 P8-C Cable</p>
 <p>Xandex Type "C" Hirose 4 Pin Connector</p>	<p>Unterminated, 2 wires</p>	<p>210-0113 C Cable</p>

Specifications

Size:	5.11.8" L x 3.425" W x 1.855" H (130.00mm x 87.00mm x 47.12mm)	
Weight: (Controller + Power Supply)	1.72 lbs (780 g)	
Input Power Requirement:	24V $\overline{=}$ (VDC)	
Power Supply Requirement:	100/120/220/240 Volts AC @ 50/60 Hz 60W	
Foot Switch Input:	Contact Closure >20msec <1mA 2.7VDC-3.6VDC	
Secondary Switch Input:	Contact Closure >20msec <1mA 2.7VDC-3.6VDC	
On-Time Range:	5-50ms	
Cycle Rate:	Exceeds 300 cycles/minute	
Coil Output:	24V \pm 2.0VDC or 48V \pm 2.0VDC Designed to work with Xandex DieMark Actuators	
Prober Input:	12 - 60 volts @ minimum 30 ms pulse width. The input circuit presents approximately 1 K Ω - 700 Ω input resistance. Typical current as a function of input voltage is listed in the following table:	
	15 V	25 mA
	20 V	45 mA
	40 V	65 mA
	60 V	85 mA (Maximum input)
Environmental Range:	<ul style="list-style-type: none"> • Indoor use • Altitude up to 2,000 m • Temperature range 5° C to 40° C • Maximum relative humidity 80 % for temperatures up to 31°C decreasing linearly to 50 % relative humidity at 40 °C 	
ESD Immunity:	IEC 61000-4-2 level 1	

**Xandex
DieMark
Limited
Warranty**

All material supplied will conform to the description stated. All products will be free of defects in materials and workmanship under normal use for the following periods:

Stated shelf life of DM-1, DM-1.25, DM-S Ink Cartridges:

- ◆ 6990, 6993, 6997 = Four (4) months. Five (5) days after cartridge opening
- ◆ 8103 and 8104 (except for 8103 White) = Four (4) months. Two (2) days after cartridge opening.
- ◆ 8103 White = Two (2) months. Two (2) days after cartridge opening.
- ◆ 7824 and 7824T = Four (4) months. Three (3) days after cartridge opening.

Electric Controller = One (1) year when product is installed and operated per manufacturer's recommendations and instructions.

Ninety (90) days from the date of delivery to the customer for all other products.

Xandex makes no other warranty, express or implied, including without limitation any warranty of merchantability or of fitness for a particular purpose. Customer, OEM or Distributor's exclusive warranty shall be, at Xandex's option, to have defective product repaired or replaced, or to receive a refund of purchase price.

Xandex may, upon request, furnish to buyer such technical advice, as it may be able to supply with reference to the use by buyer of any materials delivered. Xandex assumes no liability for the advice given or results obtained. Buyer expressly agrees that it will implement any advice thus given at its own risk and agrees to indemnify and hold Xandex harmless against any liabilities, costs or expense resulting therefrom. Xandex makes no warranty for performance, service, or support of any products unless they are purchased directly from Xandex or through an authorized Xandex Distributor.

Exclusions: This warranty shall not apply to defects or damage resulting from;

- Improper or inadequate maintenance by customer, including failure to perform preventive maintenance per manufacturer's specified schedule
- Misuse or unauthorized modification
- Operation outside the environmental specifications for the product
- Improper site preparation and maintenance

Some states and provinces do not allow limitations on how long an implied warranty lasts, so the limitation or exclusion contained in this warranty may not apply to you. However, any implied warranty of merchantability or fitness is limited to the duration period of this written warranty. If you have any questions or need further assistance, please contact your authorized Xandex distributor or contact our Customer Service Group.

Xandex Customer Service: 1360 Redwood Way, Suite A
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