



The Citronix ciSeries



Technical Service Manual

Revision 1.11
Firmware Version 5.XXx
Part Number: 012-1002-005



ciSeries Technical Service Manual

This manual explains how to install, program, replace components, service the machine and perform in depth troubleshooting for the Citronix ciSeries Continuous Ink Jet Systems.

To the best of our knowledge, the information contained in this manual was correct at the time of printing. However, continual enhancement of our products can result in some differences between instructions represented in this manual and your ciSeries System.

Citronix and Codes of Excellence are trademarks of Citronix.

This guide was written by:

Citronix
Fort Worth, Texas 76140
USA

www.citronix.com
info@citronix.com

© Copyright Citronix 2003 - 2009

All rights reserved. Reproducing this publication in whole or in part without written permission is expressly prohibited.



DECLARATION of CONFORMITY

We: Citronix

Located at: 3030 SE Loop 820
Fort Worth, Texas 76140
Tel: 817.568.9800
Fax: 817.568.1970
Email: info@citronix.com

Declare under sole responsibility that the product identified herein, has been designed, manufactured and tested in accordance to the following European Council Directives:

EN 61000-6-4:2001 Electromagnetic Compatibility (EMC). Generic Standards. Emission standard for industrial environments.
EN61000-6-2:2001 Electromagnetic Compatibility (EMC). Generic Standards. Immunity Standard for industrial environments.
EN55022-1 1998 Class A: Electromagnetic Compatibility (Radiated)
EN60204-1:1998 Safety of Machinery – Electrical Equipment of Machines. General Requirements.
EN60950:2000 Safety of Information Technology Equipment.
73/23/EEC: Low Voltage Directive as amended by 93/68/EEC and 2006/95/EEC
89/336/EEC: EMC Directive as amended by 92/31/EEC, 93/68/EEC and 2004/108/EEC

Each Product marketed, is identical to the representative unit tested and found to be with the standards.

Trade Name:	Citronix
Type of Product:	Ink Jet Printing System
Model:	ci500, ci580, ci700, ci1000, ci2000

Fort Worth, Texas USA, 2008-12-12

Original signed and available from local distributor

Richard Fox
President



ciSeries Technical Service Manual

Marking form for the name of the contents and its concentration of toxic and hazardous substances or elements (Table 1)

(In accordance with SJ/T 11364 –2006)

Citronix has verified this product against the requirements of China Ministry of Information Industry, Order No 39 and has established that at the time of printing of this document, that there are certain items specified by the part numbers given in the table below, which have a concentration of one or more of the listed toxic or hazardous substances or elements specified in Order 39.

Component or Assembly part number	Hazardous Substances or Elements					
	Lead (Pb)	Cadmium (Cd)	Mercury (Hg)	Chromium VI Compounds (CR ⁶⁺)	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
PCB, CPU 004-2004-001 004-2005-001 004-2008-001	X	O	O	O	O	O
PCB, Phase Assy. 002-1073-002	X	O	O	O	O	O

Table 1

The presence of an “X” symbol in Table 1, indicates that one or more of the assemblies nominated in Table 1 above, contains a toxic and hazardous substance or element at a level which is above the limits specified in China EIP Standard SJ/T 11363 - 2006.

When an “O” symbol is shown in any of the columns, this indicates that the particular substance or element is below the limits specified in China EIP standard SJ/T 11363 – 2006.

Signed

****Original signed and available from local distributor****

Richard Fox
President
Citronix

Signature Dated 27 December 2006



有毒有害物质或元素名称及含量标识样式（表1）

（依照SJ/T 11364 - 2006标准）

Citronix_已查证过此产品不符合中华人民共和国信息产业部第39号令，此声明文件认定在以下表格中所列零件号指明的组件存在第39号令中所规定的一种或多种有毒有害物质或元素的含量。

部件名称 或 装配零件号码	有毒有害物质或元素					
	铅 (Pb)	镉 (Cd)	汞 (Hg)	六价铬 (CR6+)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
PCB, CPU 004-2004-001 004-2005-001 004-2008-001	X	0	0	0	0	0
PCB, Phase Assy. 002-1073-002	X	0	0	0	0	0

表格1

表1中标注为“X”，表示在以上表格1中的一种或多种指定组件含有的有毒有害物质或元素含量超出中国电子信息产品标准SJ/T 11363 - 2006规定的限量要求。

当任何一列中标注为“0”，表示该种有毒有害物质或元素的含量在中国电子信息产品标准SJ/T 11363-2006规定的限量要求以下。

Signed

****Original signed and available from local distributor****

Richard Fox
President
Citronix

Signature dated 27 December 2006



ciSeries Technical Service Manual

Technical Service Manual Owner's Record

Manual Owner: _____

Date of Citronix Qualification: _____

Company: _____

Telephone: _____

Email: _____

Date Received: _____

Manual Update/Technical Bulletins
(Bulletins should be located in the last section of this manual):

Date of Update	Title of Technical Bulletin



Table of Contents

Section	Description	Page
Section 1	General Information	9
	1.1 Welcome to the Citronix ciSeries System	
	1.2 Before Using this Manual	
	1.3 Safety Information	
Section 2	ciSeries System Specification and Capabilities	11
	2.1 ciSeries Controller	
	2.2 ciSeries Printhead	
	2.3 Consumable and Delivery	
	2.4 ciSeries Controller and Printhead Physical Characteristics	
	2.5 Print Speeds and Print Quality Charts	
	2.6 Dimension Drawings – ciSeries Controllers	
	2.7 Dimension Drawings – ciSeries Printheads	
Section 3	System Installation	27
	3.1 Installation Checklist	
	3.2 Mounting	
	3.3 Commission a ciSeries System	
	3.4 Connecting Peripherals and Communications	
	3.5 Connecting Power	
Section 4	System Operation	34
	4.1 Turning Power On / Off	
	4.2 Starting the Jet	
	4.3 Selecting a Print Message	
	4.4 Add Ink and Makeup Safety	
	4.5 Add Ink and Makeup	
	4.6 Shutting the System Down	
Section 5	Programming	39
	5.1 The Keyboard and Display	
	5.2 The Main Screen Display	
	5.3 Menu Operation	
	5.4 System Properties	
	5.5 Creating and Editing Messages	
	5.6 Graphic Editor	
	5.7 System Status Screen	
	5.8 Help Screen	
	5.9 System Error Screens	
	5.10 Service Screens and Settings	
	5.11 Remote Communications	



Section 6	Languages and Alternate Fonts	95
6.1	Alternate Fonts	
6.2	Keyboard Swap	
6.3	PINYIN (Simplified Chinese)	
Section 7	Cleaning and Maintenance	106
7.1	Maintenance Chart	
7.2	Check and Clean the Printhead	
7.3	Backflush Routine	
7.4	Clean Controller, Umbilical and Printhead Enclosures	
7.5	Replace Air Filter	
7.6	Replace Ink System Filters	
Section 8	Technical Description and Troubleshooting	116
8.1	Introduction	
8.2	The Printing Process	
8.3	The Controller Enclosure	
8.4	The User Interface	
8.5	Electrical Components	
8.6	Ink System	
8.7	Printhead	
Section 9	Service Routines	142
9.1	Changing or Cleaning the Nozzle Insert	
9.2	Nozzle Alignment	
9.3	Nozzle Cleaning Routine (Ultrasonic Bath)	
9.4	Changing or Emptying Ink or Makeup Tank (ci1000)	
9.5	Shipping / Long Term Storage Preparation	
9.6	Changing the Ink System Pump	
9.7	Changing / Cleaning an Ink System Valve and Gasket	
9.8	Changing / Removing the Pressure Transducer	
9.9	Changing / Cleaning the Pressure Restrictor	
9.10	Changing / Cleaning the Venturi Restrictors	
Section 10	Reference Information	156
10.1	Ink and Makeup Consumption	
10.2	Shaft Encoder Assembly	
10.3	ciSeries Installation Report and Checklist	
10.4	Routine Cleaning and Maintenance	
10.5	1200-2000/3-6 Month Scheduled Maintenance Checklist	
Section 11	Fault Diagnosis	164

Section 1 General Information

1.1 Welcome to the ciSeries Ink Jet Printing Systems

The Citronix ciSeries Continuous Ink Jet Printing Systems uniquely combine simplicity and performance. The systems feature an intuitive user interface.

What this manual covers:

This manual covers the following:

- Safety information
- Description of operation
- Installation guidelines
- Programming the system
- Service configuration settings
- Performing routine maintenance
- Component replacement
- Troubleshoot problems

Where to find more information:

Refer to the ciSeries Operation Guide for information about basic operation and basic maintenance procedures.

1.2 Before Using this Manual

This manual makes the assumption that you have received training from Citronix or an authorized Citronix Distributor. If you have not been fully qualified by Citronix or an authorized Citronix Distributor contact Citronix to receive assistance before performing any task detailed herein.

1.3 Safety Information

Before operating any part of this system, all warnings and notes should be read and completely understood.

At appropriate areas in this manual, WARNINGS, CAUTIONS and NOTES are provided. These are provided to avoid hazards, and understanding how to safely operate this system.



A WARNING symbol identifies an operating procedure which if not strictly followed could result in injury or death to personnel. Warnings will be identified by a general warning symbol, or a specific warning symbol



A CAUTION identifies an operating procedure which if not strictly followed could result in equipment damage.



A NOTE indicates an operating procedure that is essential but not known to cause hazards as indicated by a warning or caution.

The following WARNINGS should be read and understood by all personnel involved in the operation and maintenance of this system.

Specific WARNINGS:



PERSONAL INJURY: The system uses extremely high voltages only trained and authorized personnel must complete maintenance work.



PERSONAL INJURY: Use goggles or face mask when using ink, makeup, or solvents to prevent from entering the eyes.



FIRE HAZARD: The ink, makeup, and solvents are flammable, do not smoke or use a flame in the vicinity of the system, or chemicals.



General WARNINGS:

PERSONAL INJURY: Wear protective gloves and clothing when handling ink, makeup, or solvent.

PERSONAL INJURY: Do not drink, ink, makeup, and solvents are poisonous if taken internally.

PERSONAL INJURY: Prolonged exposure to ink, makeup, or solvent vapors may cause drowsiness and effects similar to alcohol intoxication. Use only in a well ventilated open areas.

PERSONAL INJURY: Immediately after use remove paper towels or cloths that are saturated with ink, makeup, or solvent. Dispose of in a manner to ensure there is no danger of a fire or health hazard.

WARNING: Experienced, trained personnel must perform electrical troubleshooting.

WARNING: Remove power from the system prior to servicing.

Print Testing

When test printing, to avoid the risk of fire, it is required that the ink used for printing be earthed to dissipate the charge that is applied during the print process. Use only metal containers with a wire connected to an earth point.



Section 2 ciSeries System Specifications and Capabilities

2.1 ciSeries Controller

Hardware

Single Printhead Control

Dual Processor: Motorola Coldfire / DSP

Speed: 66Mhz

Memory: 4 Mbytes Flash/16 Mbytes RAM

Interface

ci580	ci700	ci1000/ci2000
1 RS232	1 RS232 or RS485	1 Ethernet
	1 RS232	1 RS232 or RS485 (1200 up to 115.2KB)
	1 PS2	1 RS232 (1200 up to 115.2KB)
		1 PS2

Inputs (opto-isolated, open collector or TTL type)

ci580

1 photocell 1 shaft encoder

ci700/ci1000/ci2000

2 photocell* 1 shaft encoder 6 programmable**

*Programmable options for Photocell 2

**Remote message selection – 64 possible selections)

Outputs

3 programmable alarms – warning and failure (Open Collector, 150mA sinking)

Programmable dry contact relay External Power (+24VDC 500mA)

Printhead Umbilical

ci580	ci700	ci1000/ci2000
6 feet (2.5 Meter)	9 feet (3 Meter)	9 feet (3 Meter) or 15 feet (4.5 Meter)

User Interface and Firmware Capabilities

Full size QWERTY keyboard

Quarter VGA backlit graphical display

Intuitive icon based operation

WYSIWYG message editing

Drag / drop field based formatting

Message Storage – ci580 – 50 messages

ci700/ci1000/ci2000 - ~1000 messages

Single button start and stop operation

Programmable Password security

Real and expiration time and date coding

Shift and rollover time and date coding

Product and batch counting coding

Graphic Creation and Printing

Graphic downloadable

Integrated graphic creator / editor

Automatic diagnostics

Error and activity logs

Service reminders

Tower Printing Functions

Continuous print capability

Backup / restore functions

Multiple operator languages

Multi-national character printing (Unicode)

Downloadable firmware updates (Ethernet)

ci1000/ci2000-internet browser interface



ciSeries Technical Service Manual

Operating Environment

Temperature: 35 – 113 F (5 – 45 C)
% Relative Humidity: 10-90% (non-condensing)

Electrical Requirements

Auto Ranging: 90-260VAC (3 Amp)
Frequency: 50-60 Hz

2.2 ciSeries Printhead

Technology:	Continuous Ink Jet (CIJ)	
Lines of Print:	ci580 – 2 lines (16 pixel)	
	ci700 – 3 lines (25 pixel)	
	ci1000 / ci2000 – 5 lines (31 pixel)	
Print:	Text, Graphics, Bar codes	
Line Speed:	See speed charts (section 2.5)	
Printhead Orientation:	Omni-directional	
Image Height:	ci580	macro drop size - .25" (6mm)-.50" (12mm)
	ci700, ci1000, ci2000	normal drop size – .10" (2.5mm)-.50" (12mm) macro drop size – .25" (6mm)-.50" (12mm)
	ci1000, ci2000	micro size – .025" (.6mm)-.25" (6mm) hs50 size - .06" (1.5mm)-.50" (12mm)
Throw Distance:	ci580	macro drop size – up to 1.50" (38mm)
	ci700, ci1000, ci2000	normal drop size – up to .50" (12mm) macro drop size – up to 1.50" (38mm)
	ci1000/ci2000	micro size - up to .25" (6mm) hs50 - up to .50" (12mm)

All models feature automatic maintenance and cleaning at startup and shutdown.

2.3 Consumable and Delivery

Ink Types:	Full range – MEK, Ethanol, Acetone
Ink Colors:	Black, Red, Blue, Yellow, Green, White, UV
Ink Dry Time:	Quick dry to immediate
Ink Bottles:	16oz (473ml)
Makeup Bottles:	16oz (473ml)
Fluid Capacities:	ci580 – 32 oz (1L)
	ci700/ci1000/ci2000 - 64oz (1.9L)



ciSeries Technical Service Manual

2.4 ciSeries Controller and Printhead Physical Characteristics:

	ci580	ci700
Enclosure:	Painted Steel	Stainless Steel
Environmental:	Nema 4 (IP55)	Nema 4 (IP55)
Weight Controller:	40 lbs	43lbs
Weight Printhead:	2lbs	2lbs
	ci1000	ci2000
Enclosure:	Stainless Steel	Stainless Steel
Environmental:	Nema 4 (IP55)	Nema 4X (IP65)
Weight Controller:	43 lbs	45lbs
Weight Printhead:	2lbs	2lbs



2.5 Print Speeds and Print Quality Charts

The line speed at which the product passes the printhead will affect print quality. The following pages show how to determine the maximum line speeds per print quality setting.

When determining the ciSeries settings for the application, the following needs to be considered:

- Line Speed
- Pixel Setting (vertical resolution)
- Print Resolution (horizontal resolution or raster pitch)
- Whether using an external or internal (autoprint) encoder

Based on the above, the best Print Quality (speed) setting should be chosen.



ciSeries Technical Service Manual

ciSeries Speed Chart – ci580

Drop Size: Macro/Internal Encoder

ci580 Drop Size: Macro - Internal		Raster	Raster	Speed	Speed	Speed	Speed
Pixel Setting	Quality	Per Sec	Pitch	FT/min	IPS	M/min	M/sec
5	Normal (extra fast)	10927	0.02	1093	219	333	5.6
5	Standard (fast)	5463	0.02	546	109	167	2.8
5	Premium (medium)	3642	0.02	364	73	111	1.9
5	Premium Plus (slow)	2731	0.02	273	55	83	1.4
7	Normal (extra fast)	7805	0.02	781	156	238	4.0
7	Standard (fast)	3902	0.02	390	78	119	2.0
7	Premium (medium)	2601	0.02	260	52	79	1.3
7	Premium Plus (slow)	1951	0.02	195	39	59	1.0
9	Normal (extra fast)	7805	0.02	781	156	238	4.0
9	Standard (fast)	3035	0.02	304	61	93	1.5
9	Premium (medium)	3035	0.02	304	61	93	1.5
9	Premium Plus (slow)	3035	0.02	304	61	93	1.5
12	Normal (extra fast)	4552	0.02	455	91	139	2.3
12	Standard (fast)	2276	0.02	228	46	69	1.2
12	Premium (medium)	2276	0.02	228	46	69	1.2
12	Premium Plus (slow)	2276	0.02	228	46	69	1.2
16	Normal (extra fast)	3414	0.02	341	68	104	1.7
16	Standard (fast)	1762	0.02	176	35	54	0.9
16	Premium (medium)	1762	0.02	176	35	54	0.9
16	Premium Plus (slow)	1762	0.02	176	35	54	0.9
2L7	Normal (extra fast)	4552	0.02	455	91	139	2.3
2L7	Standard (fast)	2875	0.02	288	58	88	1.5
2L7	Premium (medium)	1951	0.02	195	39	59	1.0
2L7	Premium Plus (slow)	1300	0.02	130	26	40	0.7

Notes: Normal (extra fast) - throw distance .25" (6mm)



ciSeries Technical Service Manual

ciSeries Speed Chart – ci580

Drop Size : Macro/External Encoder

ci580 Drop Size: Macro - External Encoder		Raster	Raster	Speed	Speed	Speed	Speed
Pixel Setting	Quality	Per Sec	Pitch	FT/min	IPS	M/min	M/sec
5	Normal (extra fast)	10927	0.02	1049	210	320	5.3
5	Standard (fast)	5463	0.02	524	105	160	2.7
5	Premium (medium)	3642	0.02	350	70	107	1.8
5	Premium Plus (slow)	2731	0.02	262	52	80	1.3
7	Normal (extra fast)	7805	0.02	749	150	228	3.8
7	Standard (fast)	3902	0.02	375	75	114	1.9
7	Premium (medium)	2601	0.02	250	50	76	1.3
7	Premium Plus (slow)	1951	0.02	187	37	57	1.0
9	Normal (extra fast)	7805	0.02	749	150	228	3.8
9	Standard (fast)	3035	0.02	291	58	89	1.5
9	Premium (medium)	3035	0.02	291	58	89	1.5
9	Premium Plus (slow)	3035	0.02	291	58	89	1.5
12	Normal (extra fast)	4552	0.02	437	87	133	2.2
12	Standard (fast)	2276	0.02	218	44	67	1.1
12	Premium (medium)	2276	0.02	218	44	67	1.1
12	Premium Plus (slow)	2276	0.02	218	44	67	1.1
16	Normal (extra fast)	3414	0.02	328	66	100	1.7
16	Standard (fast)	1762	0.02	169	34	52	0.9
16	Premium (medium)	1762	0.02	169	34	52	0.9
16	Premium Plus (slow)	1762	0.02	169	34	52	0.9
2L7	Normal (extra fast)	4552	0.02	437	87	133	2.2
2L7	Standard (fast)	2875	0.02	276	55	84	1.4
2L7	Premium (medium)	1951	0.02	187	37	57	1.0
2L7	Premium Plus (slow)	1300	0.02	125	25	38	0.6

Notes: Normal (extra fast) - throw distance .25" (6mm)



ciSeries Technical Service Manual

ciSeries Speed Chart – ci2000, ci1000, ci700

Drop Size: Normal/Internal Encoder

ci2000, ci1000, ci700, ci500 Drop Size: Normal - Internal		Raster	Raster	Speed	Speed	Speed	Speed
Pixel Setting	Quality	Per Sec	Pitch	FT/min	IPS	M/min	M/sec
5	Normal (extra fast)	15420	0.02	1542	308	470	7.8
5	Standard (fast)	7710	0.02	771	154	235	3.9
5	Premium (medium)	5140	0.02	514	103	157	2.6
5	Premium Plus (slow)	3855	0.02	386	77	118	2.0
7	Normal (extra fast)	15420	0.02	1542	308	470	7.8
7	Standard (fast)	5507	0.02	551	110	168	2.8
7	Premium (medium)	3671	0.02	367	73	112	1.9
7	Premium Plus (slow)	2753	0.02	275	55	84	1.4
9	Normal (extra fast)	8566	0.02	857	171	261	4.4
9	Standard (fast)	2855	0.02	286	57	87	1.5
9	Premium (medium)	2855	0.02	286	57	87	1.5
9	Premium Plus (slow)	2855	0.02	286	57	87	1.5
12	Normal (extra fast)	3212	0.02	321	64	98	1.6
12	Standard (fast)	2141	0.02	214	43	65	1.1
12	Premium (medium)	2141	0.02	214	43	65	1.1
12	Premium Plus (slow)	2141	0.02	214	43	65	1.1
16	Normal (extra fast)	2409	0.02	241	48	73	1.2
16	Standard (fast)	1676	0.02	168	34	51	0.9
16	Premium (medium)	1676	0.02	168	34	51	0.9
16	Premium Plus (slow)	1676	0.02	168	34	51	0.9
2L7	Normal (extra fast)	6425	0.02	643	129	196	3.3
2L7	Standard (fast)	3855	0.02	386	77	118	2.0
2L7	Premium (medium)	2658	0.02	266	53	81	1.4
2L7	Premium Plus (slow)	1835	0.02	184	37	56	0.9
19	Normal (extra fast)	2029	0.02	203	41	62	1.0
19	Standard (fast)	1376	0.02	138	28	42	0.7
19	Premium (medium)	1376	0.02	138	28	42	0.7
19	Premium Plus (slow)	1041	0.02	104	21	32	0.5
26	Normal (extra fast)	1376	0.02	138	28	42	0.7
26	Standard (fast)	1150	0.02	115	23	35	0.6
26	Premium (medium)	1028	0.02	103	21	31	0.5
26	Premium Plus (slow)	1028	0.02	103	21	31	0.5
3L7	Normal (extra fast)	3504	0.02	350	70	107	1.8
3L7	Standard (fast)	2855	0.02	286	57	87	1.5
3L7	Premium (medium)	1793	0.02	179	36	55	0.9
3L7	Premium Plus (slow)	1223	0.02	122	24	37	0.6
31	Normal (extra fast)	1133	0.02	113	23	35	0.6
31	Standard (fast)	811	0.02	81	16	25	0.4
31	Premium (medium)	616	0.02	62	12	19	0.3
31	Premium Plus (slow)	500	0.02	50	10	15	0.3
4L7	Normal (extra fast)	3084	0.02	308	62	94	1.6
4L7	Standard (fast)	2658	0.02	266	53	81	1.4
4L7	Premium (medium)	1329	0.02	133	27	41	0.7
4L7	Premium Plus (slow)	917	0.02	92	18	28	0.5

Notes:

Normal (extra fast) - throw distance .25" (6mm)



ciSeries Technical Service Manual

ciSeries Speed Chart – ci2000, ci1000, ci700

Drop Size: Normal/External Encoder

ci2000, ci1000, ci700, ci500		Raster	Raster	Speed	Speed	Speed	Speed
Drop Size: Normal - External Encoder							
Pixel Setting	Quality	Per Sec	Pitch	FT/min	IPS	M/min	M/sec
5	Normal (extra fast)	15420	0.02	1480	296	451	7.5
5	Standard (fast)	7710	0.02	740	148	226	3.8
5	Premium (medium)	5140	0.02	493	99	150	2.5
5	Premium Plus (slow)	3855	0.02	370	74	113	1.9
7	Normal (extra fast)	15420	0.02	1480	296	451	7.5
7	Standard (fast)	5507	0.02	529	106	161	2.7
7	Premium (medium)	3671	0.02	352	70	107	1.8
7	Premium Plus (slow)	2753	0.02	264	53	81	1.3
9	Normal (extra fast)	8566	0.02	822	164	251	4.2
9	Standard (fast)	2855	0.02	274	55	84	1.4
9	Premium (medium)	2855	0.02	274	55	84	1.4
9	Premium Plus (slow)	2855	0.02	274	55	84	1.4
12	Normal (extra fast)	3212	0.02	308	62	94	1.6
12	Standard (fast)	2141	0.02	206	41	63	1.0
12	Premium (medium)	2141	0.02	206	41	63	1.0
12	Premium Plus (slow)	2141	0.02	206	41	63	1.0
16	Normal (extra fast)	2409	0.02	231	46	70	1.2
16	Standard (fast)	1676	0.02	161	32	49	0.8
16	Premium (medium)	1676	0.02	161	32	49	0.8
16	Premium Plus (slow)	1676	0.02	161	32	49	0.8
2L7	Normal (extra fast)	6425	0.02	617	123	188	3.1
2L7	Standard (fast)	3855	0.02	370	74	113	1.9
2L7	Premium (medium)	2658	0.02	255	51	78	1.3
2L7	Premium Plus (slow)	1835	0.02	176	35	54	0.9
19	Normal (extra fast)	2029	0.02	195	39	59	1.0
19	Standard (fast)	1376	0.02	132	26	40	0.7
19	Premium (medium)	1376	0.02	132	26	40	0.7
19	Premium Plus (slow)	1041	0.02	100	20	30	0.5
26	Normal (extra fast)	1376	0.02	132	26	40	0.7
26	Standard (fast)	1150	0.02	110	22	34	0.6
26	Premium (medium)	1028	0.02	99	20	30	0.5
26	Premium Plus (slow)	1028	0.02	99	20	30	0.5
3L7	Normal (extra fast)	3504	0.02	336	67	103	1.7
3L7	Standard (fast)	2855	0.02	274	55	84	1.4
3L7	Premium (medium)	1793	0.02	172	34	52	0.9
3L7	Premium Plus (slow)	1223	0.02	117	23	36	0.6
31	Normal (extra fast)	1133	0.02	109	22	33	0.6
31	Standard (fast)	811	0.02	78	16	24	0.4
31	Premium (medium)	616	0.02	59	12	18	0.3
31	Premium Plus (slow)	500	0.02	48	10	15	0.2
4L7	Normal (extra fast)	3084	0.02	296	59	90	1.5
4L7	Standard (fast)	2658	0.02	255	51	78	1.3
4L7	Premium (medium)	1329	0.02	128	26	39	0.6
4L7	Premium Plus (slow)	917	0.02	0	0	0	0.0

Notes:

Normal (extra fast) - throw distance .25" (6mm)



ciSeries Technical Service Manual

ciSeries Speed Chart – ci2000, ci1000, ci700

Drop Size: Macro/Internal Encoder

ci2000, ci1000, ci700, ci500		Raster	Raster	Speed	Speed	Speed	Speed
Drop Size: Macro - Internal							
Pixel Setting	Quality	Per Sec	Pitch	FT/min	IPS	M/min	M/sec
5	Normal (extra fast)	10927	0.02	1093	219	333	5.6
5	Standard (fast)	5463	0.02	546	109	167	2.8
5	Premium (medium)	3642	0.02	364	73	111	1.9
5	Premium Plus (slow)	2731	0.02	273	55	83	1.4
7	Normal (extra fast)	7805	0.02	781	156	238	4.0
7	Standard (fast)	3902	0.02	390	78	119	2.0
7	Premium (medium)	2601	0.02	260	52	79	1.3
7	Premium Plus (slow)	1951	0.02	195	39	59	1.0
9	Normal (extra fast)	7805	0.02	781	156	238	4.0
9	Standard (fast)	3035	0.02	304	61	93	1.5
9	Premium (medium)	3035	0.02	304	61	93	1.5
9	Premium Plus (slow)	3035	0.02	304	61	93	1.5
12	Normal (extra fast)	4552	0.02	455	91	139	2.3
12	Standard (fast)	2276	0.02	228	46	69	1.2
12	Premium (medium)	2276	0.02	228	46	69	1.2
12	Premium Plus (slow)	2276	0.02	228	46	69	1.2
16	Normal (extra fast)	3414	0.02	341	68	104	1.7
16	Standard (fast)	1762	0.02	176	35	54	0.9
16	Premium (medium)	1762	0.02	176	35	54	0.9
16	Premium Plus (slow)	1762	0.02	176	35	54	0.9
2L7	Normal (extra fast)	4552	0.02	455	91	139	2.3
2L7	Standard (fast)	2875	0.02	288	58	88	1.5
2L7	Premium (medium)	1951	0.02	195	39	59	1.0
2L7	Premium Plus (slow)	1300	0.02	130	26	40	0.7
19	Normal (extra fast)	1437	0.02	144	29	44	0.7
19	Standard (fast)	1241	0.02	124	25	38	0.6
19	Premium (medium)	993	0.02	99	20	30	0.5
19	Premium Plus (slow)	993	0.02	99	20	30	0.5
26	Normal (extra fast)	1092	0.02	109	22	33	0.6
26	Standard (fast)	1092	0.02	109	22	33	0.6
26	Premium (medium)	738	0.02	74	15	22	0.4
26	Premium Plus (slow)	563	0.02	56	11	17	0.3
3L7	Normal (extra fast)	2483	0.02	248	50	76	1.3
3L7	Standard (fast)	2101	0.02	210	42	64	1.1
3L7	Premium (medium)	1300	0.02	130	26	40	0.7
3L7	Premium Plus (slow)	867	0.02	87	17	26	0.4
31	Normal (extra fast)	867	0.02	87	17	26	0.4
31	Standard (fast)	791	0.02	79	16	24	0.4
31	Premium (medium)	658	0.02	66	13	20	0.3
31	Premium Plus (slow)	563	0.02	56	11	17	0.3
4L7	Normal (extra fast)	2185	0.02	219	44	67	1.1
4L7	Standard (fast)	1883	0.02	188	38	57	1.0
4L7	Premium (medium)	941	0.02	94	19	29	0.5
4L7	Premium Plus (slow)	650	0.02	65	13	20	0.3

Notes: Normal (extra fast) - throw distance .25" (6mm)



ciSeries Technical Service Manual

ciSeries Speed Chart – ci2000, ci1000, ci700

Drop Size: Macro/External Encoder

ci2000, ci1000, ci700, ci500		Raster	Raster	Speed	Speed	Speed	Speed
Drop Size: Macro - External Encoder							
Pixel Setting	Quality	Per Sec	Pitch	FT/min	IPS	M/min	M/sec
5	Normal (extra fast)	10927	0.02	1049	210	320	5.3
5	Standard (fast)	5463	0.02	524	105	160	2.7
5	Premium (medium)	3642	0.02	350	70	107	1.8
5	Premium Plus (slow)	2731	0.02	262	52	80	1.3
7	Normal (extra fast)	7805	0.02	749	150	228	3.8
7	Standard (fast)	3902	0.02	375	75	114	1.9
7	Premium (medium)	2601	0.02	250	50	76	1.3
7	Premium Plus (slow)	1951	0.02	187	37	57	1.0
9	Normal (extra fast)	7805	0.02	749	150	228	3.8
9	Standard (fast)	3035	0.02	291	58	89	1.5
9	Premium (medium)	3035	0.02	291	58	89	1.5
9	Premium Plus (slow)	3035	0.02	291	58	89	1.5
12	Normal (extra fast)	4552	0.02	437	87	133	2.2
12	Standard (fast)	2276	0.02	218	44	67	1.1
12	Premium (medium)	2276	0.02	218	44	67	1.1
12	Premium Plus (slow)	2276	0.02	218	44	67	1.1
16	Normal (extra fast)	3414	0.02	328	66	100	1.7
16	Standard (fast)	1762	0.02	169	34	52	0.9
16	Premium (medium)	1762	0.02	169	34	52	0.9
16	Premium Plus (slow)	1762	0.02	169	34	52	0.9
2L7	Normal (extra fast)	4552	0.02	437	87	133	2.2
2L7	Standard (fast)	2875	0.02	276	55	84	1.4
2L7	Premium (medium)	1951	0.02	187	37	57	1.0
2L7	Premium Plus (slow)	1300	0.02	125	25	38	0.6
19	Normal (extra fast)	1437	0.02	138	28	42	0.7
19	Standard (fast)	1241	0.02	119	24	36	0.6
19	Premium (medium)	993	0.02	95	19	29	0.5
19	Premium Plus (slow)	993	0.02	95	19	29	0.5
26	Normal (extra fast)	1092	0.02	105	21	32	0.5
26	Standard (fast)	1092	0.02	105	21	32	0.5
26	Premium (medium)	738	0.02	71	14	22	0.4
26	Premium Plus (slow)	563	0.02	54	11	16	0.3
3L7	Normal (extra fast)	2483	0.02	238	48	73	1.2
3L7	Standard (fast)	2101	0.02	202	40	61	1.0
3L7	Premium (medium)	1300	0.02	125	25	38	0.6
3L7	Premium Plus (slow)	867	0.02	83	17	25	0.4
31	Normal (extra fast)	867	0.02	83	17	25	0.4
31	Standard (fast)	791	0.02	76	15	23	0.4
31	Premium (medium)	658	0.02	63	13	19	0.3
31	Premium Plus (slow)	563	0.02	54	11	16	0.3
4L7	Normal (extra fast)	2185	0.02	210	42	64	1.1
4L7	Standard (fast)	1883	0.02	181	36	55	0.9
4L7	Premium (medium)	941	0.02	90	18	28	0.5
4L7	Premium Plus (slow)	650	0.02	62	12	19	0.3

Notes:

Normal (extra fast) - throw distance .25" (6mm)



ciSeries Technical Service Manual

ciSeries Speed Chart – ci2000, ci1000, ci700

Drop Size: Micro/Internal Encoder

ci2000/ci1000 Micro - Internal Pixel Setting	Quality	Raster Per Sec	Raster Pitch	Speed FT/min	Speed IPS	Speed M/min	Speed M/sec
5	Normal (extra fast)	16176	0.02	1618	324	493	8.2
5	Standard (fast)	8088	0.02	809	162	247	4.1
5	Premium (medium)	5392	0.02	539	108	164	2.7
5	Premium Plus (slow)	4044	0.02	404	81	123	2.1
7	Normal (extra fast)	16176	0.02	1618	324	493	8.2
7	Standard (fast)	5777	0.02	578	116	176	2.9
7	Premium (medium)	3851	0.02	385	77	117	2.0
7	Premium Plus (slow)	2888	0.02	289	58	88	1.5
9	Normal (extra fast)	8986	0.02	899	180	274	4.6
9	Standard (fast)	2995	0.02	300	60	91	1.5
9	Premium (medium)	2995	0.02	300	60	91	1.5
9	Premium Plus (slow)	2995	0.02	300	60	91	1.5
12	Normal (extra fast)	3370	0.02	337	67	103	1.7
12	Standard (fast)	2247	0.02	225	45	68	1.1
12	Premium (medium)	2247	0.02	225	45	68	1.1
12	Premium Plus (slow)	2247	0.02	225	45	68	1.1
16	Normal (extra fast)	2527	0.02	253	51	77	1.3
16	Standard (fast)	1758	0.02	176	35	54	0.9
16	Premium (medium)	1758	0.02	176	35	54	0.9
16	Premium Plus (slow)	1758	0.02	176	35	54	0.9
2L7	Normal (extra fast)	6740	0.02	674	135	205	3.4
2L7	Standard (fast)	4044	0.02	404	81	123	2.1
2L7	Premium (medium)	2789	0.02	279	56	85	1.4
2L7	Premium Plus (slow)	1925	0.02	193	39	59	1.0
19	Normal (extra fast)	2128	0.02	213	43	65	1.1
19	Standard (fast)	1444	0.02	144	29	44	0.7
19	Premium (medium)	1444	0.02	144	29	44	0.7
19	Premium Plus (slow)	1093	0.02	109	22	33	0.6
26	Normal (extra fast)	1617	0.02	162	32	49	0.8
26	Standard (fast)	1189	0.02	119	24	36	0.6
26	Premium (medium)	1078	0.02	108	22	33	0.5
26	Premium Plus (slow)	1064	0.02	106	21	32	0.5
3L7	Normal (extra fast)	3676	0.02	368	74	112	1.9
3L7	Standard (fast)	3110	0.02	311	62	95	1.6
3L7	Premium (medium)	1925	0.02	193	39	59	1.0
3L7	Premium Plus (slow)	1283	0.02	128	26	39	0.7
31	Normal (extra fast)	1189	0.02	119	24	36	0.6
31	Standard (fast)	851	0.02	85	17	26	0.4
31	Premium (medium)	647	0.02	65	13	20	0.3
31	Premium Plus (slow)	525	0.02	53	11	16	0.3
4L7	Normal (extra fast)	3235	0.02	324	65	99	1.6
4L7	Standard (fast)	2789	0.02	279	56	85	1.4
4L7	Premium (medium)	1444	0.02	144	29	44	0.7
4L7	Premium Plus (slow)	962	0.02	96	19	29	0.5



ciSeries Technical Service Manual

ciSeries Speed Chart – ci2000, ci1000, ci700

Drop Size: Micro/External Encoder

ci2000/ci1000 Micro - External Encoder		Raster	Raster	Speed	Speed	Speed	Speed
Pixel Setting	Quality	Per Sec	Pitch	FT/min	IPS	M/min	M/sec
5	Normal (extra fast)	16176	0.02	1553	311	473	7.9
5	Standard (fast)	8088	0.02	776	155	237	3.9
5	Premium (medium)	5392	0.02	518	104	158	2.6
5	Premium Plus (slow)	4044	0.02	388	78	118	2.0
7	Normal (extra fast)	16176	0.02	1553	311	473	7.9
7	Standard (fast)	5777	0.02	555	111	169	2.8
7	Premium (medium)	3851	0.02	370	74	113	1.9
7	Premium Plus (slow)	2888	0.02	277	55	85	1.4
9	Normal (extra fast)	8986	0.02	863	173	263	4.4
9	Standard (fast)	2995	0.02	288	58	88	1.5
9	Premium (medium)	2995	0.02	288	58	88	1.5
9	Premium Plus (slow)	2995	0.02	288	58	88	1.5
12	Normal (extra fast)	3370	0.02	324	65	99	1.6
12	Standard (fast)	2247	0.02	216	43	66	1.1
12	Premium (medium)	2247	0.02	216	43	66	1.1
12	Premium Plus (slow)	2247	0.02	216	43	66	1.1
16	Normal (extra fast)	2527	0.02	243	49	74	1.2
16	Standard (fast)	1758	0.02	169	34	51	0.9
16	Premium (medium)	1758	0.02	169	34	51	0.9
16	Premium Plus (slow)	1758	0.02	169	34	51	0.9
2L7	Normal (extra fast)	6740	0.02	647	129	197	3.3
2L7	Standard (fast)	4044	0.02	388	78	118	2.0
2L7	Premium (medium)	2789	0.02	268	54	82	1.4
2L7	Premium Plus (slow)	1925	0.02	185	37	56	0.9
19	Normal (extra fast)	2128	0.02	204	41	62	1.0
19	Standard (fast)	1444	0.02	139	28	42	0.7
19	Premium (medium)	1444	0.02	139	28	42	0.7
19	Premium Plus (slow)	1093	0.02	105	21	32	0.5
26	Normal (extra fast)	1617	0.02	155	31	47	0.8
26	Standard (fast)	1189	0.02	114	23	35	0.6
26	Premium (medium)	1078	0.02	103	21	32	0.5
26	Premium Plus (slow)	1064	0.02	102	20	31	0.5
3L7	Normal (extra fast)	3676	0.02	353	71	108	1.8
3L7	Standard (fast)	3110	0.02	299	60	91	1.5
3L7	Premium (medium)	1925	0.02	185	37	56	0.9
3L7	Premium Plus (slow)	1283	0.02	123	25	38	0.6
31	Normal (extra fast)	1189	0.02	114	23	35	0.6
31	Standard (fast)	851	0.02	82	16	25	0.4
31	Premium (medium)	647	0.02	62	12	19	0.3
31	Premium Plus (slow)	525	0.02	50	10	15	0.3
4L7	Normal (extra fast)	3235	0.02	311	62	95	1.6
4L7	Standard (fast)	2789	0.02	268	54	82	1.4
4L7	Premium (medium)	1444	0.02	139	28	42	0.7
4L7	Premium Plus (slow)	962	0.02	92	18	28	0.5



ciSeries Technical Service Manual

ciSeries Speed Chart – ci2000, ci1000, ci700

Drop Size: HS50/Internal Encoder

ci2000, ci1000			Raster	Raster	Speed	Speed	Speed	Speed
HS50: 50 micron drop - Internal								
Pixel	Setting	Quality	Per Sec	Pitch	FT/min	IPS	M/min	M/sec
5		Normal (extra fast)	16850	0.02	1685	337	514	8.6
5		Standard (fast)	8425	0.02	843	169	257	4.3
5		Premium (medium)	5617	0.02	562	112	171	2.9
5		Premium Plus (slow)	4213	0.02	421	84	128	2.1
7		Normal (extra fast)	16850	0.02	1685	337	514	8.6
7		Standard (fast)	8425	0.02	843	169	257	4.3
7		Premium (medium)	5617	0.02	562	112	171	2.9
7		Premium Plus (slow)	4213	0.02	421	84	128	2.1
9		Normal (extra fast)	9360	0.02	936	187	285	4.8
9		Standard (fast)	3120	0.02	312	62	95	1.6
9		Premium (medium)	3120	0.02	312	62	95	1.6
9		Premium Plus (slow)	3120	0.02	312	62	95	1.6
12		Normal (extra fast)	3510	0.02	351	70	107	1.8
12		Standard (fast)	2340	0.02	234	47	71	1.2
12		Premium (medium)	2340	0.02	234	47	71	1.2
12		Premium Plus (slow)	2340	0.02	234	47	71	1.2
16		Normal (extra fast)	2632	0.02	263	53	80	1.3
16		Standard (fast)	1831	0.02	183	37	56	0.9
16		Premium (medium)	1831	0.02	183	37	56	0.9
16		Premium Plus (slow)	1831	0.02	183	37	56	0.9
2L7		Normal (extra fast)	7021	0.02	702	140	214	3.6
2L7		Standard (fast)	4213	0.02	421	84	128	2.1
2L7		Premium (medium)	2905	0.02	291	58	89	1.5
2L7		Premium Plus (slow)	2005	0.02	201	40	61	1.0
19		Normal (extra fast)	2217	0.02	222	44	68	1.1
19		Standard (fast)	1504	0.02	150	30	46	0.8
19		Premium (medium)	1504	0.02	150	30	46	0.8
19		Premium Plus (slow)	1138	0.02	114	23	35	0.6
26		Normal (extra fast)	1504	0.02	150	30	46	0.8
26		Standard (fast)	1257	0.02	126	25	38	0.6
26		Premium (medium)	1123	0.02	112	22	34	0.6
26		Premium Plus (slow)	1123	0.02	112	22	34	0.6
3L7		Normal (extra fast)	3829	0.02	383	77	117	1.9
3L7		Standard (fast)	3120	0.02	312	62	95	1.6
3L7		Premium (medium)	1959	0.02	196	39	60	1.0
3L7		Premium Plus (slow)	1336	0.02	134	27	41	0.7
31		Normal (extra fast)	1238	0.02	124	25	38	0.6
31		Standard (fast)	886	0.02	89	18	27	0.5
31		Premium (medium)	673	0.02	67	13	21	0.3
31		Premium Plus (slow)	546	0.02	55	11	17	0.3
4L7		Normal (extra fast)	3370	0.02	337	67	103	1.7
4L7		Standard (fast)	2905	0.02	291	58	89	1.5
4L7		Premium (medium)	1452	0.02	145	29	44	0.7
4L7		Premium Plus (slow)	1002	0.02	100	20	31	0.5

Notes: Normal (extra fast) - throw distance .25" (6mm)



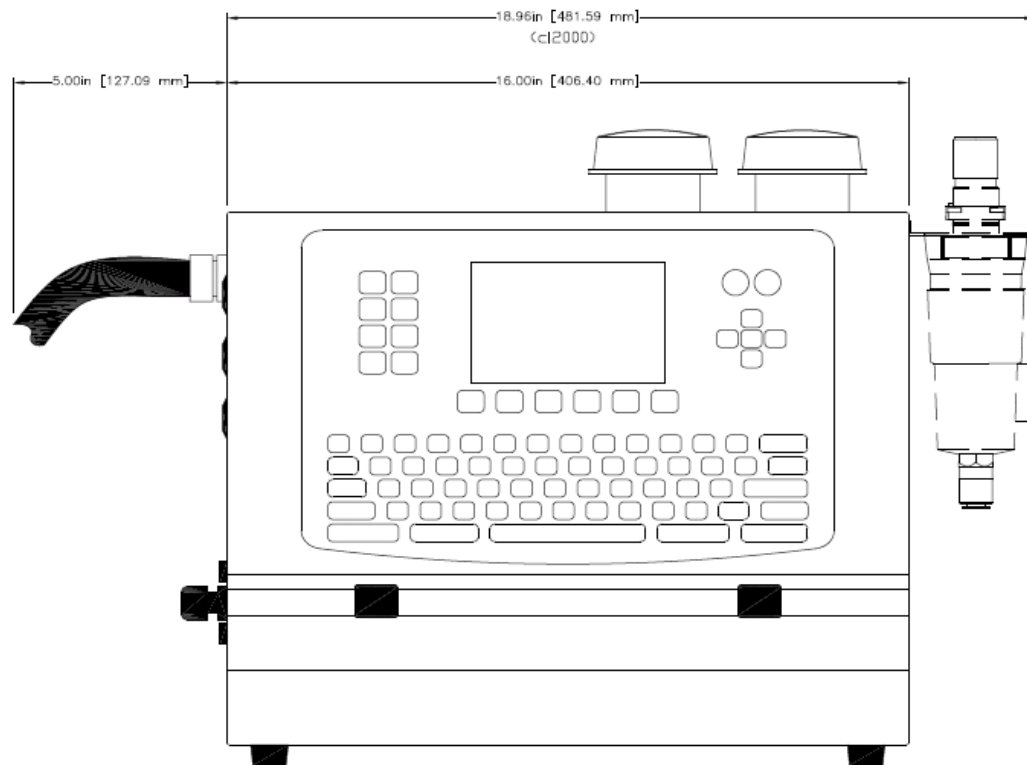
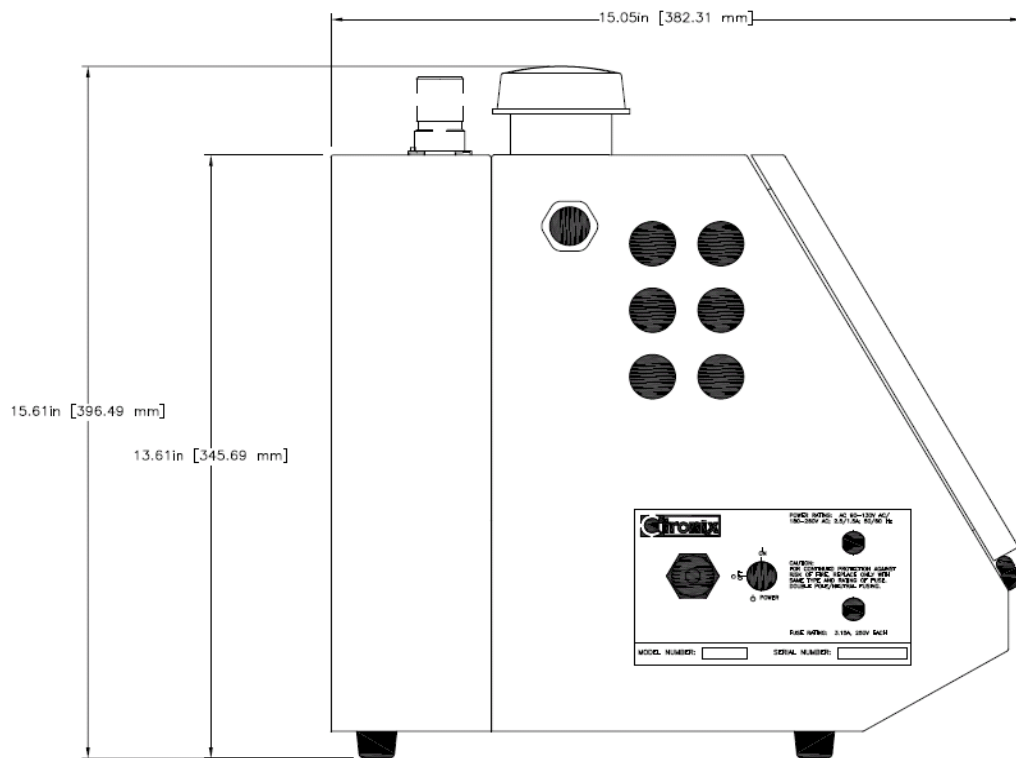
ciSeries Technical Service Manual

ciSeries Speed Chart – ci2000, ci1000, ci700

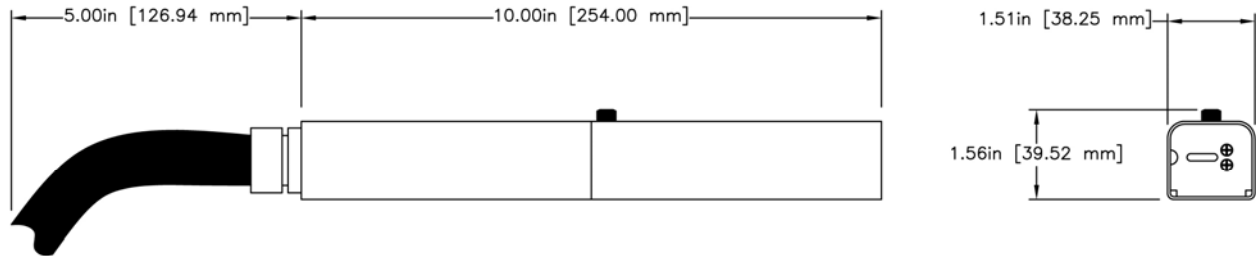
Drop Size: HS50/External Encoder

ci2000/ci1000		Raster	Raster	Speed	Speed	Speed	Speed
HS50: 50 micron drop - External Encoder							
Pixel Setting	Quality	Per Sec	Pitch	FT/min	IPS	M/min	M/sec
5	Normal (extra fast)	16850	0.02	1618	324	493	8.2
5	Standard (fast)	8425	0.02	809	162	247	4.1
5	Premium (medium)	5617	0.02	539	108	164	2.7
5	Premium Plus (slow)	4213	0.02	404	81	123	2.1
7	Normal (extra fast)	16850	0.02	1618	324	493	8.2
7	Standard (fast)	8425	0.02	809	162	247	4.1
7	Premium (medium)	5617	0.02	539	108	164	2.7
7	Premium Plus (slow)	4213	0.02	404	81	123	2.1
9	Normal (extra fast)	9360	0.02	899	180	274	4.6
9	Standard (fast)	3120	0.02	300	60	91	1.5
9	Premium (medium)	3120	0.02	300	60	91	1.5
9	Premium Plus (slow)	3120	0.02	300	60	91	1.5
12	Normal (extra fast)	3510	0.02	337	67	103	1.7
12	Standard (fast)	2340	0.02	225	45	68	1.1
12	Premium (medium)	2340	0.02	225	45	68	1.1
12	Premium Plus (slow)	2340	0.02	225	45	68	1.1
16	Normal (extra fast)	2632	0.02	253	51	77	1.3
16	Standard (fast)	1831	0.02	176	35	54	0.9
16	Premium (medium)	1831	0.02	176	35	54	0.9
16	Premium Plus (slow)	1831	0.02	176	35	54	0.9
2L7	Normal (extra fast)	7021	0.02	674	135	205	3.4
2L7	Standard (fast)	4213	0.02	404	81	123	2.1
2L7	Premium (medium)	2905	0.02	279	56	85	1.4
2L7	Premium Plus (slow)	2005	0.02	192	38	59	1.0
19	Normal (extra fast)	2217	0.02	213	43	65	1.1
19	Standard (fast)	1504	0.02	144	29	44	0.7
19	Premium (medium)	1504	0.02	144	29	44	0.7
19	Premium Plus (slow)	1138	0.02	109	22	33	0.6
26	Normal (extra fast)	1504	0.02	144	29	44	0.7
26	Standard (fast)	1257	0.02	121	24	37	0.6
26	Premium (medium)	1123	0.02	108	22	33	0.5
26	Premium Plus (slow)	1123	0.02	108	22	33	0.5
3L7	Normal (extra fast)	3829	0.02	368	74	112	1.9
3L7	Standard (fast)	3120	0.02	300	60	91	1.5
3L7	Premium (medium)	1959	0.02	188	38	57	1.0
3L7	Premium Plus (slow)	1336	0.02	128	26	39	0.7
31	Normal (extra fast)	1238	0.02	119	24	36	0.6
31	Standard (fast)	886	0.02	85	17	26	0.4
31	Premium (medium)	673	0.02	65	13	20	0.3
31	Premium Plus (slow)	546	0.02	52	10	16	0.3
4L7	Normal (extra fast)	3370	0.02	324	65	99	1.6
4L7	Standard (fast)	2905	0.02	279	56	85	1.4
4L7	Premium (medium)	1452	0.02	139	28	42	0.7
4L7	Premium Plus (slow)	1002	0.02	96	19	29	0.5

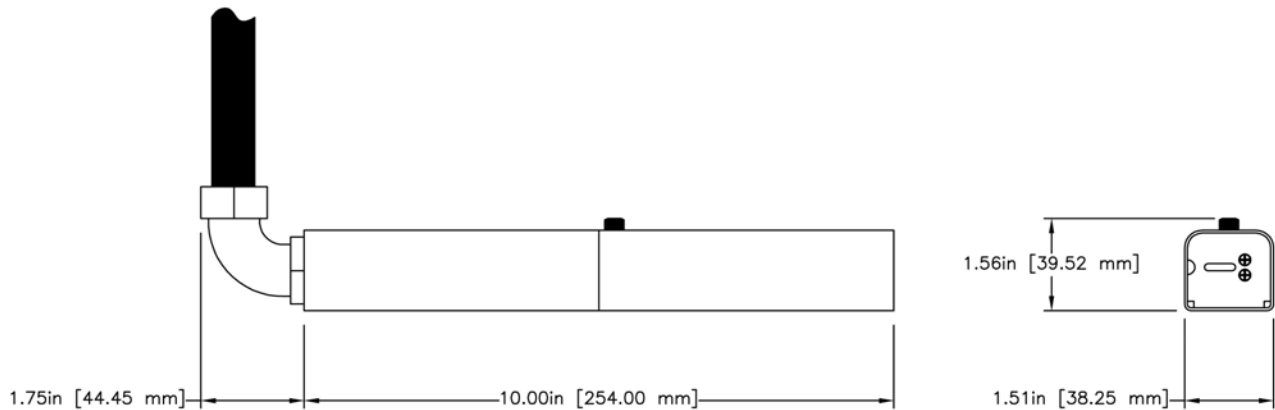
2.6 Dimensional Drawings – ci500/ci580/ci700/ci1000/ci2000



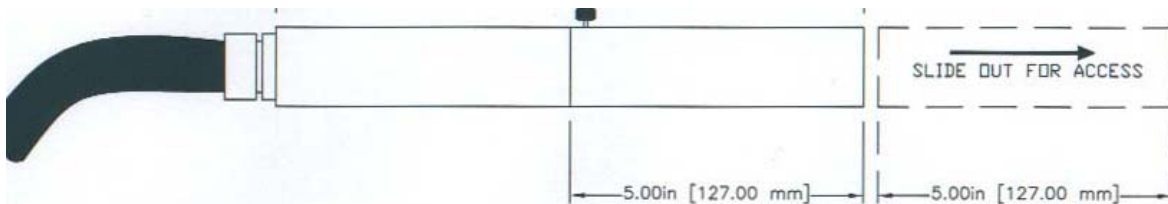
2.7 Dimensional Drawings – ciSeries Printhead



Straight Printhead Umbilical Fitting
(ci500/ci580/ci700/ci1000/ci2000)



90 Degree Printhead Umbilical Fitting
(ci1000/ci2000 option)





Section 3 System Installation

3.1 Installation Checklist

Consider the following when mounting / installing a ciSeries printer:

- Ensure a dedicated power source is available.
- Ensure the controller and printhead will be accessible for maintenance.
- Ensure printhead can be mounted solid to minimize vibration.
- Ensure the distance from the printhead to the controller is within 9 feet (3Meters) or an optional printhead umbilical length distance.
- Ensure the photocell can be mounted with or close to the printhead.
- Ensure positive air kit is installed in dusty environments or wet environments.
- Ensure a method to collect waste is provided / instructed when cleaning the printhead.

Install, mount and configure the system in the order indicated.

1. _____ Un-pack all equipment and check against packing slip
2. _____ Install Bracket Components – floor stand, conveyor side bracket, controller cart
3. _____ Install Printhead Wash Station (optional)
4. _____ Mount Photocell
5. _____ Mount Shaft Encoder (optional)
6. _____ Mount Alarm Beacon (optional)
7. _____ Install Integral Positive Air Kit or External Positive Air (optional)
8. _____ Mount Printhead
9. _____ Setup / Mount Controller
10. _____ Connect Peripherals – photocell, shaft encoder, alarm beacon, remote communications
11. _____ Connect Power
12. _____ Initialize System (Turn Power On)
13. _____ Commission the ciSeries Ink System – see page 28.
14. _____ Setup System Properties
15. _____ Setup Application Properties
16. _____ Setup Message Default Values
17. _____ Create Messages
18. _____ Start Printing
19. _____ Establish and program Filter Times for the application.
20. _____ Document all printer settings, leave a copy with the customer and keep a copy for your office
21. _____ Perform an Operating and Technical Training



3.2 Mounting

ciSeries Controller

A ciSeries controller should be positioned on a sturdy tabletop surface. The controller contains four rubber feet that raise the controller off the mounting surface allowing air circulation through the bottom of the controller for proper operation. Citronix offers an open shelf portable cart for this purpose.

Dimensional illustrations in section 2 indicate the area required for normal operation and servicing of a ciSeries system.



NOTE: If alternative mounting is used, it is necessary to allow ventilation at the bottom of the controller. Allow a minimum of ½" (12mm) area.

The controller as standard can be mounted up to 9 feet (3 meters) from the print process location. Optional printhead umbilical lengths are available to allow mounting at further distances.

Printhead

The ciSeries printhead should be installed in a manner to ensure there is no movement during the print process. The printhead should be positioned at an optimum throw distance based on the printhead type being used – see Technical Specifications. The printhead can print in any orientation allowing for top down, side coding, or bottom coding applications. Citronix offers a printhead stand or conveyor side bracket kit for this purpose.



NOTE: Positioning the printhead too close to the substrate can cause drop splash back resulting in ink build-up in the printhead that could result in frequent system errors.



NOTE: The printhead should be positioned no greater than 5 feet (1.5 meter) above or below the controller.

The printhead as standard can be mounted up to 9 feet (3 meters) from a ciSeries controller. Optional printhead umbilical lengths are available to allow mounting at further distances.

Dimensional illustrations in Section 2 should be used to determine the area required for normal operation and servicing of a ciSeries printhead.

Photocell

The photocell is used as a method to detect the product requiring marking or coding allowing the ciSeries to know when to print. The photocell should be fixed mounted with a close relationship to the printhead. Placement of the photocell should be positioned to allow a minimum print delay to minimize the time used for the print process. This is important in high speed or high throughput applications.



NOTE: Excess delay will result in printing every other product. In this event, move the photocell closer to the printhead. The optimum location is directly in line with the printhead = Delay 0.



NOTE: Multiple photocell types are available depending on the product being sensed. Use of the incorrect photocell type can result in improper detection and misplaced or inconsistent print location. Contact Citronix for a review of your application to assist determining the correct photocell type.

Citronix photocells are delivered with mounting hardware to allow mounting to the printhead floor stand or conveyor side bracket kit.

Shaft Encoder

A shaft encoder is used to detect the speed of the product to allow the print to occur at the same speed as the product. Shaft encoders are typically used in variable speed applications as the speed may vary.

The shaft encoder assembly contains four mounting holes to allow fix mounting and adaptation to particular applications. Dimensional illustrations in Section 8 detail the area required for normal operation.

Alarm Beacon

Citronix alarm beacons provide notification to the operator when an error has occurred. Three alarm beacons are offered – single, dual and three stage. The single stage alarm beacon provides a red flashing light in any error condition; the two-stage alarm beacon provides a red flashing light when the system has any error condition and a yellow light when a warning condition is present and the three stage provides an additional green light when there are NO error conditions or warnings (the three stage beacon utilizes the solid state relay connection in addition to the alarm connection).

The alarm beacon should be fixed mounted with a close relationship to the printhead or controller. The alarm beacon is delivered with mounting hardware to allow fix mounting to the printhead floor stand or conveyor side bracket kit.

Integral Positive Air Kit or Connecting External Air Source

The Citronix Integral Positive Air Kit delivers clean, dry air from the electronics compartment of the controller to the ciSeries printhead.

The pump system is automatically turned-on when the jet is started and turned off 4 minutes after a jet stop process. This lengthens the life of the air pump. The pump is rated for 4,000 hours.



ciSeries Technical Service Manual

Floor Stand

The floor stand provides mounting of a ciSeries printhead to the floor. Assembly instructions are included.

Conveyor Side Bracket Kit

The conveyor side bracket kit provides mounting of a ciSeries printhead to a conveyor. Assembly instructions are included.



ciSeries Technical Service Manual

3.3 Commission a new ciSeries System

To commission a ciSeries Ink System an understanding of basic operating procedures is required.

Step 1: Insert three bottles of ink / makeup (wait until emptied before removing).



NOTE: Filling reservoirs with less than three bottles prior to starting may cause damage.

Step 2: Start Jet – will need to start / stop jet a minimum of 3 (3) times to eliminate air from system.

Step 2a: In the event the jet misses the Gutter – perform a nozzle cleaning and possibly a Backflush will be required. Multiple cleanings or Backflush procedures may be required to start correctly for the first time.

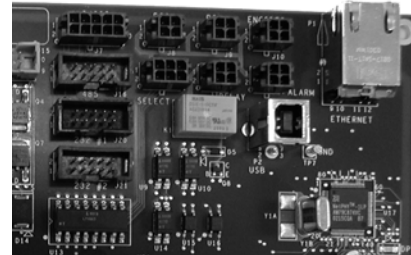
Step 3: Monitor Viscometer operation over a period of 2 hours to ensure correct operation.

3.4 Connecting Peripherals and Communications

The ciSeries products allow external peripherals to be connected directly to the CPU circuit board through ISE connectors. All peripherals delivered from Citronix contain the appropriate connector mated to fit. The peripheral cable is attached to the controller cabinet via a watertight gland.

The electrical connection is located in the lower right portion of the CPU circuit board:

Connector	Location
Photocell 1	J9
Shaft Encoder	J10
Alarm	J19
RS232	J21
Ethernet	P1



To connect alternative peripherals or communications links to the ciSeries products you will need the following, with exception to Ethernet. The Ethernet connection is accomplished via a standard RJ45 connector. A standard Ethernet “crossover” cable can be used to connect a ciSeries system to Ethernet.

Component Description	Peripheral Connection	Molex Part Number	Citronix Part Number
Molex Crimp Tool	All	638112800	014-1077-001
Molex Microfit Crimp 20-24 AWG	All	43030-0007	004-1020-001
Molex Microfit Connector 4 Pin	Photocell, Alarm, Shaft Encoder	43025-0400	004-1016-001
Molex Microfit Connector 10 Pin	RS232, RS485	43025-1000	004-1018-001
Cord Grip, ½" NPT	All	N/A	004-1007-001



NOTE: Refer to Section 7 for schematics of each connection.

Connect Citronix RS232 Host Port (J21) to a PC:

RS232 # 2 J21		DB 9 PC Side
Pin 3 – Transmit	←→	Pin 2 – Receive
Pin 5 – Receive	←→	Pin 3 – Transmit
Pin 9 – Ground	←→	Pin 5 - Ground



3.5 Connecting Power

Connect the power cord to a suitable power source as indicated below:

Single Phase - 90VAC (3 amp) to 260VAC (1 amp)
Frequency - 50/60 Hz

The socket-outlet shall be installed near the equipment and shall be easily accessible.

Due to the variety of plugs used worldwide, the power cords that ship with ciSeries systems are currently limited to standard US plug, standard European plug or standard United Kingdom plug. If you need a power cord with a different type of plug, purchase a power cord approved by local government or identified with an HAR (Harmonized Standard) label.



NOTE: To help protect and ensure reliable performance from your system, Citronix recommends the use of a surge suppressor, line conditioner, uninterruptible power supply and dedicated line from the main power source.



WARNING: THIS PRINTER MUST BE EARTHED/GROUNDED.

Installing an Alternate Power Cord

- 1) Remove existing power cord delivered with the system.
- 2) As the colors on the main leads of this equipment may not correspond with the markings identifying the terminals on your plug, proceed as follows:
 - The green and yellow wire must be connected to the terminal colored green and yellow, or marked with the earth symbol.
 - The blue wire must be connected to the terminal colored blue or marked "neutral".
 - The brown wire must be connected to the terminal colored brown or marked "live".

Section 4 System Operation

4.1 Turning Power On / Off

The power switch is located on the left hand side of a ciSeries controller.



Power Switch ON



Power Switch OFF

Powering the System On

Turning the power switch to the ON position powers and initializes the system. After the initialization screen appears, the Citronix Main Screen will appear.

Powering the System Off

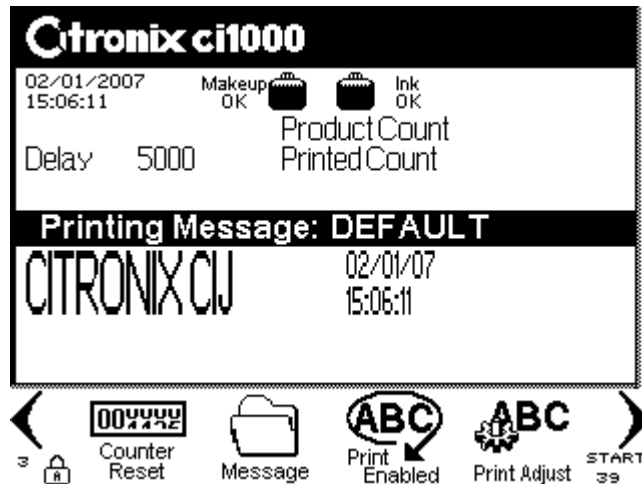
The system does not require the power switch to be turned off, unless the system is not going to be used for a lengthy period of time (several days). The power switch should be left in the ON position over weekends or short periods of non-use. Refer to Shutting the System Down for more information.



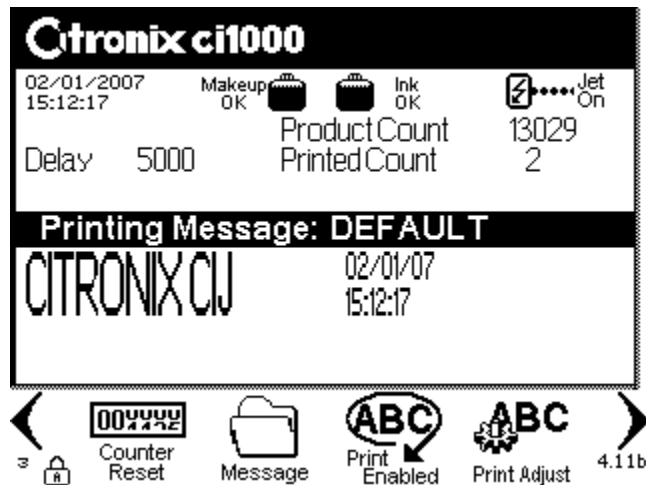
CAUTION: DO NOT TURN THE POWER SWITCH OFF WITHOUT SHUTTING DOWN THE JET.

4.2 Starting the Jet

After powering on the system, the jet must be started to print. To start the Jet, press the START key. "Jet Start" will appear in the upper right hand corner of the screen and a timer will countdown in the lower right hand corner. This timer will display the time remaining until jet is started. Other screens and/or functions may be accessed while the jet is starting.



After the start process is complete, a graphic in the upper right hand corner of the screen displays that the jet is on.



NOTE: If system indicates a Phase, Charge, Gutter, or HV Trip error, perform a Daily Printhead Cleaning routine. If error persists, potentially a Backflush Routine can correct. See Cleaning and Maintenance.

4.3 Selecting a Print Message

The Print Message select allows you to preview and select messages for printing.

- 1) Press the PRINT button or select the MESSAGE icon function key. The print message select menu is displayed.
- 2) Use the Up-Arrow or Down-Arrow keys to move the cursor through the list until it is beside the desired message. The print message title will be highlighted, and a preview of the print message will be displayed.



- 3) Press the START PRINT icon function key to select a Print Message to print.

The main screen will be displayed. The print message selected will be printing and be displayed.



NOTE: The last message printed will be ready to print after restarting system.



NOTE: Use left/right arrow keys for paging (viewing) to the left and right on long messages.

4.4 Add Ink and Makeup Safety

PERSONAL INJURY: Do not remove foil seal on bottle prior to filling.



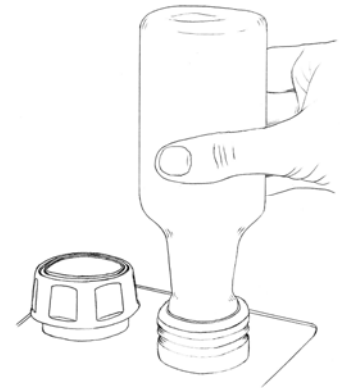
EQUIPMENT DAMAGE: Ensure ink and makeup being used has the same part number as indicated on the machine ink and makeup labels.

EQUIPMENT DAMAGE: Do not fill ink or makeup reservoirs unless the ink low, ink out or makeup low, makeup out message is displayed.

EQUIPMENT DAMAGE: Do not insert makeup in ink filler assembly, or ink in makeup filler assembly.

4.5 Add Ink and Makeup

- 1) If the ink low, ink out, or makeup low, makeup out message appears on the main screen, remove the ink or makeup reservoir filler cap.



- 2) Insert ink or makeup bottle in the reservoir filler assembly. Add one (1) bottle of ink or makeup into ink or makeup reservoir.
- 3) Ensure bottles are completely empty before removing. When the bottle is empty, remove it and dispose of it in accordance with local regulations.
- 4) Refit ink or makeup reservoir filler cap.



NOTE: DO NOT USE CLEANER IN PLACE OF MAKEUP AS SYSTEM WILL NOT OPERATE CORRECTLY.

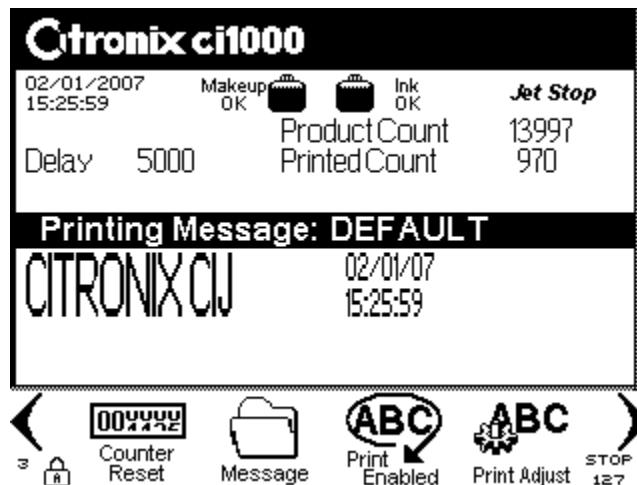


NOTE: DO NOT USE MAKEUP IN PLACE OF CLEANER, JET WILL NOT START CORRECTLY.

4.6 Shutting the System Down

Shutting a ciSeries System Down

- 1) Stop the jet by pressing the STOP key. "Jet Stop" will appear in the upper right hand corner of the screen and a timer will countdown in the lower right hand corner. Other screens and/or functions may be accessed while the jet is stopping.
- 2) Turn the system power off after the complete countdown is complete.



EQUIPMENT DAMAGE: DO NOT TURN THE POWER SWITCH OFF WITHOUT SHUTTING DOWN THE JET.

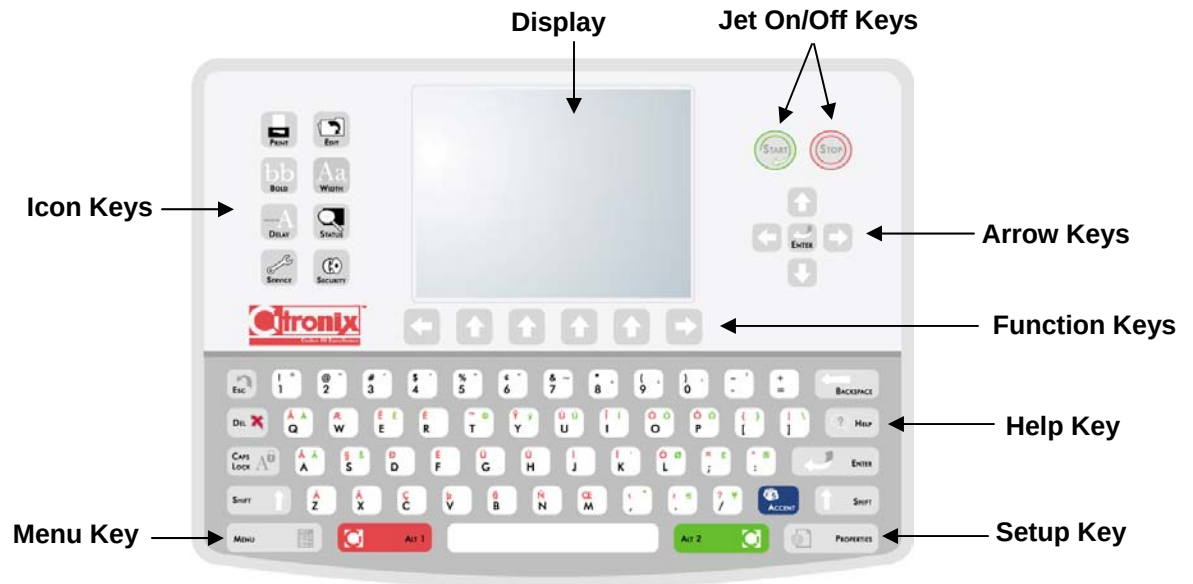


NOTE: TURNING POWER OFF BEFORE JET IS STOPPED COMPLETELY WILL RESULT IN INK LEAKING FROM THE NOZZLE AND GUTTER. THIS WILL REQUIRE MANUAL CLEANING TO START JET.

Section 5 Programming

5.1 The Keyboard and Display

On the front of the controller is the user interface made up of a display and a keyboard. The display and keyboard are used to control and program the system.



The keyboard is comprised of several keys for operation:

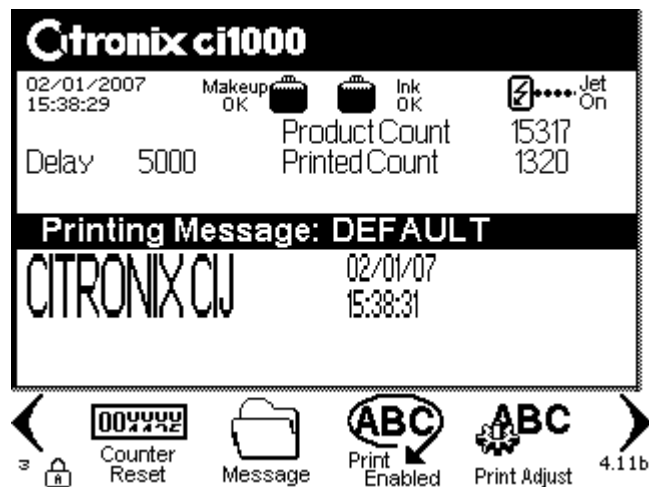
- Alphanumeric and special character keys in QWERTY form are used for programming.
- Operation keys are used for moving around during programming.
- Icon function keys are used for operation.

Operation Keys		Icon Keys	
Up Arrow	Moves cursor up	Start	Starts the jet
Down Arrow	Moves cursor down	Stop	Stops the jet
Right Arrow	Moves cursor right	Menu	Listing of commands
Left Arrow	Moves cursor left	Properties	System setup
Function	Selects icons on display	Help	Help with programming
Enter	Selects or saves changes	Edit	Edit the selected message
Escape	Aborts changes	Print	Select a message to print
Delete	Deletes character behind cursor	Delay	Enter print delay value
Caps Lock	Toggles upper/lower case	Bold	Enter message bold value
Shift	Toggles upper/lower case	Width	Enter message width value
Alt 1	Selects special characters	Status	View system status
Alt 2	Selects special characters	Service	System service functions
Space	Enter space into message	Security	Login/logout of system
Accent	Selects accent marks for characters		

5.2 Main Screen Display

The main screen displays:

- The current time and date
- Makeup and ink status
- Jet status and high voltage status
- Print delay value
- Number of prints since the count was reset
- Number of prints since new message was selected
- Current user logged on (if any)
- Message printing and preview of message
- Function icon keys
- Flash writing status
- Caps, shift, and alternate character status
- Screen number, and firmware version



To display a new screen, press the desired function icon key.



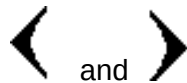
NOTE: Use left/right arrow keys for paging (viewing) to the left and right on messages.

Counter Reset – Allows resets of counters.

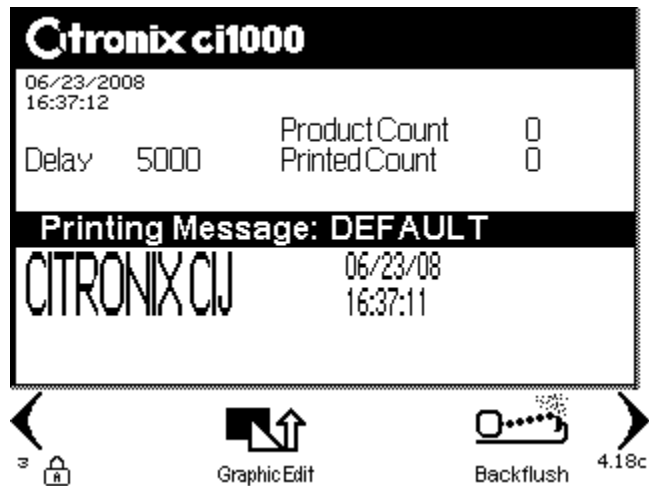
Message – Allows creation, editing or selection of a message for printing.

Print Enable/Disable – Allows printing to be stopped and restarted.

Print Adjust – Allows adjustment of print parameters.



and Indicate that there are hidden icons. Scroll left or right to access these.

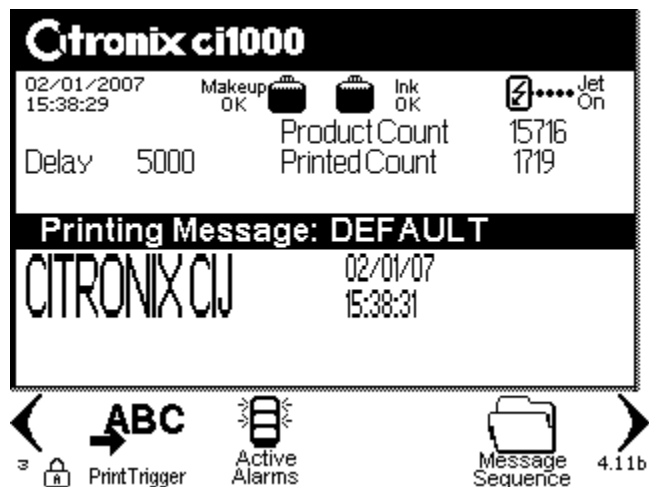


Graphic Edit – Opens the on-board graphic editor.

Backflush – Begins a system backflush (See Section 6). Backflush is only enabled is Jet is off and Printhead Cover is open.



NOTE: When the clock graphic is displayed in the lower left hand corner the system is writing information to flash. Recent changes made will not be saved if system is shutdown while writing to flash.



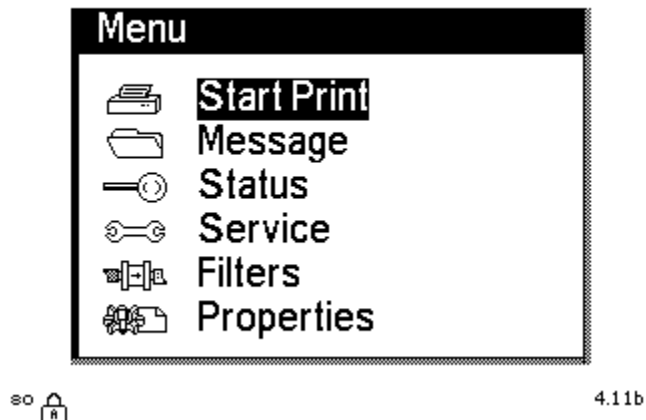
Print Trigger – Triggers the machine to print one time for diagnostics.

Active Alarms – Displays any alarm conditions currently active.

Message Sequence – Allows messages to be added or deleted from a sequence. See Message Sequence Section ____ for detailed instructions.

5.3 Menu Operation

The menu icon key provides an alternative method to gain quick access to printer functions. Press the Menu icon key the following screen is displayed:



Use the up / down arrow keys to highlight the desired function. Upon highlighting the desired function, press the ENTER key, or press the ESCAPE to escape the menu.

5.4 System Properties

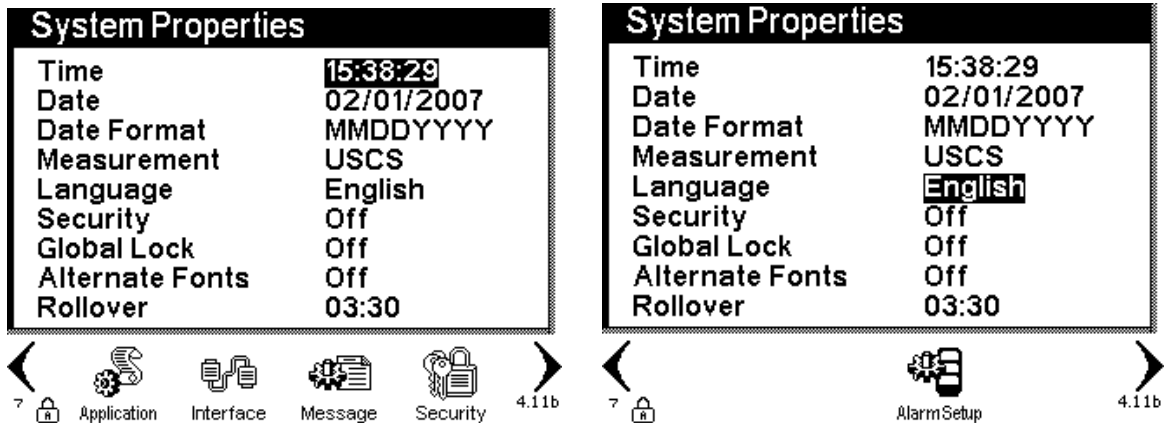
The Properties function icon key enters the system setup screens. Enter specific information related to the application.



NOTE: All settings and values listed are the factory defaults.

Use the up / down arrow keys to highlight the desired setting. Upon highlighting the desired setting, press the right arrow key to toggle through the options, or a pop-up box will open to allow entry of the desired setting. Use the delete/backspace keys to assist during entry of the desired setting value. Press ENTER to save the settings, ESCAPE to abort the changes.

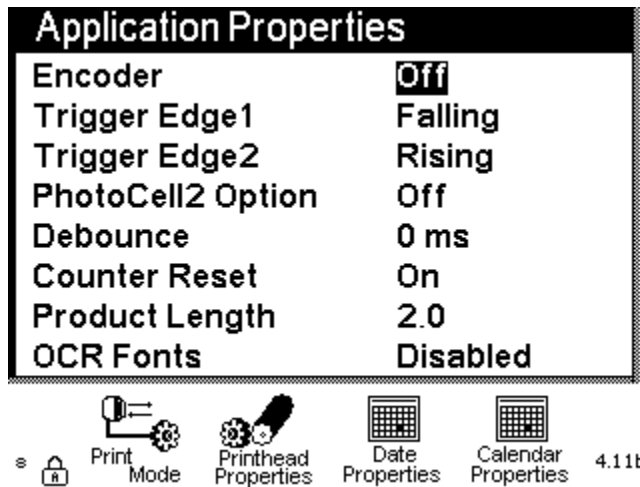
System Properties



Settings	Action	Options
Time	Set current time	HH:MM:SS
Date	Set current date	MM/DA/YYYY
Date Format	Set display date format	MMDDYYYY, DDMMYYYY or YYYYMMDD
Measurement	Set display measurement format	USCS or Metric
Language	Set display language	English, Spanish, French, German, Italian, Chinese, Russian, Bulgarian, Arabic, Vietnamese, Korean, Polish, Turkish, Thai, Hebrew, Greek, Danish, Swedish, Norwegian, Finnish, Brazilian Portuguese, Romanian, Dutch, Japanese
Security	Turn security on / off	On/Off
Global Lock	Set message settings format	On/Off On = message settings are global Off = message settings are per message
Alternate Fonts	Allows use of languages using a non-Roman font set	On/Off On allows Chinese, Arabic, Vietnamese, Korean, and Russian font sets
Rollover	Set a rollover time	Set a positive or negative HH:MM when the date will change (before or after midnight)

Icon Keys	Function
Application	Setup screen for specific application properties.
Interface	Setup screen for host communication interface (RS232, RS485).
Message	Setup screen message default values for all future new messages.
Security	Setup screen for security – user and password.
Alarm Setup	Setup alarm 1, alarm 2, alarm 3 and relay functionality.

Application Properties



Settings	Action	Options
Encoder	Sets whether a shaft encoder is used or not	On/Off
Trigger Edge 1 Trigger Edge 2	Sets edge of print-go signal to begin printing	Rising/Falling
PhotoCell 2 Option	Allows the use of a second PhotoCell to reset or increment one or both counters or reverse the message	Reset Counter 1, Reset Counter 2, Reset Counters 1 / 2, Increment Counter 1, Increment Counter 2, Increment Counters 1 / 2, Message left/right, Message Up/Down or Off
Debounce	Sets photocell 1 debounce time in milliseconds. Useful to filter secondary electrical signals given by mechanical relays.	0 – 99 ms
Counter Reset	Allows counters to reset upon message selection or retain last count	On/Off
Product Length	Sets the product length in inches allowing the software to calculate line speed	Product length in tenths of an inch
OCR Fonts	Enables or disables OCR fonts (to be read by optical readers). NOTE: Font 9 characters only – 0 – 9.	Enabled/Disabled

Icon Keys	Function
Print Mode	Setup screen for mode of operation and to enable/disable Autoprint.
Printhead Properties	Setup screen for Drop size, to enable/disable SmartClean and print quality settings.
Date Properties	Setup screen date properties such as Week start date, Hijri date and Atlas code. Also used to set up encoded dates and times and to select date and time delimiters (separators).
Calendar Properties	Setup screen for days, week, months, and year. Allows custom programmed autocodes for day, week, month and year.

Print Mode

Operation Setup	
Mode of Operation	Normal
AutoPrint	Disabled
Msg Data Command	Enabled

4.1 

4.18c

Settings	Action	Options
Mode of Operation	Sets the operation of the system for the application – see details below.	Normal, Measurement, Message Sequence, Message Code, One for One.
AutoPrint	Allows the ability print continuously. Use Delay to separate distance between printing. NOTE: Too little delay will cause a Phase Error.	Enabled / Disabled.
Message Data Command	Status – indicates if remote communications is able to operated in the specific modes of operation.	No options – just status.

Mode of Operations Defined:

Normal mode is the common mode of operation. A Message is selected to be printed and the same Message prints on all products.

One-For-One mode is designed for applications that need to print new data on each product. The new data must be sent by an external computer – for each print. This mode of operation guarantees that the same data will not print twice. If new data does not arrive before a photocell trigger, the photocell is ignored and nothing will print on the product.

Message Codes uses a six line connector to signal a binary number from 0 to 63. This number indicates the Message Code of the Message to be printed. When Message Code mode is selected, each Message may be assigned a Message Code. There is no transmission of data for this mode. The only control is the four lines of input. These lines are read at the time of the photocell trigger.

Message Sequence uses a list of Messages to be printed. Each photocell trigger will switch to the next Message in the list. The list will wrap from bottom back up to the top. There may be up to twenty Messages in the list. There is only one Message Sequence stored for use.



Printhead Properties

Printhead Properties	
Drop Size	Macro
Print Quality (speed)	Standard (fast)



4.18c

Settings	Action	Options
Drop Size	Sets size of drop and speed of operation. See speed charts.	Macro and Normal
Print Quality (speed)	Sets print quality and speed of print per drop size selected. See speed charts.	PremiumPlus (slow) Premium (medium) Standard (fast) Normal (extra fast)

Date Properties

Date Properties	
Week Start	Jan 1
Hijri Date Adjust(days)	0
Atlas Code Enable	Disabled
Atlas Start Date	01/01/2004
Encoded Date YMD	0000/00/00
Encoded Time HMS	00:00:00
Date Delimiter	/
Time Delimiter	:



4.18c

Settings	Action	Options
Week Start	Specify the starting point for the week of year autocode.	Jan 1 Sunday Monday Saturday ISO – see definition below.
Hijri Date Adjust (days)	Allows a day offset for the Hijri calendar.	0, 1, 2.
Atlas Code Enable	Enables the Atlas code option.	Enabled, Disabled.
Atlas Start Date	Defines the beginning day of year.	Day, Month, Year.
Encoded Date YMD	Allows entry of an encoded date.	Year, Month, Day.
Encoded Time HMS	Allows entry of an encoded time.	Hours, Minutes, Seconds.
Date Delimiter	Allows the definition of the delimiter in the date.	Any ASCII character.
Time Delimiter	Allows the definition of the delimiter in the time.	Any ASCII character.

ISO definition:

The ISO definition of the week number is an international standard that many companies use. The ISO definition is that the week must start on Monday.

Also, the following definition for week 1 – stated in different ways –

- The week with the year's first Thursday in it.
- The week with Jan 4 in it.
- The first week with 4 or more days of the new year in it.
- If Jan 1 is a Mon, Tues, Wed, or Thur, then it is the first week of the year.

If a normal year starts on Thursday, or a leap year on Wednesday, then that year will have 53 weeks.

Calendar Properties

The Calendar Properties screens allows user definable names for Day of Week, Day of Month, Month, and Year. Use right arrow to open. Names may be given any name up to 20 characters each. Use AutoCodes "Alpha" to enter into message: Alpha Day of Week, Alpha Day of Month, Alpha Month and Alpha Year.

Calendar Properties

Day of Week

Sun
Mon
Tue
Wed
Thu
Fri
Sat

 Year Properties
 Month Properties
 Day Properties

4.18c

Calendar Properties

Day of Month

1	9	H	S
2	A	J	T
3	B	K	U
4	C	L	V
5	D	M	W
6	E	N	X
7	F	P	Y
8	G	R	

 Year Properties
 Month Properties
 Week Day Properties

4.18c

Calendar Properties

Month

Jan	Jul
Feb	Aug
Mar	Sep
Apr	Oct
May	Nov
Jun	Dec

 Year Properties
 Week Day Properties
 Day Properties

4.18c

Calendar Properties

Year

	F
B	G
C	H
D	I
E	J

 Month Properties
 Week Day Properties
 Day Properties

4.18c

Interface Properties

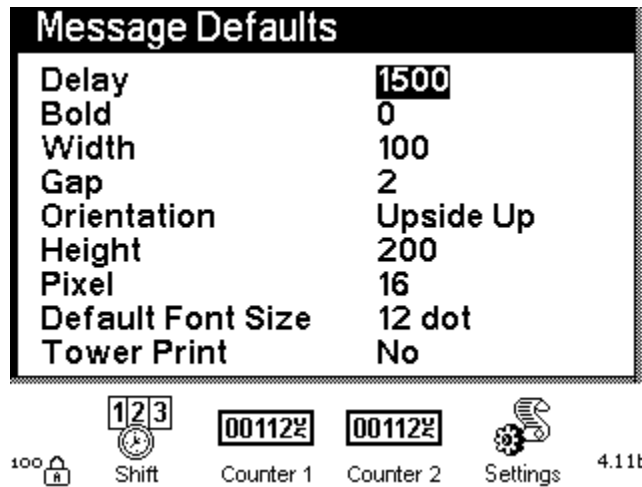
Host Interface Properties	
Acknowledge Ready	No
Acknowledge Complete	No
Acknowledge Photocell	No
Error	No
Echo Characters	No
VJ Emulation	No



4.11b

Settings	Action	Options
Acknowledge Ready	Acknowledges next print ready – can be used to download next print message in one for one operation. Acknowledgement character: "X"	X / Command / No
Acknowledge Complete	Acknowledges message print complete	C / Print data / No
Acknowledge Photocell	Acknowledges Photocell signal received	Yes / No
Error	Sets automatic communication error Notification	Yes / No
Echo Characters	Enables ability to echo any character received. Useful as troubleshooting tool.	Yes / No
VJ Emulation	Allows printer to emulate a VJ printer	No / Yes / CC 1 Line / CC 2 line
(Serial) Baud	Sets baud rate	115.2K, 57.6K, 38.4K, 19.2K, 9600, 4800, 2400, 1200
(Serial) Data	Sets data bits	7, 8
(Serial) Stop	Sets stop bit(s)	1, 2
(Serial) Parity	Sets parity bit	None, Odd, Even
(Serial) Type	Sets type of connection	HOST, RS485, Default, COM 1
(Internet) IP Address	Allows definition of IP Address for Ethernet communications	xxx.xxx.xxx.xxx
(Internet) IP Mask	Allows definition of IP Mask for Ethernet communications	xxx.xxx.xxx.xxx
(Internet) Internet ID	Allows assignment of an internet "nickname" for the printer	0 – 15 characters

Message Default Properties

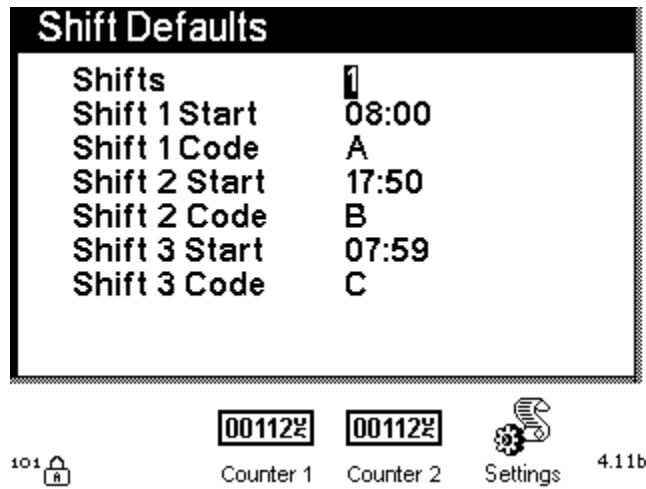


Settings	Action	Options
Delay	Sets delay in rasters between print-go and printing	0 – 999999999
Bold	Duplicates rasters increasing the width of characters	0 – 9
Width	Sets the print resolution by dividing the encoder input pulses, or the int. raster clock setting	0 – 9999
Gap	Sets inter-character spacing in rasters	0 – 9
Orientation	Sets direction of print, and orientation of print	Upside Up, Upside Down, Mirror Up, Mirror Down w/Tower Print Option Enabled: *Tower CCW, Tower CW
Height	Sets the deflection voltage to increase or decrease the height of the printed message	60 – 255
Pixel	Sets number of printed vertical pixels	5 / 7 / 9 / 12 / 2L7 / 16 / 19 / 3L7 / 25 / 31 / 4L7
Default Font Size	Sets the font size all message fields will default to	5 / 7 / 9 / 12 / 16 / 19 / 25 / 31
Tower Print	Enables Tower printing option	Yes / No

*CCW=Counter Clockwise, CW=Clockwise.

Icon Keys	Function
Shift	Setup screen for setting Shift default values.
Counter 1 & 2	Setup screen for setting Counter default values.
Settings	Setup Screen for setting message defaults

Shift Default Properties



Settings	Action	Options
Shifts	Sets number of shifts for shift autocode	1, 2, 3
Shift 1	Sets shift 1 begin time	HH:MM
Shift 1 Code	Sets shift 1 code	5 places - Full character set
Shift 2	Sets shift 2 begin time, and shift 1 end time	HH:MM
Shift 2 Code	Sets shift 2 code	5 places - Full character set
Shift 3	Sets shift 3 begin time, and shift 2 end time	HH:MM
Shift 3 Code	Sets shift 3 code	5 places - Full character set

Counter Default Properties

Counter 1 Defaults

Start	0
Upper	100000
Lower	0
Increment	1
Repeat	0
Lead Zero	Yes
Counter Digits	6
Wrap Around	Yes



Shift



Counter 2



Settings

4.11b

Counter 2 Defaults

Start	0
Upper	100000
Lower	0
Increment	1
Repeat	0
Lead Zero	Yes
Counter Digits	6
Wrap Around	Yes



Shift



Counter 1



Settings

4.11b

Settings	Action	Options
Start	Sets beginning count number	0 – 99999999
Upper	Sets the upper limit of count sequence	0 – 99999999
Lower	Sets the lower limit of the count sequence	0 – 99999999
Increment	Sets the increment value	0 – 99
Repeat	Sets the repeat value for batch printing	0 – 99
Lead Zero	Sets to print or not print leading zeros	Yes / No
Counter Digits	Sets the number of digits to print	1 – 8
Wrap Around	Sets whether counter returns to zero after upper limit or stops printing	Yes / No

Message Settings Defaults

Message Settings Defaults	
Alternate 0	No
Alternate 1	No
Alternate 7	No
Repeat Pitch	0
Repeat Print	0
AutoPrint Pitch	0
Msg Code	0



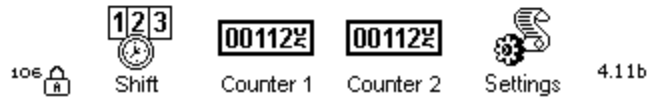





Settings	Action	Options
Alternate 0	Turns on European 0 (with slash)	Yes / No
Alternate 1	Turns on European 1 (with underline)	Yes / No
Alternate 7	Turns on European 7 (with dash)	Yes / No
Repeat Pitch	Sets pitch between repeated prints in rasters	0 – 999999999
Repeat Print	Sets number of times a message will be printed after each product detection	0 – 99999999
AutoPrint Pitch	Allows secondary delay when using AutoPrint feature – delay between each print cycle	999999999
Message Code	Sets the message code (for message select)	0 – 63

Expiration Settings Defaults

Expiration Settings Defaults	
Expiration 1 Days	30
Expiration 1 Weeks	0
Expiration 1 Months	0
Expiration 1 Years	0
Expiration 2 Days	60
Expiration 2 Weeks	0
Expiration 2 Months	0
Expiration 2 Years	0



Two expiration days may be coded onto the product. Expiration dates may be any combination of days, weeks, months, and years. The values will be added together to equal the total expiration value when printing.

Security Properties

Security Properties

Security	Inactive
Print Enable	N/A
Ethernet Access	N/A
User	root
Properties	Yes



16  User Access



Log On



Log Off



Users

5.06c

Settings	Action	Options
Log On	Logs user in	8 characters – case sensitive
Log Off	Logs user out	8 characters – case sensitive
Users	Brings up list of available users	10 users – case sensitive

USER LIST

Settings	Action	Options
Edit User	Edits highlighted user	Change User Name, Password, or Access Levels
Add User	Adds a new user	Add User Name, Password, and Access Levels
Delete User	Deletes highlighted user	N/A

Security User List

CITRONIX

Security User

User	root
Password	root
Message Selection	Yes
Message Edit	Yes
Print Adjust	Yes
Status	Yes
Filter Reset	Yes
Properties	Yes
Service	Yes
Remote Access	Update



4.11b



5.06c

Alarm Options/Setup

Setup for single, dual or triple alarm beacons.

Relay is utilized for third lamp in triple alarm beacons.

All conditions are hard coded as Failures, Warnings or Print Ready.

Alarm Options			
	Alarm1	Alarm2	Alarm3
Failures	Flash	Flash	Off
Warnings	Flash	N/C	N/C
Print Ready	N/C	N/C	On
Not Ready	Flash	N/C	Off
N/C - Not Controlled			

⌂ 




5.06c

Alarm Options			
	Alarm1	Alarm2	Relay
Failures	Flash	Flash	On
Warnings	Flash	N/C	N/C
Print Ready	N/C	N/C	Off
Not Ready	Flash	N/C	On
N/C - Not Controlled			

⌂ 

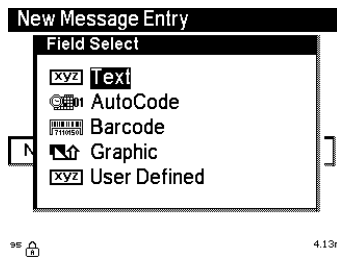



5.06c

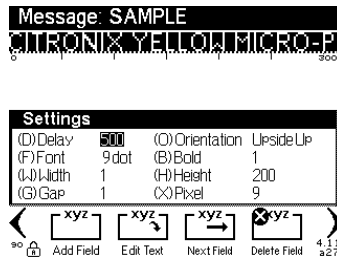
All alarms are set to either Steady On, Flashing or No Change (N/C).

5.5 Creating and Editing Messages

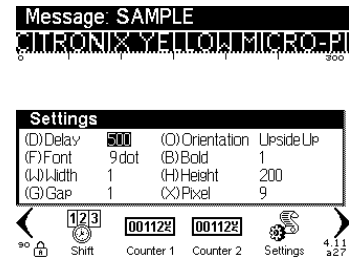
- 1) Select the Message icon key from the Main Screen.
- 2) Select New or Edit Message icon key.
- 3) If creating a new message: Enter the New Message Name, press Enter.
- 4) If editing, or after entering a New Message Name, the following screens are displayed to finish creating a message or edit an existing message:



Field Select



Message creation or editing



Scrolling displays additional icons

Editor Controls			
Add Field	Adds a data field	*Delay	Use "D" to adjust Delay
Edit Text	Edit information in text data field	*Font	Use "F" to adjust Font
Next Field	Moves between fields	*Width	Use "W" to adjust Width
Delete Field	Delete data field	*Gap	Use "G" to adjust Gap
Left Arrow	Moves data field left	*Orientation	Use "O" to adjust Orientation
Right Arrow	Moves data field right	*Bold	Use "B" to adjust Bold
Up Arrow	Moves data field up	*Height	Use "H" to adjust Height
Down Arrow	Moves data field down	*Pixel	Use "X" to adjust Pixel
Alt 1	Selects special characters	*Caps Lock	Toggles between upper/lower
Alt 2	Selects special characters	*Shift	Toggles between upper/lower
*Page	Use "P" to page screens (large messages).		



NOTE: *The Caps Lock and Shift keys operate dual function during editing. Shift and Caps Lock are used in the traditional sense for selecting upper and lower case characters during data entry, and also operate during the adjustment of a setting between a positive and negative increment of the setting.



Note: Pixel defines vertical print area and print speed. Refer to speed charts.

- 5) After editing or creating a new message, press the Enter key to save. If editing a message, the current message name will pop-up to allow the ability to save as a new name (copy/save as function). Should the same name be kept, a separate file will be created based on time and date.



ciSeries Technical Service Manual

Font Chart

The following fonts are available for selection:

Font Name	Description	Ci580	Ci700	Ci1000/2000
5 Dot	5 x 5 Dot Matrix	1 or 2 Line	1 to 4 Line	1 to 5 Line
7 Dot	7 x 5 Dot Matrix	1 or 2 Line	1 to 3 Line	1 to 4 Line
9 Dot	9 x 7 Dot Matrix	1 Line	1 to 3 Line	1 to 3 Line
12 Dot	12 x 8 Dot Matrix	1 Line	1 or 2 Line	1 or 2 Line
16 Dot	16 x 12 Dot Matrix	1 Line	1 Line	1 Line
19 Dot	19 x 15 Dot Matrix	N/A	1 Line	1 Line
25 Dot	25x18 Dot Matrix	N/A	1 Line	1 Line
31 Dot	31x20 Dot Matrix	N/A	N/A	1 Line

Pixel Chart

The following pixel settings are available for selection:

Pixel	Description	Ci580	Ci700	Ci1000/2000
5	5 x 5 Dot Matrix	1 or 2 Line	1 to 4 Line	1 to 5 Line
7	7 x 5 Dot Matrix	1 or 2 Line	1 to 3 Line	1 to 4 Line
9	9 x 7 Dot Matrix	1 Line	1 to 3 Line	1 to 3 Line
12	12 x 8 Dot Matrix	1 Line	1 or 2 Line	1 or 2 Line
2L7	2 Lines of 7 x 5 Dot Matrix	2 Line	1 Line	2 Line
16	16 x 12 Dot Matrix	1 Line	1 Line	1 Line
19	19 x 15 Dot Matrix	N/A	1 Line	1 Line
3L7	3 Lines of 7 x 5 Dot Matrix	N/A	3 Line	3 Line
25	25x18 Dot Matrix	N/A	1 Line	1 Line
31	31x20 Dot Matrix	N/A	N/A	1 Line
4L7	4 Lines of 7 x 5 Dot Matrix	N/A	N/A	4 Line



NOTE: The pixel parameter should be set to the lowest value in relation to the largest character or characters.

NOTE: Using Pixel 2L7, 3L7, 4L7 will provide optimum speed and quality for dedicated 2 line, 3 line or 4 line 7x5 character printing.

Optional Fields

The following fields are available for selection when creating or editing a message:

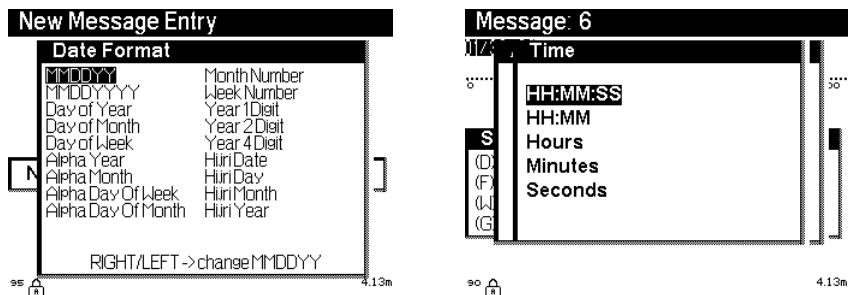
- Text Allows alphanumeric text to be inserted
- Autocode Allows Times, Dates or Shift (See section 10.5) to be inserted.
- Counters Allows one or two counters to be inserted.
- Barcode Allows a barcode (See section 10.6) to be inserted.
- Graphic Allows a downloaded Graphic to be inserted.
- User Defined Allows a User Defined Text or Barcode field to be inserted.

AutoCode Chart

The following autocodes are available for selection when adding a data field:

Time Based	Date Based (Normal) (Expiration) (Rollover) (Expiration Rollover)	Shift	Counter
HH:MM:SS	MMDDYY or MMDDYYYY	Three Shift Codes	Counter 1
HH:MM	Day of Year		Counter 2
Hours	Day of Month		
Minutes	Day of Week		
Seconds	Alpha Year		
	Alpha Month		
	Alpha Day of Week		
	Alpha Day of Month		
	Month Number		
	Week Number		
	1, 2, or 4 Digit Year		
	Hijri Date		
	Hijri Day		
	Hijri Month		
	Hijri Year		

When selecting a Time or Date based field the user is prompted to select a delimiter (separator). The default may be accepted or any character used. The user will also be whether to reverse the characters or encode the characters.



NOTE: The MonthDayYear configuration can be changed to DayMonthYear or YearMonthDay by using the left or right arrow keys.



ciSeries Technical Service Manual

Time, date, shift and counter codes are based on the following:

AutoCode	AutoCode Basis
Time	Based on real time setup in System Properties
Date	Based on real date setup in System Properties
Expiration Date	Based on real date and expiration date setup in System Properties and Application Properties
Rollover Date	Based on real date and rollover time setup in System Properties and Application Properties
Expiration Rollover Date	Based on real date, rollover time and expiration date setup in System Properties and Application Properties
Shift	Based on real time and shift time setup in System Properties and Application Properties
Counter	Based on counter setup in Application Properties



NOTE: ROLLOVER TIME IS A OFFSET OF THE 12:00AM CALENDAR DAY CHANGE. IF ROLLOVER IS SET TO 2:00 (AM), THE CALENDAR DAY WILL ADVANCE AT 2:00 (AM), NOT 12:00AM.



Bar codes

The following bar codes are available for selection:

Description	Input (enter data)	Human Readable Text Available (yes/no)	Check Digit
I 2 of 5	Up to 256 numeric characters or Counter	Yes	Automatic or Disabled
Code 39	Up to 256 alpha-numeric characters or Counter	Yes	Manual – must enter
Code 128	Up to 256 alpha-numeric characters or Counter	Yes	Manual – must enter
UPC A (11)	11 numeric characters	Yes	Automatic
UPC E (6)	6 numeric characters	No	Automatic
EAN13 (12)	12 numeric characters	Yes	Automatic
EAN8 (7)	7 numeric characters	Yes	Automatic
Datamatrix	Variable based on matrix	No	N/A



NOTE: Utilize the “Bold” setting to increase size of the bar code. The bold setting defines the number of printed columns used for the wide and narrow spaces and bars.



ciSeries Technical Service Manual

Printable Character Chart

Normal	Shift	Alt 1	Alt 1 + Caps Lock	Alt 2	Alt 2 + Caps Lock
1	!				
2	@				
3	#				
4	\$				
5	%				
6	¢				
7	&				
8	*				
9	(				
0	)				
-	_				
=	+				
q	Q	â	Â	À	à
w	W	æ	Æ	μ	μ
e	E	ë	Ë	È	è
r	R	é	É	~	~
t	T	™	™	©	©
y	Y	ÿ	Ÿ	Ý	ý
u	U	ù	Ù	Ú	ú
l	l	ï	Ï	Í	í
o	O	ò	Ò	Ó	ó
p	P	ô	Ô	Õ	õ
[	[	{	{	}	}
]	]			\	\
a	A	å	Å	Ä	ä
s	S	š	Š	Š	š
d	D	ð	Ð		
f	F	ê	Ê		
g	G	ü	Ü		
h	H	û	Û		
j	J	ì	Ì		
k	K	î	Î	'	'
l	L	ö	Ö	Ø	ø
;	;	¤	¤	£	£
:	:	"	"	®	®
z	Z	á	Á	¼	¼
x	X	ã	Ã	½	½
c	C	ç	Ç	¾	¾
v	V	þ	Þ		
b	B	ß	ß		
n	N	ñ	Ñ		
m	M	œ	Œ		
,	,	<	<	°	°
.	.	>	>	€	€
/	/	?	?	¥	¥

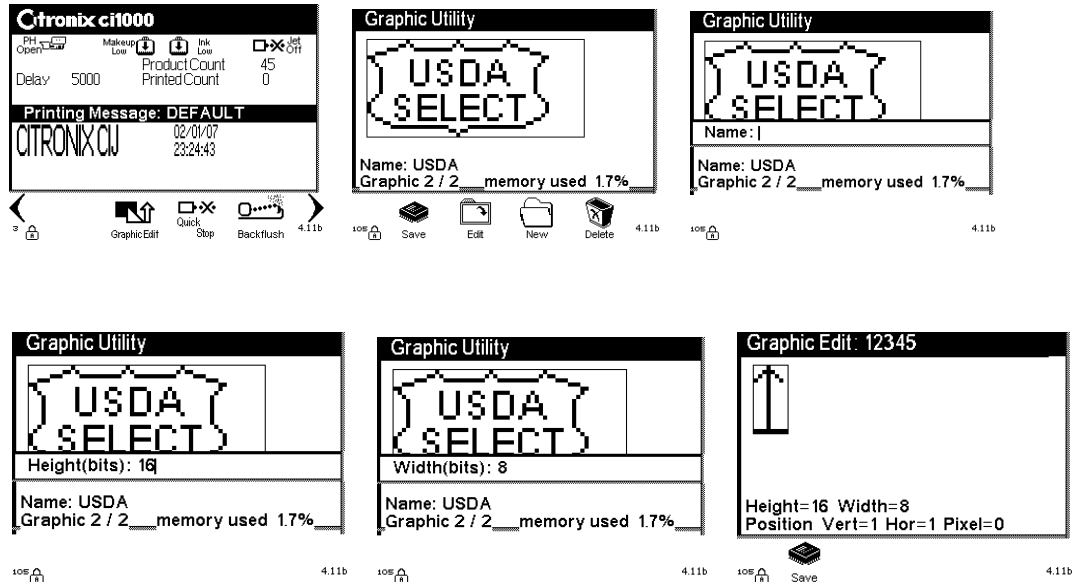
5.6 Graphic Editor

Step 1: Select New, Edit or Delete icon to create a new graphic, edit or delete the existing graphic. Use the up / down arrows to scroll through existing graphics.



NOTE: Graphics can be generated through the integrated Graphic Utility or downloaded via the AutoUpdate utility.

Step 2: Creating new graphic requires the following input: a name, height and width of the graphic.



Step 3: Creating new graphic requires the following input: a name, height and width of the graphic.

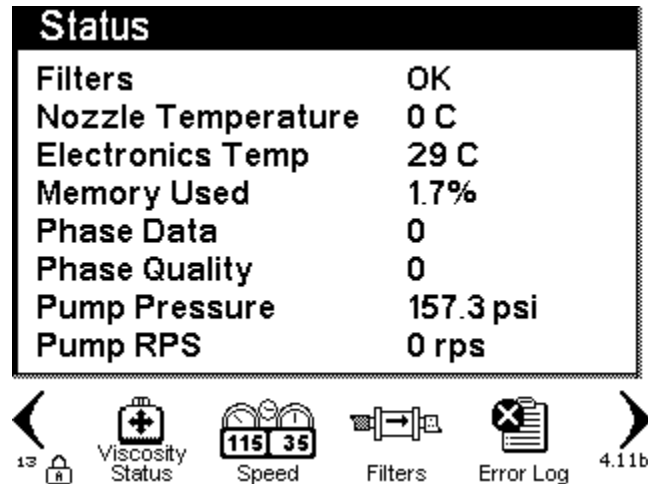


NOTE: Graphic width is divisible by 8, if you enter 7 the width will be 8, if you enter 8 it will be 8, if you enter 9 it will be 16.

- Step 4: Use the up / down / right / left arrows to position the cursor in the location of the printed pixel, press enter. Eliminate a printed pixel, place the cursor on the printed pixel and press enter. Create patterns using a single pixel placement at a time. Utilize the status parameters for details of graphic: Graphic Size, Cursor Position and Pixel selection (1=printed or 0=non-printed).
- Step 5: Press the "Save" icon when complete. Press enter or escape key to exit the Graphic Utility.
- Step 6: Enter into message with the "Graphic" field selector. Use the arrow keys to select the appropriate graphic for the specific message.

5.7 System Status Screen

The following screen displays the system status and allows access to filter monitoring and status screens:



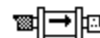
Status	Description	Options
Filters	Indicates status of the filters	OK, Due
Nozzle Temp	Indicates the temperature at the nozzle	Displays temperature at printhead – ambient.
Electronics Temp	Indicates the electronics temperature	Displays temperature in cabinet – shows higher than ambient by 5-10C.
Memory Used	Indicates the amount of memory used	Percentage of total memory
Phase Data	The position where the software is setting the phase	0-15 (Continuously changing)
Phase Quality	Percentage of time phase is found	0-100%
Pump Pressure	Current pump pressure	Pressure in psi or Bars
Pump RPS	Current pump RPS (revolutions per second)	Pump speed in RPS

Icon Keys	Function
Viscosity Status	Shows current viscosity status
Speed	Speed status screen (performance)
Filters	Filter status screen
Error Log	Current error log
Viscosity Log (scroll over)	Current viscosity log

Filter Status

Filters			
Filter	Status	Time (Hours)	
		Run	Remain
Main	OK	0	2000
Pre Pump	OK	0	1999
Gutter	OK	0	1999
Fan	OK	16	683
Make Up	OK	0	1999

14 



Filters 4.11b

NOTE: When filter time expires and filter status becomes DUE an error message will pop up. The error will return every 3 minutes until status is reset.

Status	Product	Description	Options
Main	All	Allows 2000 hour operation	OK, Due
PrePump	All	Allows 2000 hour operation	OK, Due
Gutter	All	Allows 2000 hour operation	OK, Due
Fan	All	Allows 700 hour operation	OK, Due
Makeup	All but ci500	Allows 2000 hour operation	OK, Due

Icon Keys	Function
Filters	Screen to reset filter times after they have been changed.

Update Filters

Update Filters	
Select Filter to Change	
Main	OK
Pre Pump	OK
Gutter	OK
Fan	OK
Make Up	OK

15 



OK 4.11b

Use the up / down arrow keys to highlight the filter to update, press ENTER to update. Use the OK key to go back to Filter Status.

Speed Screen

Speed	
Encoder Freq	0
Print Freq	0
Average Drops	0
Max Print Freq	
Line Speed	---
MPC	0
TFC	0
DNRC	0



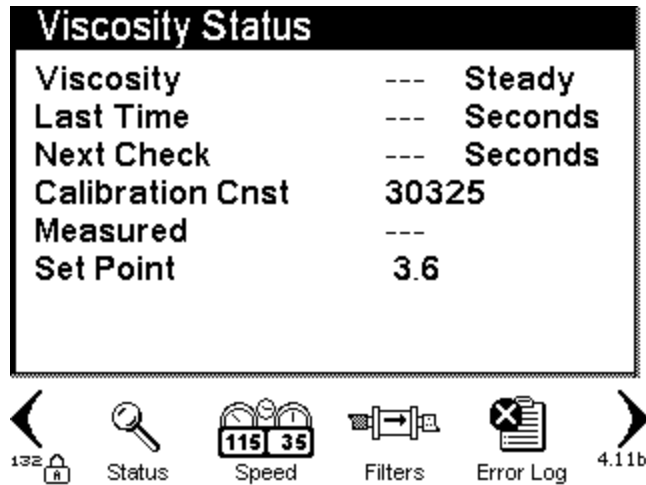
4.12b

Field	Description	Options
Encoder Freq	Actual frequency of encoder	Frequency in DPI
Print Freq	Actual printing frequency	Encoder Freq divided by the Width plus 1
Average Drops	Average number of drops used per raster of current message	Frequency in DPI
Max Print Freq	Maximum frequency the message can be printed with current settings and parameters	Drop Freq divided by Max Drops
Line Speed	Shows line speed based on product Length input on Applications Properties screen.	Speed Status
MPC	Missing Product Count. Message too large for the speed.	Count
TFC	Too Fast Count. Attempting to print faster than processor's capability.	Count
DNRC	Did Not Receive Count. In one-for-one mode, product was detected but new message was not received.	Count



NOTE: For optimum performance Print Frequency should never exceed Max Print Frequency.

Viscosity Status Screen



Field	Description	Options
Viscosity	Shows status of viscosity	High, Low or OK Steady, Rising or Falling
Last Time	Ball drop time	Time in seconds
Next Check	Time until next viscosity check	Time in seconds
Calibration Constant	Calibration setting – calibration is obtained from the viscometer. Calibrated at factory.	Calibration number or NOT CALIBRATED
Measured	Measured viscosity	Viscosity in CentiPoise
Set Point	Target viscosity	Viscosity in CentiPoise



ciSeries Technical Service Manual

5.8 Help Screen

The help screen displays where to receive help with the product. It also displays information Citronix will require to assist in any diagnostics. The help is broken down into 3 separate screens; Citronix and lifetime information, Distributor information and diagnostic information.

Help	Contact Information	Hardware Help
 Citronix Continuous Ink Jet Copyright 2006 Citronix Email: info@citronix.com Internet: www.citronix.com Power On Time 39.30 Hours Run Time 0.00 Hours Total Prints 0 PRESS ANY KEY TO CONTINUE PRESS ESC TO EXIT	 Citronix Continuous Ink Jet Copyright 2006 Citronix Distributor: DISTRIBUTER Contact: TECHNICIAN Email: YOU@YOURCOMPANY.com Telephone: 123-456-7890 PRESS ANY KEY TO CONTINUE PRESS ESC TO EXIT	 Citronix Continuous Ink Jet Copyright 2006 Citronix Version 4.11b-test Smart Clean Board Version = V2 DSP Version 1.62 Xilinx Version 2.16 Xilinx Type = XC2S100 PCB Serial--452E33000000 PRESS ANY KEY TO CONTINUE PRESS ESC TO EXIT

Distributors can now enter their contact information to be displayed on the Help Screen. To add Information, press SERVICE and type "SCONTACT". The information can then be edited for distributor use.

Local Contact Setup		Local Contact Setup	
Distributor	DEFAULT	Distributor	DISTRIBUTER
Contact	-----	Contact	TECHNICIAN
Telephone	-----	Telephone	123-456-7890
Email	-----@---.com	Email	YOU@YOURCOMPANY.com

128

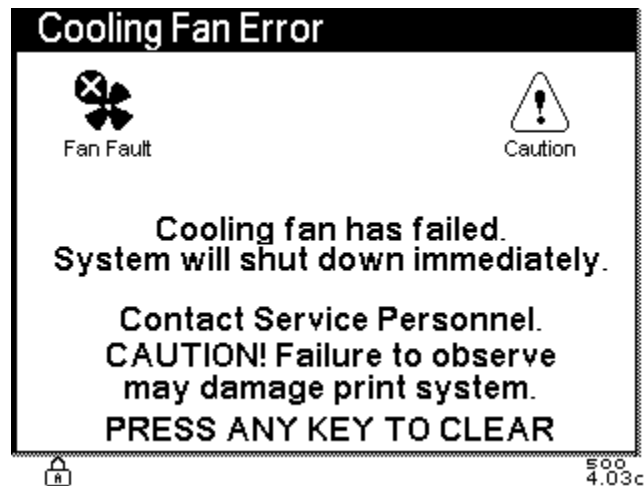
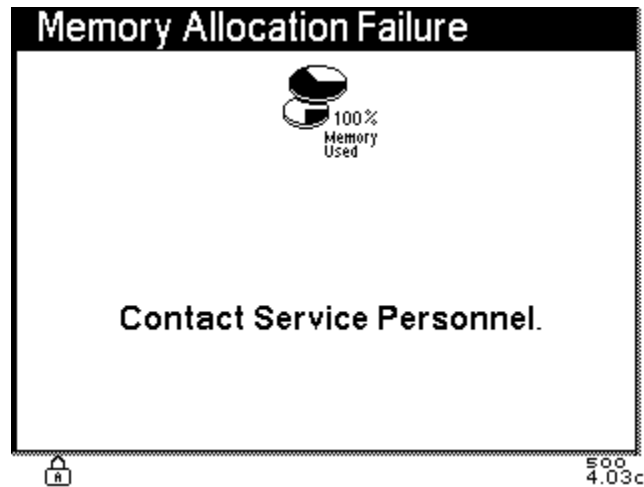
4.11b

128

4.11b

5.9 System Error Screens

The following error screens are displayed when a fault occurs. See Section 12 for troubleshooting.



Photocell Error



PC Error

**Product detection occurred
during print process.
Adjust print delay,
or photocell placement to correct.**

PRESS ANY KEY TO CLEAR



500
4.03c

Filter Service Required



Filter Due



Caution

Filters are due for replacement.

**CAUTION! Failure to observe
may damage print system.**

PRESS ANY KEY TO CLEAR



500
4.03c

Temperature Fault



Temp Fault



Caution

Check/replace system fan filter.

**Should this not correct the error,
Contact Service Personnel.**

**CAUTION! Failure to observe
may damage print system.**

PRESS ANY KEY TO CLEAR



500
4.03c

Printhead Charge Error



Charge Error



Caution

**Ink or solvent on charge electrode.
Clean and allow
printhead components to dry.
If cleaning does not remedy,
Contact Service Personnel.
CAUTION! Failure to observe
may damage print system.
PRESS ANY KEY TO CLEAR**



500
4.03c

Gutter Error



Gutter Fail



Caution

**Ink is not entering gutter.
Clean and allow
printhead components to dry.
If cleaning does not remedy,
Contact Service Personnel.
CAUTION! Failure to observe
may damage print system.
PRESS ANY KEY TO CLEAR**



500
4.03c

Printhead Temperature Fault



PH Temp



Caution

Lower the temperature at printhead.

**Contact Service Personnel.
CAUTION! Failure to observe
may damage print system.
PRESS ANY KEY TO CLEAR**



500
4.03c



Makeup Reservoir Full

Makeup High



Caution

Remove makeup.

System will not print
until makeup is removed.
**CAUTION! Failure to observe
may damage print system.
PRESS ANY KEY TO CLEAR**

500
4.03c**Makeup Reservoir Low**

Makeup Low



Caution

Add makeup.

**CAUTION! Failure to observe
may damage print system.
PRESS ANY KEY TO CLEAR**

500
4.03c**Makeup Reservoir Empty**

Makeup Out



Caution

Add makeup.

**CAUTION! Failure to observe
may damage print system.
PRESS ANY KEY TO CLEAR**

500
4.03c

High Voltage Trip



HV Trip



Caution

**Ink or solvent on deflector electrodes.
Clean and allow
printhead components to dry.
If cleaning does not remedy,
Contact Service Personnel.
CAUTION! Failure to observe
may damage print system.
PRESS ANY KEY TO CLEAR**



500
4.03c

Modulation Error



Mod Fail



Caution

**Printhead requires cleaning.
Clean and allow
printhead components to dry.
If cleaning does not remedy,
Contact Service Personnel.
CAUTION! Failure to observe
may damage print system.
PRESS ANY KEY TO CLEAR**



500
4.03c

Pump Pressure Error



Press Fail



Caution

Pressure = 142.5 psi

Pump operating above normal pressure

**Contact Service Personnel.
CAUTION! Failure to observe
may damage print system.
PRESS ANY KEY TO CLEAR**



500
4.03c

Pump Pressure Error



Press Fail



Caution

Pressure = 142.7 psi

Pump operating below normal pressure

**Contact Service Personnel.
CAUTION! Failure to observe
may damage print system.
PRESS ANY KEY TO CLEAR**



500
4.03c

Pump Motor Error



Press Fail



Caution

Pump motor has failed.

Contact Service Personnel.

**CAUTION! Failure to observe
may damage print system.
PRESS ANY KEY TO CLEAR**



500
4.03c

Viscosity High Error



Viscosity



Caution

Viscosity above operating range.

Add makeup.

**Contact Service Personnel.
CAUTION! Failure to observe
may damage print system.
PRESS ANY KEY TO CLEAR**



500
4.03c

Viscosity Low Error

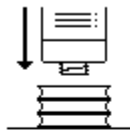
Viscosity



Caution

Viscosity below operating range.

**Contact Service Personnel.
CAUTION! Failure to observe
may damage print system.
PRESS ANY KEY TO CLEAR**

500
4.03c**Add Makeup**

**Action: System requires makeup
for continued operation.
Caution: Failure to observe will result
in poor print quality.**

PRESS ANY KEY TO CLEAR

500
4.03c**Counter Completed.**

Caution

**Photocell Disabled.
Enable Photocell to continue.**

PRESS ANY KEY TO CLEAR

500
4.03c

Viscometer Error



Viscosity



Caution

Viscometer Sensor Error

Contact Service Personnel.
CAUTION! Failure to observe
may damage print system.
PRESS ANY KEY TO CLEAR

500
4.03c

Viscometer Not Calibrated



Viscosity



Caution

Calibrate Viscometer

Contact Service Personnel.
CAUTION! Failure to observe
may damage print system.
PRESS ANY KEY TO CLEAR

500
4.03c

Mains Power Error



Power Fail



Caution

**Mains interference or
a power outage has occurred.**

Contact Service Personnel.
CAUTION! Failure to observe
may damage print system.
PRESS ANY KEY TO CLEAR

500
4.03c

Printing too fast !

Too Fast

**Print quality will improve
at lower print speeds,
or a less demanding print message.**

500
4.03c**Unused Memory Is Low**

**Unused memory is low.
Purge event/error logs,
or delete unused messages**

PRESS ANY KEY TO CLEAR500
4.03c**Memory Is Full**

**Memory is full.
Purge event/error logs,
or delete unused messages**

PRESS ANY KEY TO CLEAR500
4.03c

Log in Failure

Log In Fail

**Not logged in, wrong user name,
or password.**

**Log in, or use the correct
user name and password.**

PRESS ANY KEY TO CLEAR

500
4.03c**Not Logged In**

Caution

Not Logged In

Login before using printer.

500
4.03c**Unexpected DSP Jet Off**

Caution



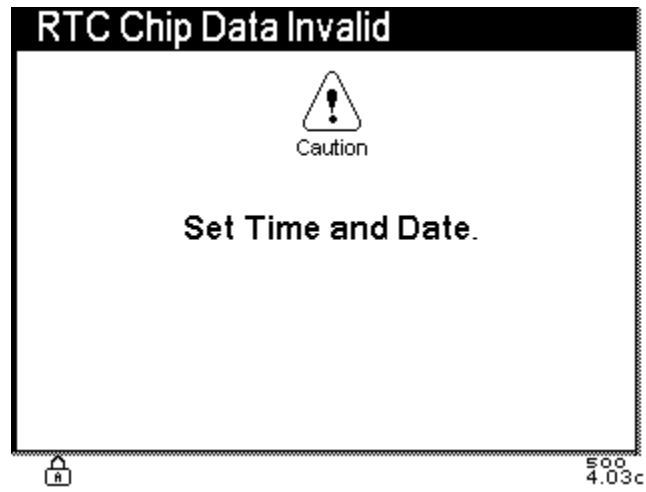
Caution

Unexpected DSP Jet Off

**Contact Service Personnel.
CAUTION! Failure to observe
may damage print system.**

PRESS ANY KEY TO CLEAR

500
4.03c





ciSeries Technical Service Manual

5.10 Service Screens and Settings

The Service function icon keys enter the system configuration screens.



CAUTION: The service configuration files should only be changed by Citronix trained personnel that have a thorough understanding of the service configuration settings.



NOTE: All settings detailed are based on a specific printhead and ink system. Settings will vary from one system to another.



NOTE: Settings changed will take affect immediately, and require an acceptance or cancellation prior to leaving the service screen.

Original Factory Calibrated Service settings are detailed on the Citronix label located on the inside of the air filter cover on the right hand side of the controller and on the inside of the keyboard panel door of the electronics compartment next to the CPU. These settings are specific to the originally configured components for each system.



NOTE: If the nozzle is removed for cleaning, replaced and/or any component of the drop generator is removed/replaced then the system must be re-calibrated (Modulation, Charge and Pressure).

CONTROLLER SETTINGS				
	CHARGE	MOD	PRES	BAND
NORMAL	74	190	40	-2
MACRO	74	150	40	0

Serial # 0408311E
MACHINE REV A16

VISCOMETER CALIBRATION 36126 P/H REV A8

INK TYPE: MEK BLACK INK INK # : 300-1001- 001
MAKEUP: MEK MAKE-UP MU # : 300-1007 001
Q.C. DATE: 11/07/08 INSPECTOR: [Signature]

WARNING

This printer will only work properly with Citronix firmware version 5.04N or later. Use of an older version of firmware may cause poor print quality and may void warranty.

Service Status

Use the function icon keys to access service settings or functions. The Service Status screen displays four service function icon keys; using the function icon arrow keys can access additional service function icon keys.

Service		Service	
Drop Size	Normal	Drop Size	Macro
Charge Setting	74%	Charge Setting	70%
Modulation Setting	150	Modulation Setting	180
Band Setting	0	Band Setting	0
Viscometer Cal Cnst	36150	Viscometer Cal Cnst	36150
Pump Pressure	40	Pump Pressure	40
Gutter Offset	0	Gutter Offset	0














5.10.2 Calibrate Modulation, Charge and Pressure:

Drop Size, Charge Setting, Modulation Setting, Viscometer Calibration Constant and Pump Pressure are changed by scrolling to the desired command and using the left and right arrow keys to adjust.



NOTE: Each drop size has independent values for Modulation, Charge and Pressure.

Step 1

Set Charge:

Pressure: 40

Modulation:

Modulation –

72

40

a) Set Modulation to 150.

b) Set Band to 0 and make a print sample.

c) Advance the Band until the print quality looks good. (Use both + and – ranges).

d) When a good band is found - check for a 100 volt good print window and set the modulation in the center of this window.

Eg. If the window is 100 to 220 then set the modulation at 160.

e) If an acceptable window cannot be found then advance to the next band.

Step 2

Charge –

Adjust between 68-76, ensure range is good, set value to optimum print quality.

Step 3

Pressure –

Adjust value between 37-43, ensure range is good, set value to optimum print quality. If pressure range fails, find another modulation band – repeat steps 1-3.



NOTE: It is necessary to follow this procedure should a change be made to the drop generator: nozzle removal/clean, nozzle replacement, resonator seal change, resonator replacement. In addition, should an ink type change be made this procedure should be followed.



ciSeries Technical Service Manual

Viscometer Cal Const (Viscometer Calibration)

A ciSeries system must have the viscometer calibrated to operate correctly. A properly calibrated viscometer will maintain the optimum ink viscosity through the print operation.

The calibration constant is determined at the factory. Each viscometer is calibrated at the factory. Enter the calibration constant from the “Service Label” or the “Viscometer” – inscribed on the side.

To adjust the viscosity set point:

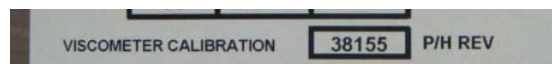
- 1) Scroll down to the Viscometer Cal Cnst.
- 2) Press the right arrow to bring up the user entry prompt.
- 3) Type in the correct 5-digit viscometer calibration.
- 4) Press Enter twice and you will be prompted to accept or cancel changes.

Service	
Drop Size	Macro
Charge Setting	72%
Modulation Setting	150
Viscometer Cal Cnst	34212
Pump Pressure	40
Cal Constant: 34212	

12

4.12b

The calibration constant can be obtained from the “Service Label” or via the actual viscometer. This will be engraved and labeled at the factory.





Gutter Offset:

Offers the ability to make software adjustments to prevent build-up on gutter - Do not use unless needed. It will have some effects on the drop placement, and therefore the print quality.

Gutter Offset is a "fine tuning" adjustment to the position of the ink drops. Positive values move the ink away from the gutter, negative values move the ink towards the gutter. Acceptable values are -3 to +10.

Rarely needed, suggest using only with Micro printers or with Pixel 31 or in situations that Height is set above 200. Mostly a small plus number will move the drops far enough away from the edge of the gutter to avoid clipping.



ciSeries Technical Service Manual

Additional service function icon keys accessed by the function icon arrow keys:



Filter Times



Override



Test Valves



Phase Set



Run Pump



HV Trip



Visc. Check



Phase Align



Configure

Prior to accepting a change to a factory system configuration setting you will be prompted to accept the changes. You may accept or reject the changes at this time.

Filter Times

The Fluid Filter time limits can be set in this service screen. Use right arrow to open entry box and enter a value between – 300 - 2000 hours. This will determine when the “Filter Due” warnings are displayed on the main screen.

Filter Limits	
Ink Filter	2000 Hours
Fan Filter	2000 Hours

490

4.18c

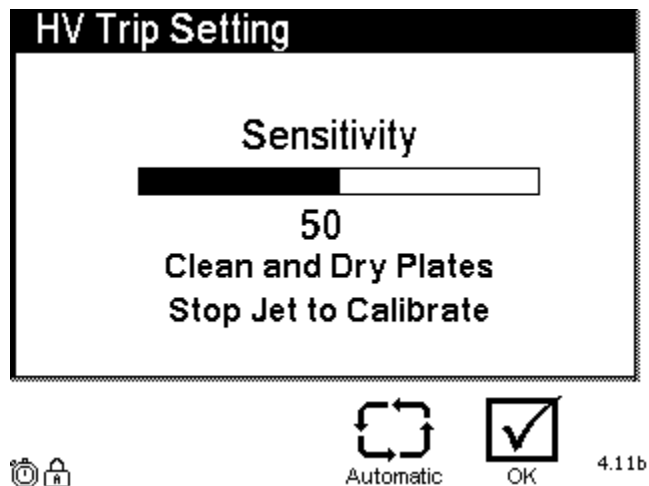
HV Trip Setting

The high voltage trip setting sets the sensitivity to stop the jet and turn the high voltage off in the case of a high voltage arc between the ground and the high voltage plate.

The potential for a high voltage arc occurs when the printhead is wet (ink, cleaner or moisture in the environment). The HV Trip setting is now an automatic function.

To calibrate the HV Trip setting:

- 1) Ensure printhead is clean and dry.
- 2) Ensure the printhead cover is fitted.
- 3) Press the "automatic" button.
- 4) The system will self-calibrate the correct sensitivity.





Viscosity Check

The system automatically checks viscosity every 2 minutes. Additionally, the viscosity can be checked manually by pressing the Viscosity Check icon. This will start the Viscosity check manually.

Override

The override function allows a service technician the ability to turn the error functions off to carry out service functions.

The override functions should only be used on a temporary basis to enable a service routine to be carried out.

To turn the various settings on/off:

- 1) Use the right arrow to toggle between No/Yes.
- 2) Use the up / down arrow to select the appropriate function to turn on/off.



CAUTION: Upon completing the service routine, ensure the manual override settings are turned to the No position. Automatically at power off the Manual Overrides will default to No.

Manual Override	
Charge Fault	No
Phase Fault	No
Gutter Fault	No
Ink System Fault	No



4.11b



ciSeries Technical Service Manual

Manual Valve Control (Test Valves)

The manual valve control provides a tool to diagnose if a valve is working correctly. Each individual valve can be controlled via this screen – open or closed. This allows the valve to be removed and then close/open manually verifying with fluid that the valve is indeed opening and closing correctly.

To open or close valve:

- 1) Use the right arrow to toggle between Closed and Open.
- 2) Use the up / down arrow to select the appropriate valve to Close or Open.

Manual Valve Control	
Printhead Valve	Closed
Viscosity Valve	Closed
Gutter Purge Valve	Closed
Makeup Valve	Closed
Air Prg/Makeup Pump Valve	Closed
Nozzle Flush Valve	Closed



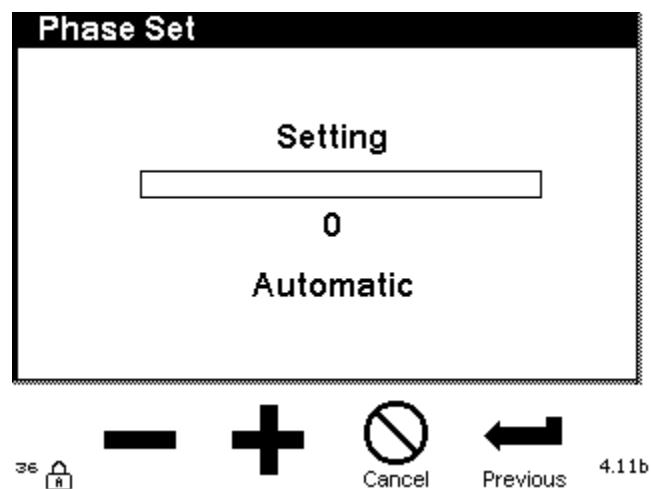
4.18c

Phase Set (Test Automatic Phasing)

The phase set is a tool to manually adjust the phasing process for diagnostic purposes. The manual phase set can only be adjusted during this screen as a diagnostic tool to check if automatic phasing is working correctly. When exiting this screen the automatic phasing will be re-enabled.

To manually adjust phasing:

- 1) Use the “+” or “-” function icon keys to increase or decrease the phase value.
- 2) The adjustment will take place immediately.
- 3) When exiting the screen auto phasing will be implemented. Manual phasing can only be operated when in this screen.



Diagnostic Use:

Determine if the system is stable enough for the phase detector to perform correctly.

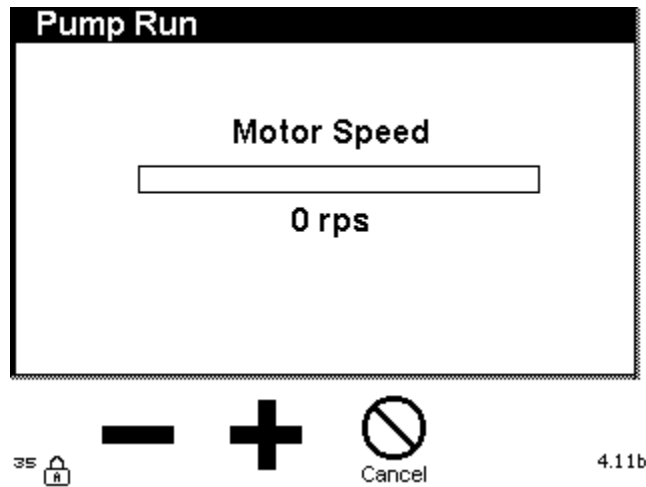
- o This tool disables the use of the phase detector.
- o 0-15 manual phase positions. Find a manual phase value that provides consistent good print.
- o If a good manual phase value can be determined this proves the phase detector could be faulty. Assuming phase detector will not provide good quality printing.

Run Pump

The run pump function provides the ability to run the pump as a tool to circulate ink through the system without starting the jet.

To run the pump:

- 1) Press the Run Pump function icon key.
- 2) Increasing the speed starts the pump. Use the Cancel or Previous function icon key to stop the pump.



NOTE: When the run pump operates. The ink will circulate through system normally, with exception that the printhead valve does not open (no jet). The vacuum will operate as normal and vacuum at the gutter can be verified for diagnostics.



ciSeries Technical Service Manual

Configure

This screen provides the ability to select the correct ink type being used and select the keyboard in use.

To set the Ink Type:

- 1) Press the "Configure" icon key from the main screen.
- 2) Scroll to "Ink Type".
- 3) Use the left /right arrows to select the ink type.
- 4) Press "OK" icon to save changes or "Cancel" icon to abort.

Ink options for ci580:

MEK, Acetone, Ethanol

Ink options for ci700/ci1000/ci2000:

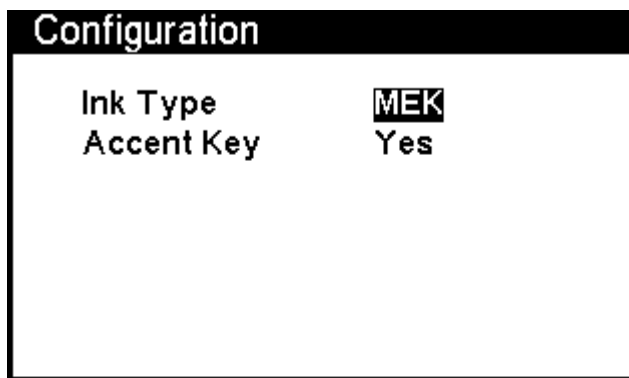
MEK, Plastic MEK, Ethanol, Alcohol Resistant, Acetone and Glycol.

Ink Type selection changes the default settings such as pump pressure, viscosity set point and conductivity measurement for ink/makeup low conditions.

To set the Accent Key (Keyboard Type):

- 1) Press the "Configure" icon key from the service status screen.
- 2) Scroll to "Accent Key".
- 3) Use the left /right arrows to select "Yes" or "No".
- 4) Press "OK" icon to save changes or "Cancel" icon to abort.

Keyboards delivered starting ciSeries Model 2006 have an accent key. To utilize this capability, this feature is required to be enabled (Yes). Pre-2006 systems should have this feature disabled (No).

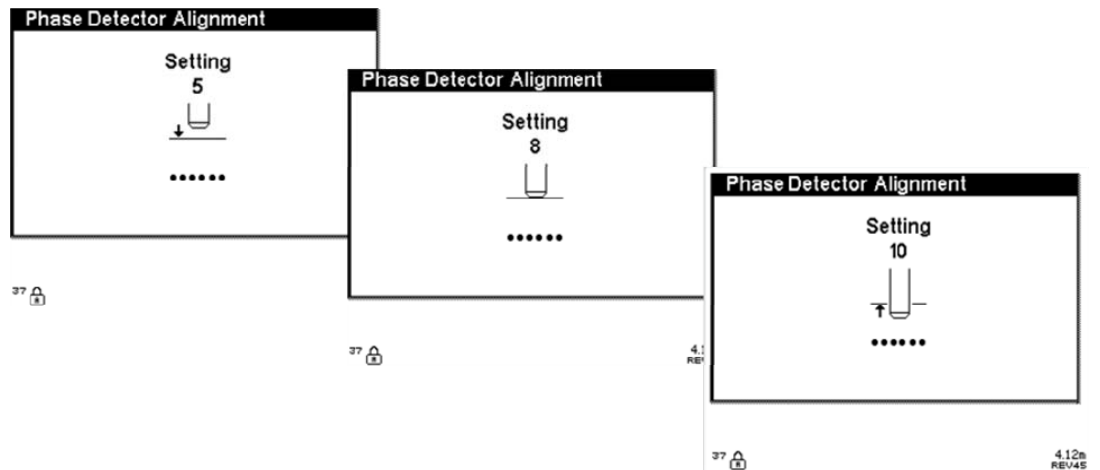


4.18c

Phase Alignment

To Align the Phase Detector:

- 1) Press the "Service" icon key from the main screen.
- 2) Press the "Phase Align" icon key from the service status screen.
- 3) Adjust the phase detector closer or farther from the jet based on the screen instructions.



Phase Calibration:

- Seeking # 8 (perfect), band is 7-9 acceptable.
- Graphic shows distance too close, too far and just right.
- This will offer a Phase Quality of 100.



Resetting the System

There are five different types of a reset that can be performed to a ciSeries system:

Soft Reset –

- 1) Press the Help key six times

This resets the system, maintaining all programmed settings including messages, system properties, and factory configuration files.

Message Reset –

- 1) Press the Service icon key
- 2) Press “MSG”

This resets the message files to the single factory default message. All message files are deleted. This will not delete or affect factory configuration settings, or system property settings.

Graphic Reset –

- 1) Press the Graphic Edit icon key
- 2) Press “GR”

This resets the Graphic Editor and deletes current graphic files stored. This will not delete or affect factory configuration settings, or system property settings.

Hard Reset – from the Main Screen:

- 1) Press the Service icon key
- 2) Press “ZZZ”

This resets all settings to firmware defaults. *All messages, system properties, and factory configuration settings will be erased.* Only qualified service engineers capable of configuring a ciSeries system should use function.

System Recovery Reset – from the Main Screen:

- 1) Power Off
- 2) Press and hold the “Stop” key.
- 3) Turn the Power On, holding the “Stop” key until the Main Screen boots completely.

This reset provides the ability to recover from situation where the firmware fails to initialize. All settings will reset to firmware defaults. *All messages, system properties, and factory configuration settings will be erased.* Only qualified service engineers capable of configuring a ciSeries system should use this function.



5.11 Remote Communications

Citronix publishes a “Printer Communications Manual”. This can be referenced for the following topics:

- Update firmware on the printer.
- Download Graphics to the printer.
- Download Messages to the printer.
- Backup and Restore all Graphics, Messages and Properties of the printer.
- Perform certain commands to select messages and update text in messages.
- Perform certain commands to control the printer.

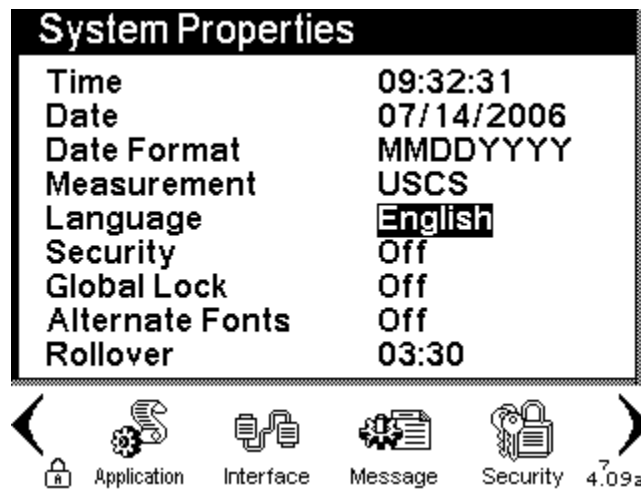
Section 6 Languages and Alternate Fonts

This section will assist in operating and printing in multiple languages. It will also provide instructions on using alternate font sets for printing with the ciSeries Printer.

On the front of the controller is the user interface made up of a display and a keyboard. The display and keyboard are used to control and program the system.

Citronix ciSeries Printers have the ability to operate in English, Spanish, French, German, Italian, Chinese, Russian, Bulgarian, Arabic, Vietnamese, Korean, Polish, Turkish, Thai, Hebrew, Greek, Swedish, Norwegian, Finnish, Portuguese, Romanian and Dutch.

Pressing PROPERTIES, using the Down Arrow Key to highlight Languages and using the Right Arrow key to scroll through the options change user interface language.



Selecting a User Language



ciSeries Technical Service Manual

Citronix currently offers keyboards in English, Arabic, Korean, Greek and Hebrew:



Citronix English Keyboard



Citronix Arabic Keyboard



Citronix Korean Keyboard



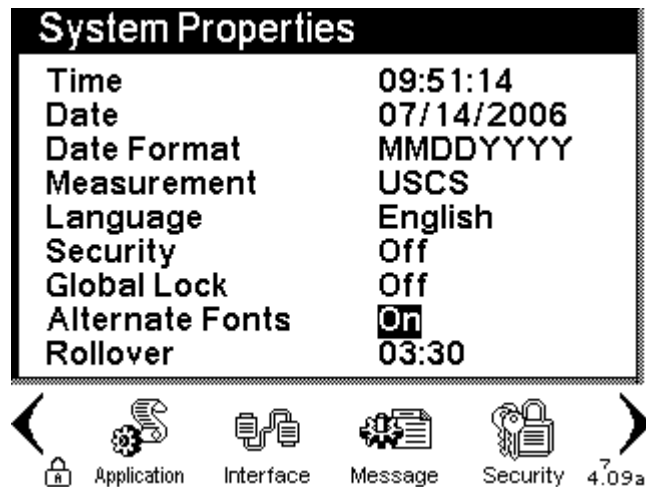
Citronix Greek Keyboard



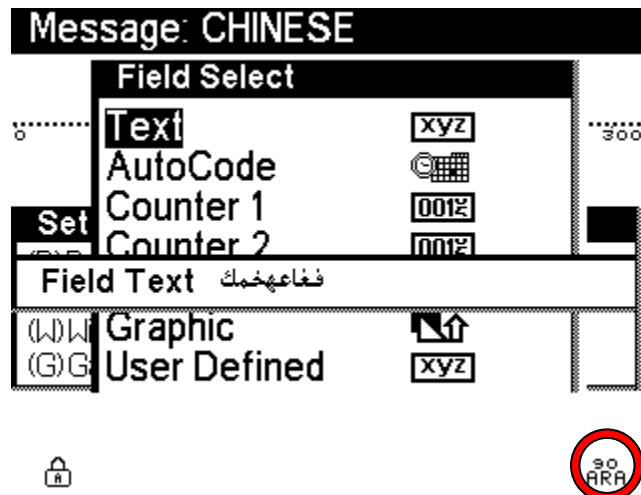
Citronix Hebrew Keyboard

6.1 Alternate Fonts

Alternate fonts (languages) may be used in graphic names, message names, message text, autocodes, user names, and user passwords. Multiple languages (Arabic, Chinese, Vietnamese, Korean, etc.) may now be used in different fields of a message, etc. Alternate fonts are enabled on the System Properties screen. With Alternate fonts enabled, pressing the properties key changes fonts/languages. The alternate font must be selected prior to the User Input Popup being displayed. The Alternate font cannot be changed while entering text in the User Input Popup. The font/language selected will be displayed in the lower right corner of the display.



Enabling Alternate Fonts



Using Alternate Fonts (Arabic shown)

6.2 Keyboard Swap

Font Sets

Each piece of text information entered into the printer has a font set associated with it.

In usual mode of operation, this is the font set of the language the printer is operating in – the language set on the System Properties screen.

Code Pages

A code page is a set of characters associated with a language and its fonts. The number of characters is limited to 224 maximum. Most code pages have less.

The main code page for English has many accented characters used by languages from Western Europe. This code page (1252) is properly called the Latin1 code page – not the English code page.

For the non-Latin languages that use code pages, their characters have replaced many of the Latin characters, mostly the accented letters of the Latin code page. Therefore, text using their code page can include the non-accented Latin letters, but not the accented Latin letters. Also, most of the special characters may be used, but not all.

Mixing Languages

If the printer is operating in a non-English language, its fonts also have the English/Latin1 characters in them. If the font set is a Unicode font set, *all* the English/Latin1 characters are included in the font set, including accented letters and special characters

If the font set is a non-English code page (code page other than 1252), the characters of that language have replaced some of the special English/Latin1 characters in the code page. These replaced English/Latin1 characters are not in the font set associated with this language.

Several languages have the ability to switch keyboards from their native keyboard to the English/Latin1 keyboard. This keyboard swap is performed by pressing the ALT1 (or ALT2) key and then pressing the SPACE bar. Available languages may be found in the Language Table.

These languages are allowed to mix English/Latin1 characters in with their native characters within one text field. This is allowed because their fonts have the English/Latin1 characters in them.

If the language has Unicode fonts, all the English/Latin1 characters are allowed to be used. If the language has code page, only some of the characters may be used as shown in the Special Characters Table.



NOTE: When operating in Chinese mode the default font set is English/Latin1. It will be necessary to perform a keyboard swap *prior* to entering Chinese characters.

	Fonts	Keyboard / Code Page	Keyboard Swap
English	Latin	1252	na
Arabic	Arabic	Unicode (0660-0669 & FE80-FEFC)	Yes
Brazilian Portuguese	Latin	1252	na
Bulgarian	Cyrillic	1251	Yes
Chinese - simplified	Chinese	Unicode (4E00-9FA5)	Yes
Finnish	Latin	1252	na
French	Latin	1252	na
German	Latin	1252	na
Greek	Greek	1253	Yes
Hebrew	Hebrew	1255	Yes
Italian	Latin	1252	na
Korean	Korean	Unicode (AC00-D7A3) (Using 0100-0267)	Yes
Norwegian	Latin	1252	na
Polish	Latin	1252	na
Romanian	Latin	1252	na
Russian	Cyrillic	1251	Yes
Spanish	Latin	1252	na
Swedish	Latin	1252	na
Thai	Thai	Unicode (0E00-0E60)	Yes
Turkish	Turkish	1254	na
Vietnamese	Vietnamese	Unicode (1E00-1EF9)	Yes

Language Table

Latin	Arabic	Chinese	Greek	Hebrew	Korean	Russian	Thai	Turkish	Vietnamese
¢	¢	¢	¢	¢	¢		¢	¢	¢
£	£	£	£	£	£		£	£	£
¥	¥	¥	¥	¥	¥		¥	¥	¥
¼	¼	¼		¼	¼		¼	¼	¼
½	½	½	½	½	½		½	½	½
¾	¾	¾		¾	¾		¾	¾	¾

Special Characters Table

6.3 PINYIN (Simplified Chinese)

There are two ways to enable Pinyin (typing Chinese characters). The first is to change the operating language to Chinese (See section 1). The second is enabling Alternate Fonts and selecting Chinese (See Section 2).

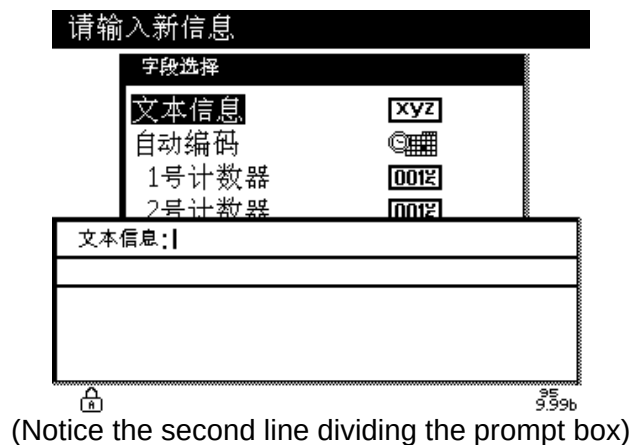
The text prompt will look similar to the following:



The screenshot shows a terminal window with a black header bar containing the text '请输入新信息'. Below this is a '字段选择' (Field Selection) menu with four options: '文本信息' (Text Information), '自动编码' (Auto Encode), '1号计数器' (Counter 1), and '2号计数器' (Counter 2). To the right of these options are four buttons: 'XYZ', a grid icon, '0012', and '0012'. The '文本信息' option is highlighted. Below the menu is a large text input area with the label '文本信息:' and a cursor. At the bottom left is a lock icon, and at the bottom right is the text 'SE 9.99b'.

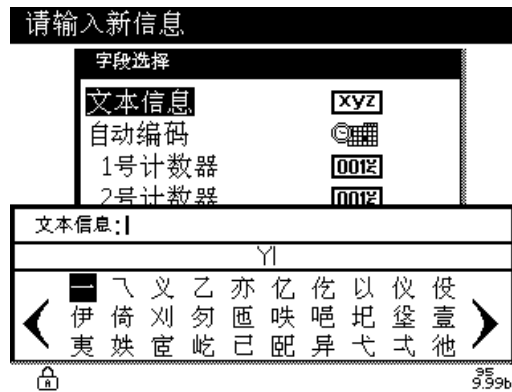
The prompt defaults to typing in English; however, by pressing ALT1 (or ALT2) + SPACE it will enable pinyin.

The prompt will look similar to the following:

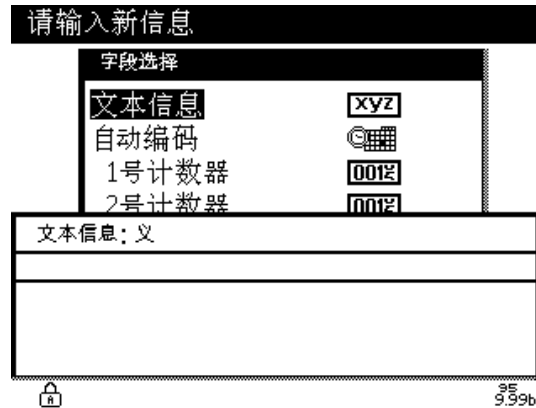


This screenshot is identical to the previous one, but the text input area now has a second line, creating a two-line prompt box. Below the screenshot, the text '(Notice the second line dividing the prompt box)' is written.

Pinyin is sometimes referred to as a “phonetic transcription” or a system using roman letters to represent Chinese characters as syllables. For example many Chinese characters have the phonetic sound of “YI”.



To select a specific character move the cursor using the arrows to the right of the screen. If the large arrows appear on the screen with the Chinese characters there is more than one page of characters. Press the far right or left hotkeys below the screen to scroll to the next page. Pressing the ENTER key will select the character and place it in the text message.



NOTE: Citronix only supports approximately 4000 of the more than 20000 Chinese simplified characters.

7.1 Maintenance Chart

Period of Time	Task	Reference
Every Day	Check and clean printhead, as required	Section 7.2/7.3
Every Week	Clean controller, umbilical, and printhead enclosure	Section 7.4
Every 3-6 months or 1200-2000 Hours	Replace air filter	Section 7.5
Every 3-6 months or 1200 -2000 Hours	Replace main ink filter Replace gutter filter Replace feed filter Replace makeup filter (ci1000/ci700)	Section 7.6
<i>Pigment (White and Yellow) Inks</i> Every 3 months or 1200 Hours	Replace main ink filter Replace gutter filter Replace feed filter Replace makeup filter (ci1000/ci700) Refresh ink in ink reservoir	Section 7.6



Note: The maintenance chart is a general guideline. Some applications will require more frequent filter changes dependent on the environment.



Note: Pigment Inks – White and Yellow should be changed every 1200 hours. In addition, pigment inks should have the ink reservoir refreshed at this same interval (dispose of used ink and replenish with new).



Note: The Filter Due error screen will popup when filters become due based on filter time settings. This error screen will popup every five minutes until filter status's are reset.

7.2 Check and Clean Printhead

The system will operate for a considerable time before the printhead will require cleaning. However, peak operating performance and reliability will only be maintained if the printhead is cleaned on a regular basis. To check and clean the printhead:

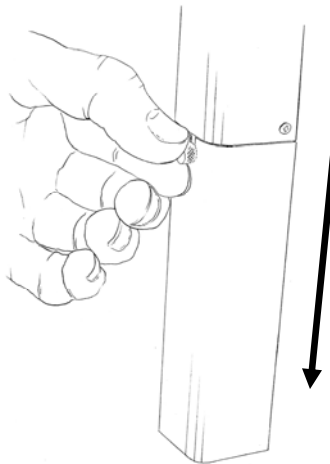


NOTE: Do not use Makeup fluids to wash printhead. The conductive properties in the Makeup fluids will cause HV Trip errors.

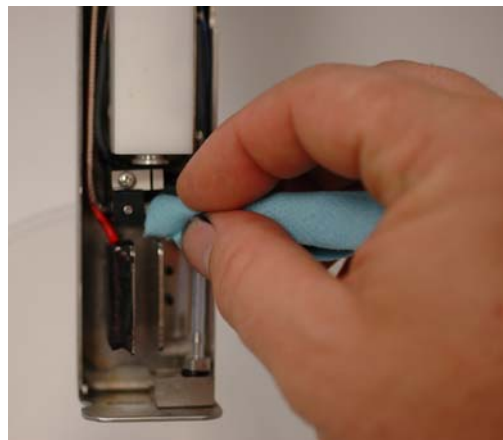
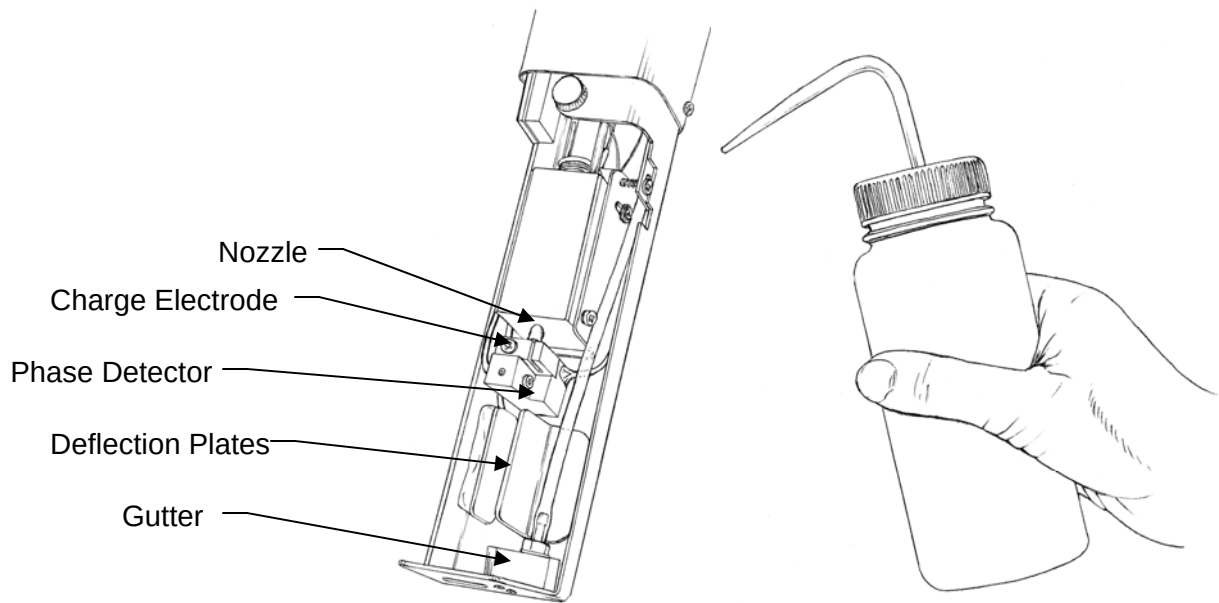


NOTE: Make sure the Cleaning Solvent being used is compatible with the ink being used.

- 1) Stop the jet.
- 2) Release the thumbscrew securing the printhead front cover and slide off the cover.



- 3) Check inside the printhead cover for a build up of ink deposits, if any deposits are evident then clean the inside of the cover.
- 4) Check the printhead for build up of ink deposits and where necessary use the appropriate cleaning solvent compatible with the type of ink being used. Pay particular attention to the **Nozzle, Charge Electrode, Phase Detector, Deflection Plates and Gutter**.
- 5) Using a suitable container to catch excess cleaning solvent. Dispose of excess cleaning solvent in accordance with local regulations.



NOTE: The printhead must be completely dry before attempting to start the jet. Use lint free cloths for drying printhead components or use low-pressure dry clean air. Do not use high-pressure air, or cloths or paper towels with lint waste.

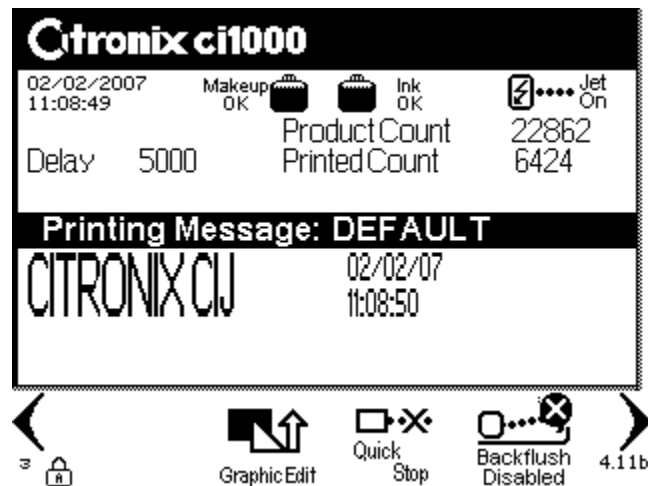
- 6) Allow the printhead to dry, ensure that the slot in the charge electrode is clear of cleaning solvent. Refit the printhead cover and tighten the thumbscrew.

7.3 Backflush Routine

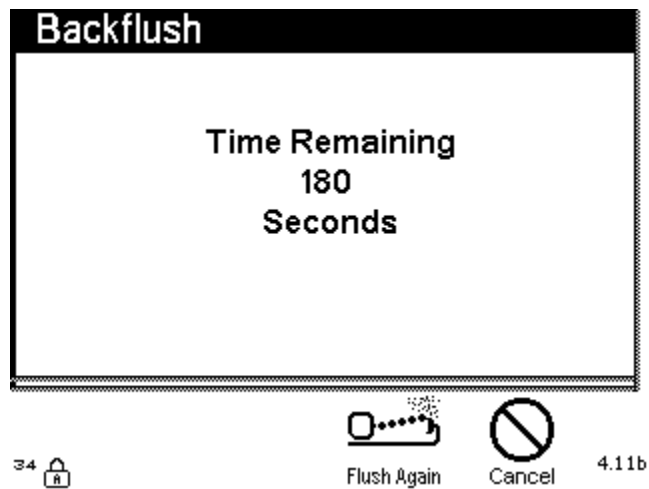
In the event the jet does not start correctly after a Daily Printhead Cleaning, a Backflush Routine can be performed to clear nozzle blockages or partial nozzle blockages. To perform a Backflush routine:

- 1) Stop the jet.
- 2) Locate the BACKFLUSH function icon key: On the main screen – use the function icon arrow keys to scroll left or right to access the BACKFLUSH function icon key.

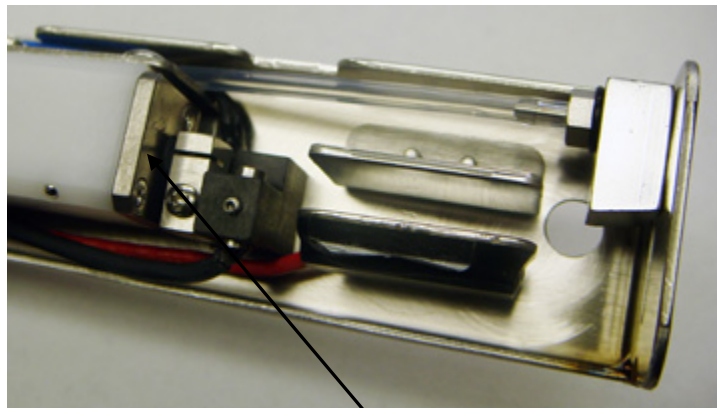
NOTE: The BACKFLUSH icon will be “disabled” if the jet is ON or the printhead front cover is closed.



- 3) Release the thumbscrew securing the printhead front cover and slide the cover off.
- 4) Press the Backflush function icon key. The system will vacuum from the nozzle until the CANCEL function icon key has been pressed. Perform in intervals of 10 seconds. After ten seconds press the CANCEL function icon key to stop the process.



- 5) While the backflush operation is in process, apply the appropriate cleaning solvent to the nozzle. Observe the cleaning solvent being vacuumed through the nozzle.



Spray cleaning solvent into nozzle

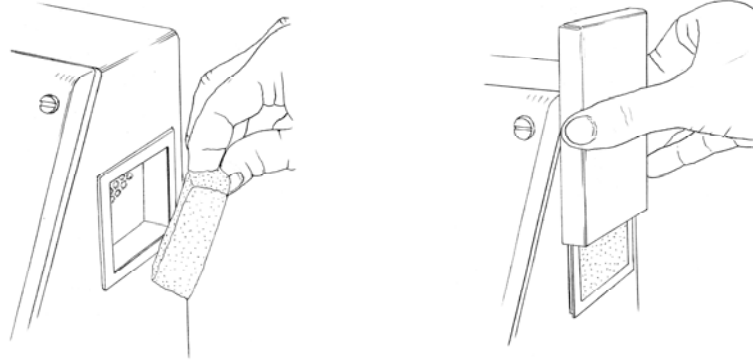
- 6) If this does not clear the problem – repeat six times. If problem persists contact a maintenance technician.

7.4 Clean Controller, Umbilical, and Printhead Enclosures

Clean the system enclosures with stainless steel cleaner, and absorbent cloth.

7.5 Replace Air Filter

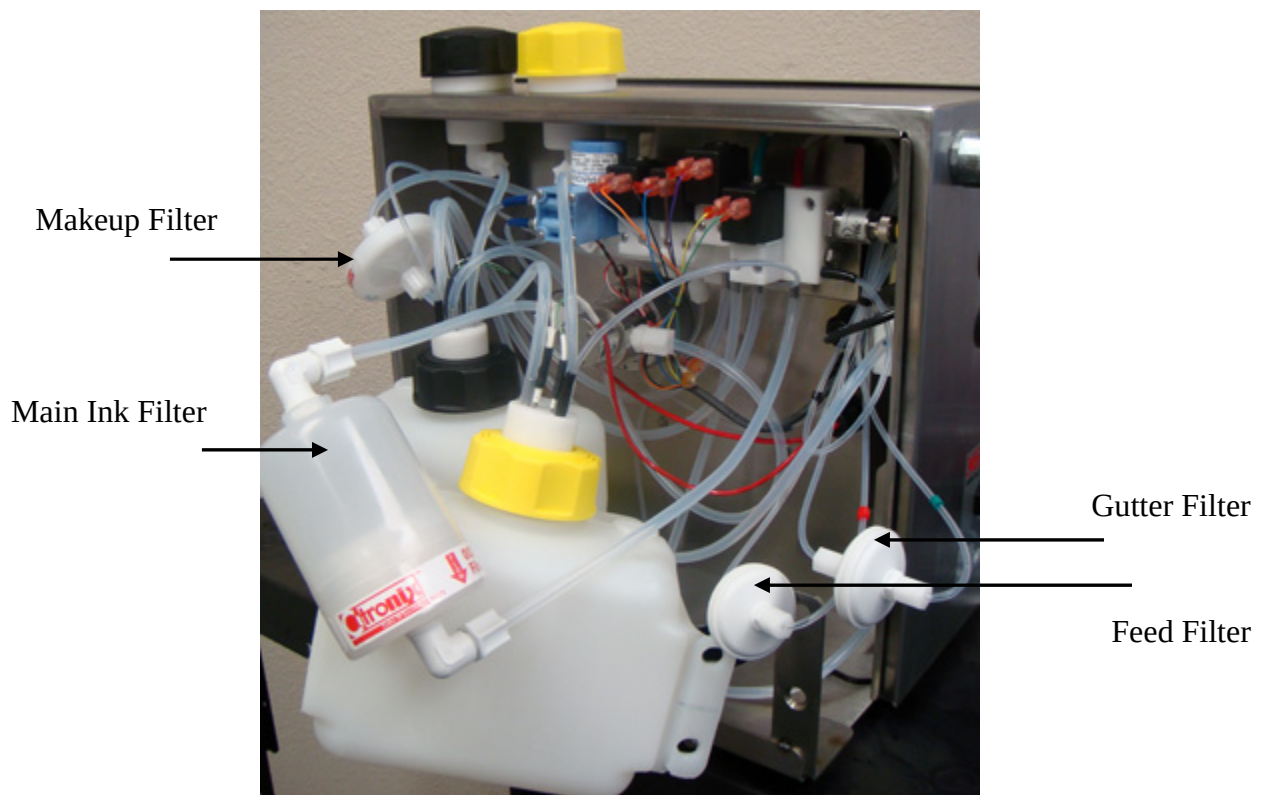
The air filter is located on the right hand side of the cabinet, beneath the air filter protection cover. To replace the air filter:



- 1) Remove the air filter protection cover.
- 2) Remove the air filter.
- 3) Replace the air filter.
- 4) Replace the air filter cover.

7.6 FILTER CHANGE INSTRUCTIONS

1. Ensure machine has been shut down using normal jet stop procedures (do not use Quick Stop).
2. Open back cover to gain access to fluidic system.
3. Citronix recommends the use of protective gloves and eyewear during filter change procedures.
4. Cut the tie wraps securing the main filter in place.
5. Using a #2 Phillips screwdriver unfasten the makeup tank. It may be necessary to unfasten the ink tank as well to ease access. Ensure the mounting hardware is not misplaced.



Ink system cover removed, main filter released and makeup tank unfastened.
(Clean system shown for clarity)

6. Using a 5/8" wrench loosen connections on both sides of main filter and remove. Use caution, as there will be ink in the tubing and filter. Dispose of used filter and fluids in accordance with local regulations
7. Using a 5/8" wrench attach a new main filter to the 1/4" Teflon tubes as shown. Ensure 10" tube from pump attaches to the inlet side of the pump and the 1/4" tube from the manifold to the outlet side. Flow direction of the filter is indicated with arrows on the label. Tighten connectors finger tight followed by one to one and a half turns with the wrench.



Attach main filter as shown paying careful attention to flow direction.

8. Using a 7/16" wrench remove and replace gutter/feed filter to 1/8" Teflon tubes. Ensure filter is facing correct direction. Red line from manifold should attach to the inlet side of the filter and line from umbilical to the outlet side. Note: The inlet side of the filter is a square boss while the outlet side is hexagonal. The flow direction is also marked with an arrow. Tighten connectors finger tight followed by one turn with the wrench. Green marker indicates Gutter Line and Red marker indicates Feed Line.
9. Replace gutter/feed filter as instructed paying careful attention to the flow direction.



10. Place gutter/feed filters behind makeup tank ensuring tubing is not kinked or pinched.
11. Using a 5/8" wrench loosen connections on both sides of makeup filter and remove. Use caution, as there will be makeup in the tubing and filter. Dispose of used filter and fluids in accordance with local regulations
12. Using a 5/8" wrench attach a new makeup filter to the 1/4" Teflon tubes as shown. Ensure tube from makeup tank attaches to the inlet side of the pump and the 1/4" tube from the manifold to the outlet side. Flow direction of the filter is indicated with arrows on the label. Tighten connectors finger tight followed by one to one and a half turns with the wrench.



Attach makeup filter as shown paying careful attention to flow direction.

13. Reattach tanks using original hardware. Using tie wraps secure main filter in place as shown.



Secure tanks and main filter as shown with two cable ties.

14. Commission system following published "startup" instructions.
15. Replace and/or close ink system cover.



Section 8 Technical Description, Troubleshooting and Repair

8.1 Introduction

This section provides a technical description with function, troubleshooting of the components and repair procedures of a ciSeries system.

8.2 The Printing Process

Fluid pressure generated through the use of an internal pump pushes a steady stream of ink through the control valves and into the drop generator. Inside the drop generator, electric pulses vibrate the ink chamber to separate the ink stream into droplets. A programmable pattern of electric pulses per second creating 60,000 - 88,000 droplets a second.

The vibration is fast and steady providing a continuous, consistent formed stream of drops. Each drop is formed in the same location, while at the same time an electric charge is applied to give each drop a predetermined negative electrostatic charge. The amount of the charge on the drop determines its location to make up the printed code.

The negatively charged droplets leaving the charge electrode pass under a high voltage deflection plate, which has a fixed positive charge. The deflecting plate has a strong attraction for the droplets with the larger negative charges and pulls them higher in the pattern. The droplets with lower charges have less attraction and are deflected to lower positions. Droplets that are not needed for the pattern will not receive a negative charge as they pass; consequently, they will not be attracted to the deflection plate. The uncharged droplets shoot straight into the gutter and are delivered back to the ink reservoir for re-use.

To print a 7x5 matrix character, the printhead prints five vertical columns in which it may print up to 7 dots on each column. Allowing the uncharged drops of ink to return to the ink supply result in blank spaces in the figures on the printed surface. Print capabilities include printing alphanumeric characters, graphics, and bar codes.

8.3 Controller Cabinet

ci500	Painted Steel Construction Nema 4 (IP55) Type Protection
ci700/ci1000:	Stainless Steel Construction Nema 4 (IP55) Type Protection
Ci2000:	Stainless Steel Construction Nema 4 (IP65) Type Protection

Nema 4 (IP55) – Protected against dust - limited ingress (no harmful deposit).
Protected against low pressure jets of water from all directions - limited ingress permitted.

Nema 4 (IP65) – Totally protected against dust. Protected against low pressure jets of water from all directions - limited ingress permitted.



8.4 User Interface

On the front of the controller is the user interface made up of a display and a keyboard. The display and keyboard are used to control and program the system.



8.5 Electrical Components

The electrical components housed within the controller enclosure are the following:

- Mains Fuses
- ON/OFF Switch
- Mains EMI Filter
- Low Voltage Power Supply
- High Voltage Power Supply
- Central Processing Unit
- Ink System Pump Motor
- Cooling Fan
- Viscometer Sensor





Mains Fuses

There are two mains supply fuses located on the left hand side of the controller enclosure. The fuses are 3.15 amp for both 110VAC and 240VAC operation.

Fuse: 3.15 amp

Fuse Type: 5x20mm

Testing the fuses:

- 1) Turn power off, and disconnect power supply.
- 2) Remove fuse from fuse holder.
- 3) Perform a conductivity test.
- 4) Replace as necessary.

ON/OFF Switch

The mains supply switch is located on the left hand side of the controller. The switch in the off position disables the mains supply to the system, and the switch in the on position enables the mains supply to the system.

Testing the ON/OFF Switch:

- 1) Take caution, as high voltage is present when performing this test.
- 2) Open controller enclosure electrical door.
- 3) Turn the power switch to the on position.
- 4) Test for 120 or 240 volts on the input side of the mains EMI filter.
- 5) Replace as necessary.

Mains Filter

The mains EMI filter is located on the inside of the controller enclosure on the left hand side. This component isolates, and filters the mains supply from electrical noise and spikes from interfering with the operation, as well as preventing noise from being transmitted from the system to the mains supply.

Testing the mains filter:

- 1) Take caution, as high voltage is present when performing this test.
- 2) Open controller enclosure electrical door.
- 3) Turn the power switch to the on position, perform fuse and on/off switch test first.
- 4) Test for 120 or 240 volts on the load side of the mains filter.
- 5) Replace as necessary.



ciSeries Technical Service Manual

Low Voltage Power Supply

The low voltage power supply is located on the back wall of the controller enclosure. The power supply is a switch mode unit that provides the necessary voltages for operating the system.

Mains Supply: Single Phase
 100-240VAC; 3.15A

Frequency: 50/60 Hz

Outputs: +5V (8 amp)
 +24V (4 amp)
 -12V (1 amp)
 12V (2.5 amp)

To test the low voltage power supply:

- 1) Take caution, as high voltage is present when performing this test.
- 2) Open controller enclosure electrical door.
- 3) Turn the power switch to the on position.
- 4) Test for 120 or 240 volts on the input side of the power supply (J1). This ensures voltage is present from the source, and that the mains supply fuses, switch and mains filter are functioning.
- 5) Test for +5V, +24V, -12V, and +12V on output side of the power supply (J2).
- 6) Replace as necessary.

Low Voltage Power Supply Connections:

J1 Pin	AC Input
1	Ground
3	Neutral
5	Line

J2 Pin	DC Output
2	+5V
5	Common
6	Common
7	Common
8	+24V
9	+24V
11	-12V
13	+12V



Note: If the fuse located on the power supply is blown, this is an indication of a failure of circuit components. The power supply should be replaced and/or have the power supply sent for repair by authorized Citronix personnel.

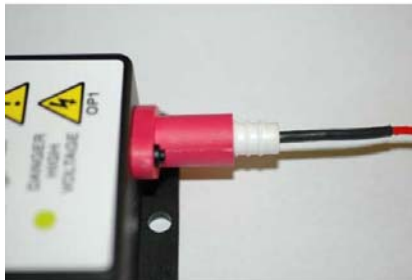
High Voltage Power Supply

The high voltage power supply is located on the back wall of the controller enclosure. This power supply generates high voltage necessary for the printhead deflector plates and is powered by a variable 0 - +23 V DC from the CPU circuit board.

A variable high voltage output of 0 – 8000 V at 120 μ amps is provided to establish the electrostatic field between the deflector plates in the printhead.

Troubleshooting:

- 1) Take caution, as high voltage is present when performing this test.
- 2) Open controller enclosure electrical door.
- 3) Turn the power switch to the on position.
- 4) Measure the input voltage to the high voltage power supply. This voltage should be between 0 and ~+21 volts. Note this voltage.
- 5) Adjust the Height command to 255 via the Print Adjust screen.
- 6) Re-measure the input voltage to the high voltage power supply. This voltage should be ~+21 volts.
- 7) If the voltage changed from the original measurement to ~+21 volts, the next step is to print.
 - a) Close the controller enclosure door.
 - b) Start the jet, and print.
 - c) If the system does not print, or if the size of print is extremely small in height, it's possible that the high voltage power supply is not functioning properly or the connection between the high voltage power supply and the deflection plates is open – perform a continuity measurement.
- 8) There is no suitable field test method for testing the output of the high voltage power supply. Should this module be suspect of failure after performing the input/print test, the component should be replaced.



Cable Connected Correctly



Cable Connected Loose (Incorrect)

Potential Solutions:

Red high voltage cable (white connector) – Must be plugged firmly into module. Carries 0-8000VDC to the Positive Deflection Plate. If cable is loose or not connected no voltage will be on the deflection plates resulting in no print. System will increment counters, show high voltage present, but will not print.

Central Processing Unit

The central processing unit (CPU) is located on the controller enclosure door. The CPU provides the intelligence and processing power necessary to generate, receive, and transmit the necessary electrical signals to operate the system.

Failure Modes:

- No Power
- Input DC Fuses Fail
- Battery Backup Discharge

To test the DC input:

- 1) Take caution, as high voltage is present when performing this test.
- 2) Open controller enclosure electrical door.
- 3) Turn the power switch to the on position.
- 4) Test for +5V, +24V, -12V, and +12V on the input of the CPU (J28). This ensures voltage is present from the source, and that the mains supply fuses, switch, mains filter and low voltage power supply are functioning.

J25 Pin	DC Input
1	+5V
2	Common
3	Common
4	+24V
5	+24V
6	Power Fail
7	-12V
8	Common
9	+12V

To test the DC input fuses:

- 1) Turn power off, and disconnect power supply.
- 2) Perform a conductivity test, or review LED for fuse.
- 3) Replace as necessary.

LED / Fuse	Voltage
+5V – 2 Amp	+5V
+24VHV – .5 Amp	+24V
+24VMTR – 2 Amp	+24V
+24VEXT/Fan – 2 Amp	+24V



Note: Replacing +24VHV - .5 Amp fuse with 2 Amp fuse maybe result in PCB, CPU failure. This fuse protects the board from a short in the drop generator probe – typically a result of mishandling the printhead assembly.



Note: If the external +24V fuse fails system will display an error indicating fan failure. System will not operate until fuse is replaced.



CAUTION: DO NOT ADJUST POTENTIOMETER (R3), DAMAGE MAY RESULT. (OLD STYLE (3 FUSE) CPU ONLY)



CAUTION: DO NOT UNPLUG ANY CABLE/CONNECTOR FROM THE CPU OR OTHER WITH THE POWER ON TO THE CONTROLLER; DAMAGE WILL RESULT.

To test the Battery:

- 1) Turn power off, and disconnect power supply.
- 2) Ensure battery measures ~3.3V across positive and negative.
- 3) Replace as necessary.



CAUTION: RISK OF EXPLOSION, IF AN INCORRECT TYPE REPLACES BATTERY. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS.

Connections

Printhead Connections	Ink System Connections	Internal Electrical Connections	Ext. Peripheral Connections
J1: Charge Cable	J5: Ink Temp Probe	J23: Display Backlight	J7: Not Used
J2: Modulation Cable	J6: Ink Sys Valves	J25: Air Fan	J8: Photocell2
J3: Gutter/Phase Cable	J11: Makeup Cable	J28: DC Power In	J9: Photocell 1
J4: PH Valve/Strobe LED	J12: Ink Cable	J29: Deflection Voltage	J10: Shaft Encoder
	J13: Press Transducer	J30: Display Cable	J16: Not Used
	J14: Viscometer Sensor		J17: MSG Select
	J15: Ink Pump		J18: Relay Output
			J19: Alarm Output
			J20: RS232 #1
			J21: RS232 #2
			J32: Positive Air Kit
			P1: Ethernet

LED Indicators and Descriptions

LED Identifier	Function	Potential Fault Indicated
LED 1: PC2 Signal	Not Used	
LED 2: PC1 Signal	Lights when PC signal received.	LED does not light: wired incorrectly, not connected. Incorrectly wiring may cause +24V External fuse to (fail).
LED 3: Encoder Signal	Lights when SE signals are received.	LED does not light: wired incorrectly, not connected. Incorrectly wiring may cause +24V External fuse to protect (fail).
LED 4, 5, 6, 7, 9, 18, 19	Not Used	
LED 10: Motor Fault	Lights when a motor fault has occurred or when the pump is turned off.	LED lights when pump is running
LED 11: Ethernet DPX	Lights when in full duplex. Off when operating in half duplex.	None.
LED 12: Ethernet LNK	Lights when Ethernet link is established.	Not lighting indicates no connection has been established.
LED 13: Ethernet TX	Flashes when data is transmitted.	If not flashing – transmission is not occurring.
LED 14: Ethernet RX	Flashes when data is received.	If not flashing – receiving is not occurring, possibly not being transmitted to or bad cable.
LED 15: Ethernet COL	Flashes to indicate Ethernet collisions are occurring.	Normal operation.
LED 16: Ethernet SPD	Lights when connected at 100MBS, when not lit, connected at 10MBS.	None.
LED 17: Heartbeat	Heartbeat signal, indicates CPU board is active and operating.	If LED does not light, potential software lockup or board failure. Perform resets to recover. Starting with soft reset first.
+5V: Board Logic FUSE: 2 amp	Fuse limits the amount of current to be drawn protecting electronic circuit – LED on indicates fuse is active.	If current is overdrawn by incorrect operation, the LED is not illuminated indicating +5V was protected (fuse requires replacement).
+24VHV: High Voltage FUSE: .5 amp	Fuse limits the amount of current to be drawn protecting electronic circuit – LED on indicates fuse is active.	If current is overdrawn by incorrect operation, the LED is not illuminated indicating +24V was protected (fuse requires replacement and possible modulator replacement).
+24VMTR: Motor Voltage FUSE: 2 amp	Fuse limits the amount of current to be drawn protecting electronic circuit – LED on indicates fuse is active.	If current is overdrawn by incorrect operation, the LED is not illuminated indicating +24V MTR was protected (fuse requires replacement and possible motor or cable replacement).
+24VEXT: Fan/Ext. Peripherals FUSE: 2 amp	Fuse limits the amount of current to be drawn protecting electronic circuit – LED on indicates fuse is active.	Incorrect wiring of external peripheral may cause fuse to protect (fail) (correct wiring, fuse requires replacement or possibly fan requires replacement).

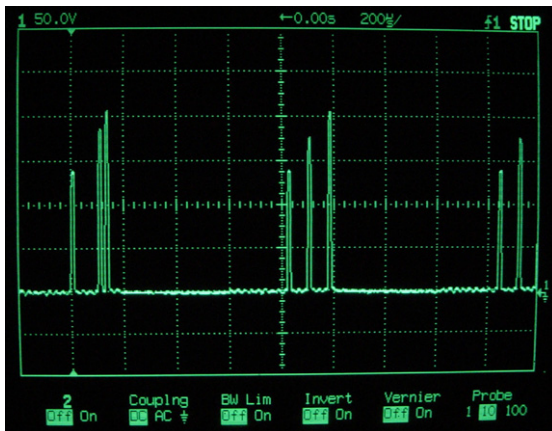
Test Points



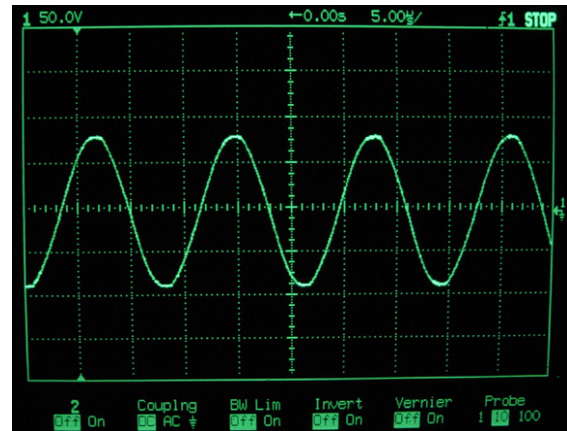
CAUTION: DO NOT ATTEMPT TO USE TEST POINTS IF YOU ARE NOT QUALIFIED TO USE AN OSCILLOSCOPE OR MULTI-METER! DAMAGE MAY RESULT!

Test Points	Description	Tool to Measure	Failure Diagnosis
TP1:	Charge Signals	Oscilloscope	No charge signal – incorrect programming, or board failure.
TP2:	Modulation Signal	Oscilloscope	No modulation signal – board failure, possible modulation probe short. Test modulation probe before replacing board.
TP3:	No field use		
TP4:	No field use		
TP5:	No field use		
TP6:	No field use		
TP7:	Ground		
TP8:	Ground		
TP9:	Ground		
TP10:	No field use		
TP11:	Ground		
TP12:	Ground		
TP13:	+5V	Multi-meter or Oscilloscope	No voltage, check +5V fuse. Replace if necessary.
TP14:	+3.3V	Multi-meter or Oscilloscope	No voltage, check +5V fuse. Replace if necessary.
TP15:	+2.5V	Multi-meter or Oscilloscope	No voltage, check +5V fuse. Replace if necessary.
TP16:	Battery, +3V	Multi-meter or Oscilloscope	No or low voltage, replace battery.
TP17:	No field use		

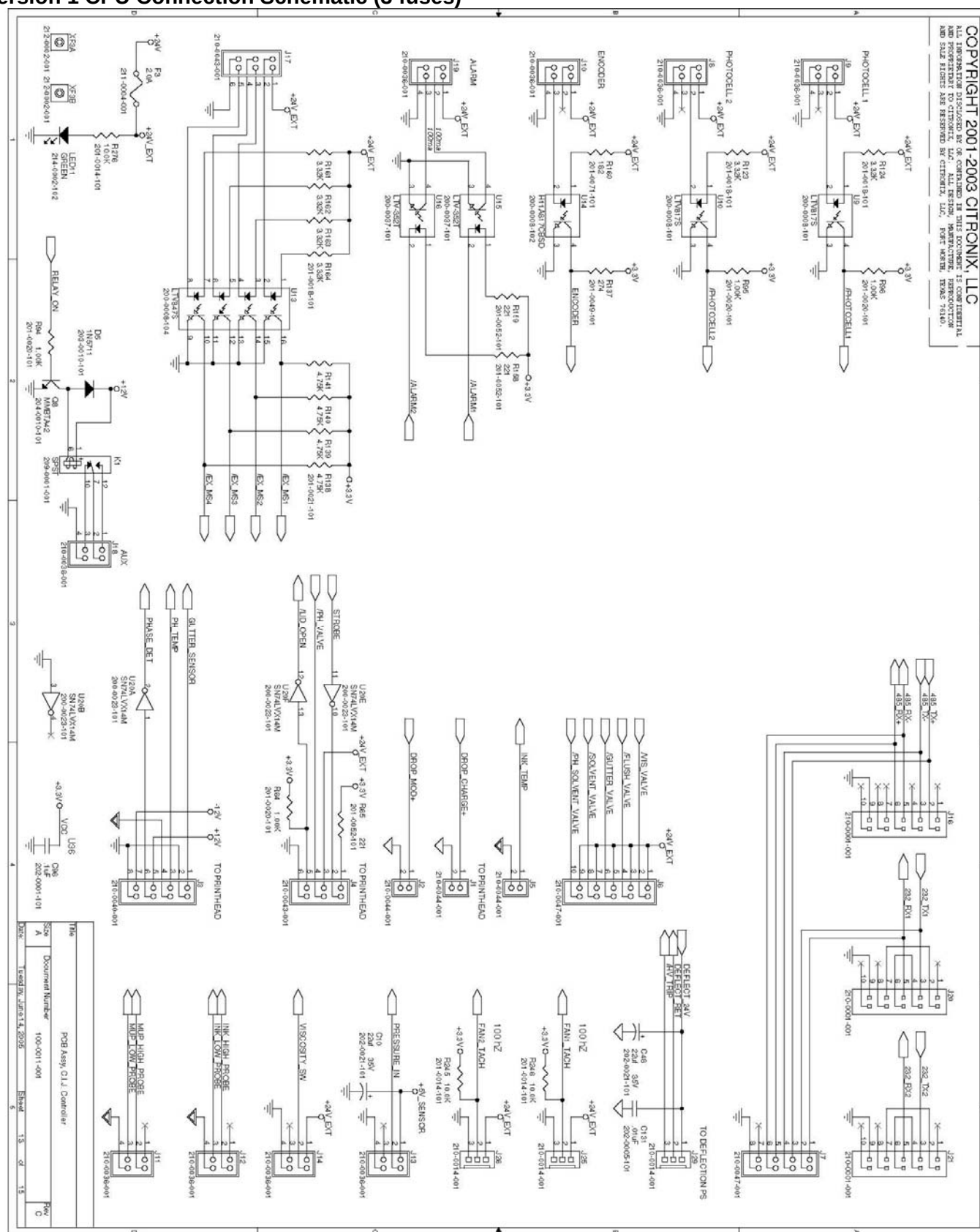
Charge Signal:



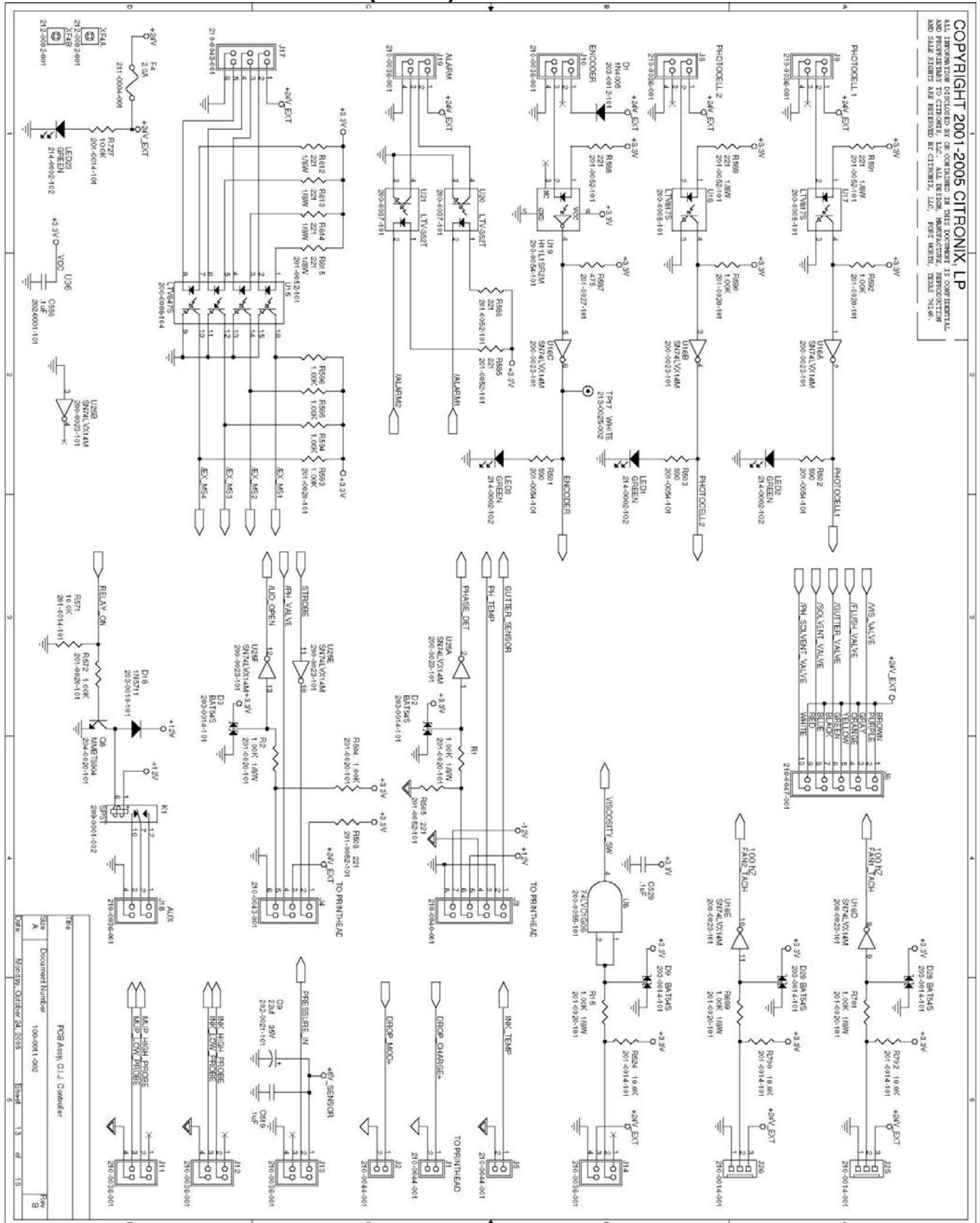
Modulation Signal:



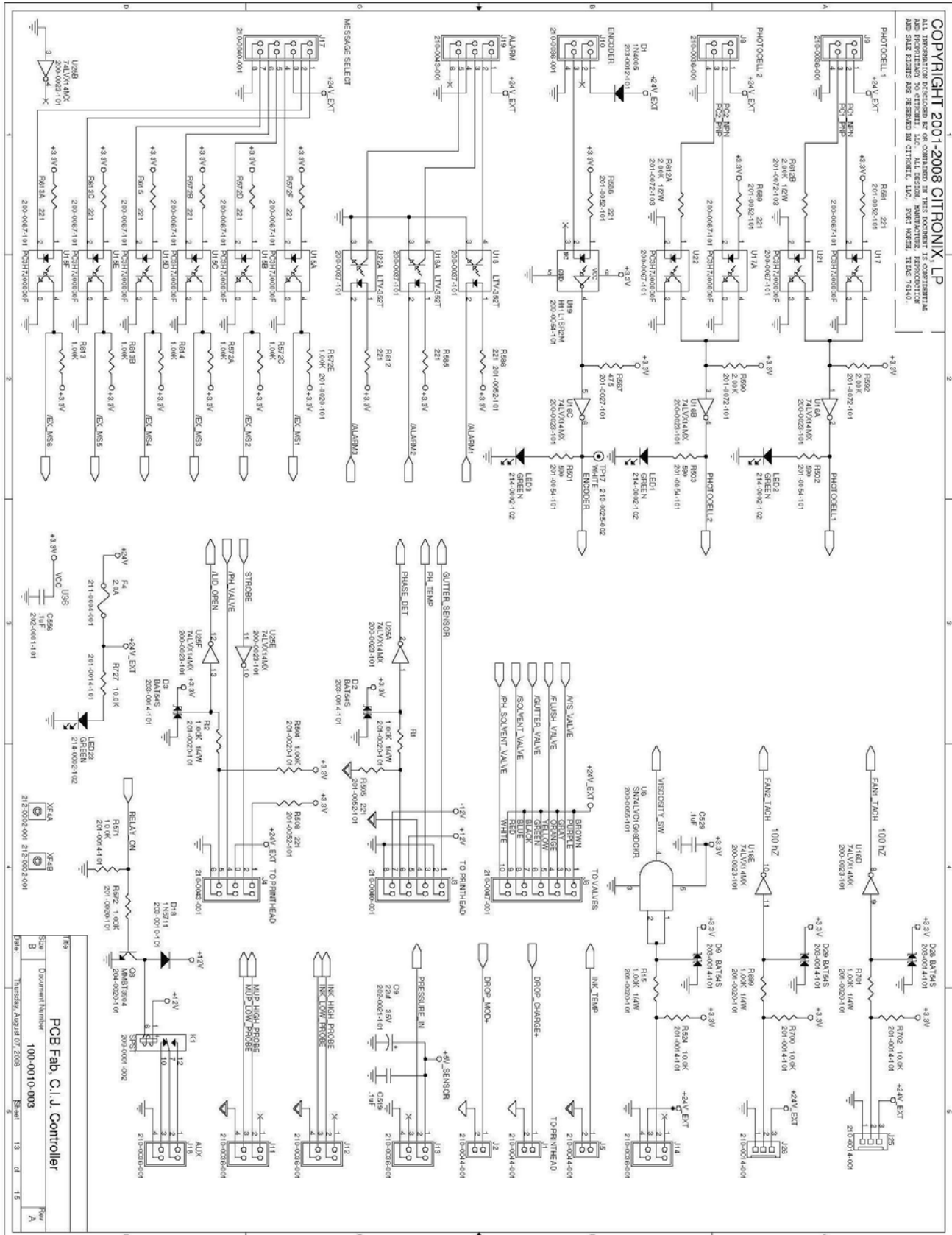
Version 1 CPU Connection Schematic (3 fuses)



Version 2 CPU Connection Schematic (4 fuses)



Version 3 CPU Connection Schematic (4 fuses)





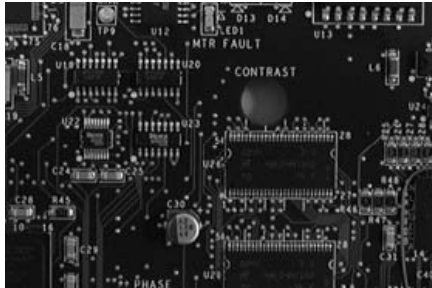
ciSeries Technical Service Manual

¼ VGA LCD Display

The display is a 320x240 display allowing the ability to display text and graphics. The Citronix systems take full advantage of the graphical capability by providing a graphical icon based user interface with WYSIWYG message creation, editing and selection. The display is backlit, providing ease of operation in dim lit manufacturing environments. The backlight is software controlled to shut down after 20 minutes of inactivity; actuation of any keyboard button will turn backlight back on.

The display's contrast adjustment is located in the center of the circuit board. To adjust the contrast:

Tool Required: Non-conductive screwdriver - # 1 cross tip.



To adjust display contrast:

- 1) Turn power off.
- 2) Open front system door.
- 3) Rotate contrast switch (left or right).
- 4) Power on to check adjustment. Repeat if necessary.



CAUTION: Equipment damage is possible. Do not attempt to adjust display contrast if power-on with conductive tools.

Ink System Pump Motor

The Ink System Pump Motor is mounted on the back wall of the controller enclosure. The pump motor is on the electrical side of the enclosure, and the Ink Pump is on the ink system side of the enclosure isolated through a Teflon seal. The motor is magnetically coupled to the pump to assure separation of the ink from the drive and electronic components.



CAUTION: Do not plug or unplug pump cable from CPU or Pump Motor with power on to the controller; damage to the pump motor and CPU will result.

Cooling Fan

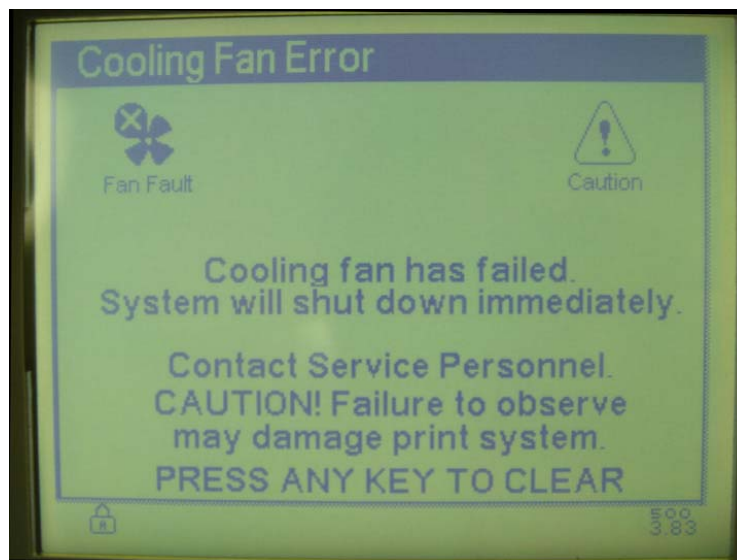
The cooling fan is mounted on the back wall of the controller enclosure. It is powered by external +24V supplied from the CPU. The fan provides cooling for the electronics compartment, as well provides evacuation of any solvent vapors.

As an integral part of the system the fan runs the entire time the machine is running. The fan contains a signal to alert the system in the event the fan fails that will stop the printing.

In the event the fan fails, an error alert will be displayed and the system will stop printing. The fan should be replaced when this occurs.



NOTE: The fuse +24V EXT controls the voltage to the fan. It is possible that a fan failure error screen is a result of fuse +24V EXT. Check and replace as necessary.



Fan Failure Screen

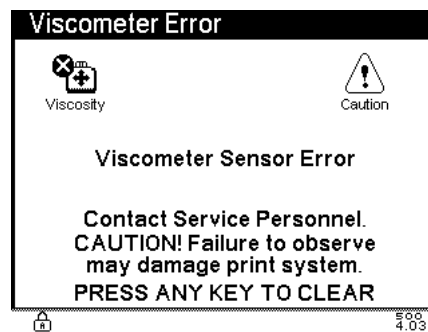
The fan failure screen will display if the +24V EXT fuse is blown, the fan fails or the fan cable fails. The yellow wire provides feedback that the fan is turning (tach feedback) – no connection, results in a Cooling Fan Error.

Viscometer Sensor

The viscometer sensor is located on the back wall, lower left hand corner. The sensor is an inductive sensor for detecting the viscometer ball made of stainless steel. The sensor detects when the ball moves upward to ensure viscometer is working. The sensor then detects when the ball returns detecting the ball fall time determining the thickness of the fluid, giving the viscosity time on the Viscosity Status screen.

Troubleshooting:

The sensor has an integrated LED and will light at the beginning cycle of the viscosity check and also at the end. This indicates the sensor is working and the ball is moving (correct operation). In the event the LED does not light at the beginning, the system will also display the following Error screen “Viscometer Error”. This indicates either the sensor has failed or the ball is stuck in the viscometer, or no fluid is present in the viscometer.



Potential Solutions:

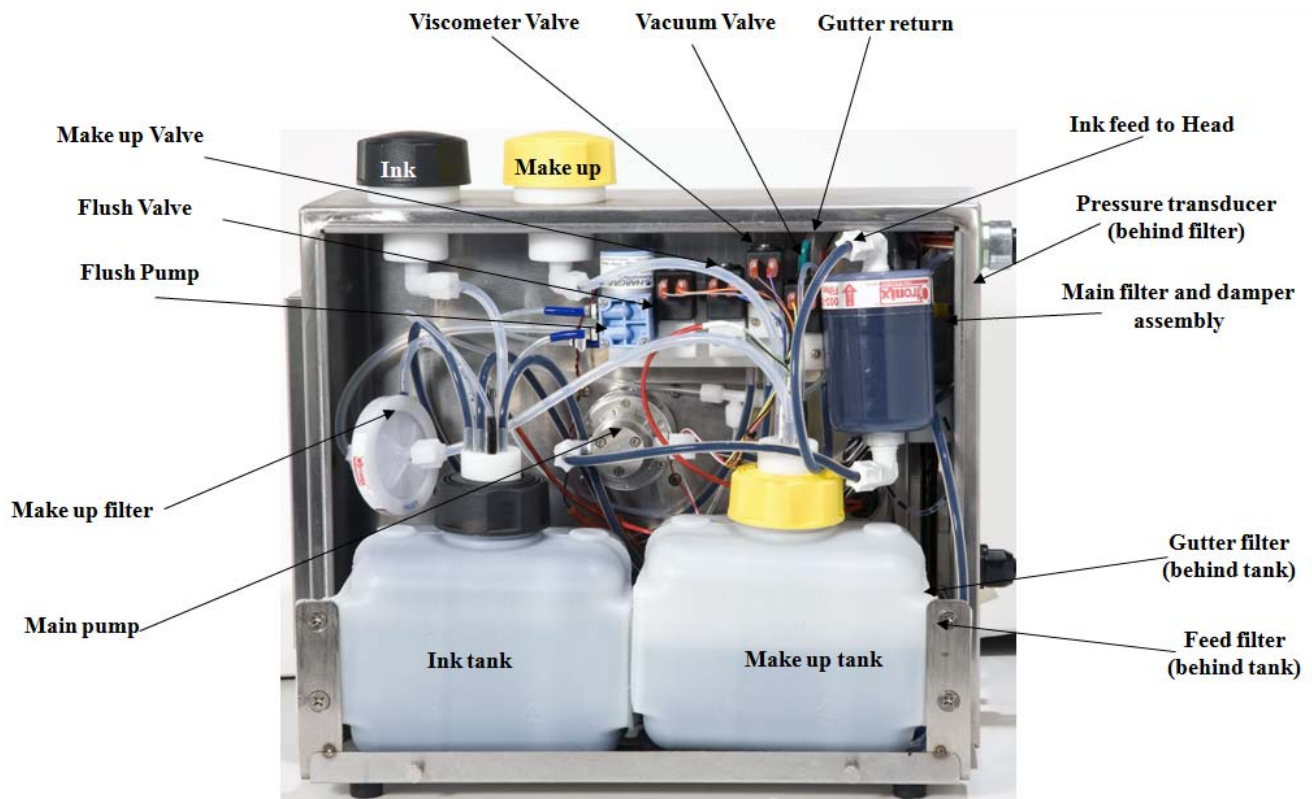
- Verify sensor is good or bad, replace as necessary.
- Ensure sensor is plugged into the PCB correctly.
- Verify the ball is stuck in viscometer, disassemble/clean viscometer.
- The viscometer must be free of air to operate correctly. If the return line from the viscometer to the ink reservoir is not submerged in the ink the line will allow air to collect in the viscometer. Verify no damage to tubing and correct as necessary.
- Ensure viscometer valve is functioning, use “Valve Test”.
- Ensure the Pressure Restrictor is not clogged, clean/replace as necessary.

8.6 Ink System

The components housed within the ink system enclosure are the following:

- Ink and Makeup Tank
- Ink pump
- Ink System Valves and Manifold
- Venturi
- Pressure Transducer
- Ink Temperature Probe
- Viscometer
- Ink Filters

Ink System Diagram





Algorithms for Start/Stop Jet (SmartFlush):

Start Jet -

- If the jet is not running for more than 2 hours, then the system will perform a Flush Start.
- Time is kept over power off in RTC. The flush start condition is not reset until the jet completes the full start sequence.
- The jet "part" of the jet start is complete when the counter goes to 0 - when the Jet Start icon is replaced with the Jet On icon.
- If there is an error in the 8 seconds between that and the HV icon coming on, the Flush Start is considered complete.

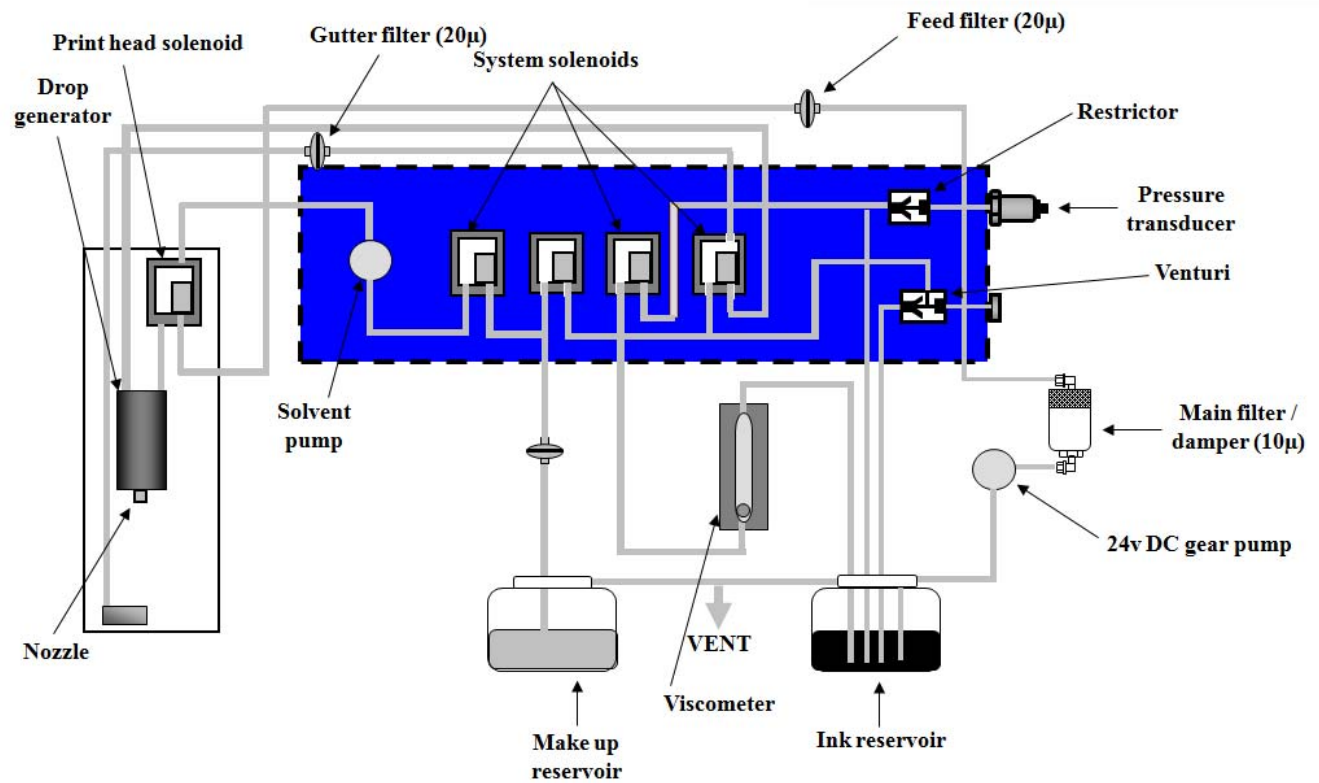
Stop Jet -

- If an ERROR stop, system stops without flush.
- If jet is stopped during start jet (Pressing Stop Key during Start Process), stop without Flush.
- If STOP key is pressed when the jet is off, then the system does a Flush Start.
- If normal stop when jet is running, Heavy Pigment, always stop with Flush Stop.
- If normal stop when jet is running, if not Heavy Pigment, Flush Stop if viscosity is greater than .3 below set point, otherwise stop without Flush.

Add makeup algorithm after viscosity check -

- Viscosity still checked on the same schedule.
- If Food Grade ink, wait for viscosity to stabilize before adding makeup.
- If not Food Grade, wait for jet to be on for one hour before adding makeup.
- Viscosity check will not take affect for 1 hour after Start Jet. After 1 hour of operation, if viscosity is high, makeup will be added. If any problem stops the jet, when restarted, the system will wait another hour before acting on a viscosity check. It now takes longer before new ink's viscosity will lower to 3.6.

Ink System Fluidic Schematic





Ink and Makeup Tanks

ciSeries Ink and Makeup Tanks

The ci580 ink and makeup tanks hold 1 liter of ink or makeup.

The ci700/ci1000/ci2000 ink and makeup tanks hold 1.9 liters of ink or makeup.

8.6.3 Ink Pump

The Ink System is mounted on the back wall of the controller enclosure. The pump motor is on the electrical side of the enclosure, and the ink pump is on the ink system side of the enclosure isolated through a Teflon seal. The motor is magnetically coupled to the pump to assure separation of the ink from the drive components.



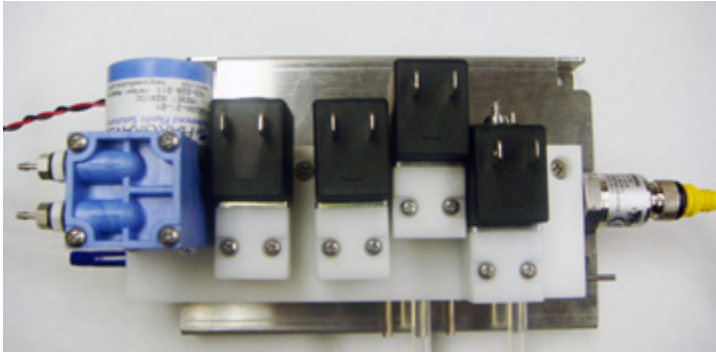
CAUTION: Dry ink residue in ink pump may cause pump lockup. +24V MTR will blow when this occurs. If leaving idle for more than two weeks, ensure the system is flushed completely of all ink residues or leave ink in system. To remedy ingest Cleaning Solution directly into the pump head via the inlet or outlet.



ciSeries Technical Service Manual

Ink System Valves

The ink system valves control the various ink and makeup supply.



Valves from left to right:

- 1) Nozzle Flush Valve
- 2) Makeup Valve
- 3) Viscosity Valve
- 4) Gutter/Vacuum Valve

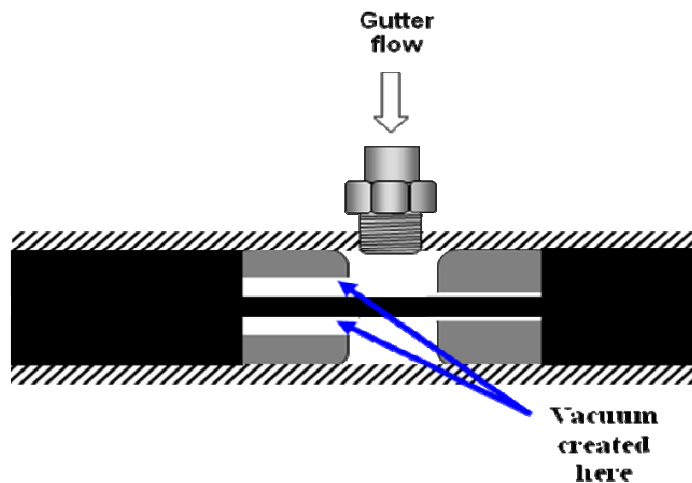
Valves can be tested using the SERVICE-TEST VALVES screen. Valves can be opened and closed manually to verify operation.

Manual Valve Control	
Printhead Valve	Closed
Viscosity Valve	Closed
Gutter Purge Valve	Closed
Makeup Valve	Closed
Air Prg/Makeup Pump Valve	Closed
Nozzle Flush Valve	Closed

Venturi / Presssure Restrictor

Ink flowing through the venturi creates a vacuum, which is used for various purposes. During jet on operation the vacuum draws ink back into the system from the gutter. It is also used to draw makeup solvent into the system for ink viscosity control and to clear nozzle clogs via the backflush feature.

The venturi uses the turbulence caused by a high-pressure ink flow passing through a small orifice (.032") directly into a larger orifice (.062"). The turbulence creates a vacuum around the ink flow.



The venturi is located inside the ink manifold behind the Vacuum Valve and accessed by the hole plug screw.

Troubleshooting:

If the first orifice is restricted (clogged) the system will generate no Vacuum. This can be verified by using the Run Pump service tool and spraying cleaning solution into the gutter. Additionally, the systems RPS value will be very low to maintain normal Pressure. This can be verified by reviewing the Status screen. Clean/replace as necessary.

If the second orifice is restricted the system will direct the ink stream to the gutter, a substantial flow of ink will be noticed at the gutter. Clean/replace as necessary.



Pressure Transducer

The pressure transducer monitors the operating ink pressure and feeds a signal to the CPU board for increasing/decreasing the pump rounds per second to maintain a set operating pressure.

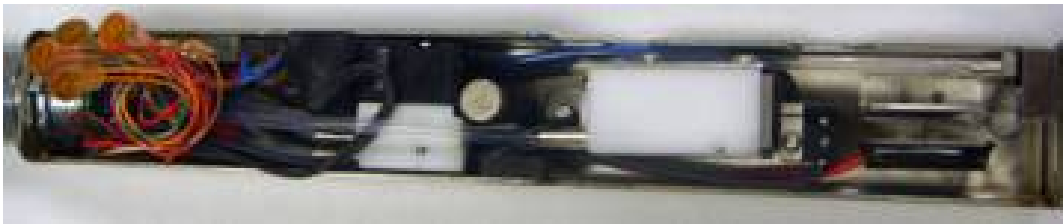
Viscometer

The viscometer is an instrument used to measure viscosity of the ink. The measuring method is to move a stainless ball to the top of the glass tube, then release. The release time is marked and timed. The timing is from the top of the viscometer to the bottom where an inductive sensor detects the ball. The quicker the time, the thinner the ink is and the slower the time the thicker the ink is.

8.7 Printhead Components

The printhead components housed within the printhead enclosure are the following:

- Drop Generator
- Nozzle
- Charge Electrode and Strobe
- Phase Detector
- Deflector Plates
- Gutter
- Printhead Valve / Heater
- Phase Circuit Board
- Printhead Cover Sensor
- Printhead Temperature Sensor





Drop Generator

The drop generator oscillates the ink stream that is supplied under pressure via the ink pump in effort to break the stream into uniform drops. The modulation voltage used for the oscillation determines the drop break up point, and is an individual characteristic to each printhead. The printhead is calibrated with the modulation voltage at the time of manufacturing, and so noted on the "Service Label".

The modulation voltage must be correct ensuring the drop break up point occurs in the charge electrode slot. Should the drop break up point occur outside the slot, incorrect charging of the drops will occur.

Charge Electrode

The breakup caused by the drop generator is calibrated to occur within the charge electrode slot. The charge electrode applies a charge to drops required for printing, those drops that do not receive a charge will be returned to the ink system for re-use through the gutter.

A strobe LED situated underneath the charge electrode allows the drop break up to be viewed with a 10x or greater magnifying eyeglass.

Phase Detector

The phase detector provides feedback that the drop charging is occurring correctly. The drop charge timing is critical to the operation, thus a feedback circuit is required to ensure this timing to maintain optimum print quality.

Deflector Plates

The deflector plates generate an electrostatic field. This field deflects drops by the amount of charge they received at the charge electrode. Drops with a greater charge will be deflected further than those with a lower charge. Drops that do not contain a charge will not be deflected passing through the electrostatic field to the gutter for re-use by the ink system.

Gutter

The printhead gutter collects non-charged droplets and delivers this reclaimed ink back to the ink system for re-use. The gutter primarily is only collecting the non-used ink allowing a sensor to monitor the gutter's operation. In the event the gutter is not collecting non-printed drops during the printing process the sensor will detect a fault and display an error screen.

Printhead Valve / Printhead Heater

The printhead valve is a three-way valve:

Turns the jet on / off

Opens and closes to allow air to be purged from the system at startup.

Through controlled pulse width modulation, the printhead valve is used as a heater for the printhead to allow operation in cold environments. Through the use of the temperature sensor, and this heating method the printhead is brought to 70 F, and maintained.



Phase Circuit Board

The board receives a low voltage signal from the phase detector. The Phase Circuit Board amplifies and digitizes this signal for processing.

Printhead Cover Sensor

The printhead cover and printhead body contain an integrated intrinsically sealed switch to turn the charge voltage (up to 300V), and deflector voltage (up to 8KV) off. These voltages are required to print, thus the system will not print without the printhead cover in place. The switch is integrated with the printhead body, and the magnet is integrated with the printhead cover. The cover switch will toggle an icon on the main screen to indicate if the printhead is open or closed.

Printhead Temperature Sensor

The printhead contains a temperature sensor to ensure the flammable fluid temperature ignition point is not exceeded. Set well below the ignition point, if the temperature at the printhead exceeds 60 degrees C the system will shutdown automatically, in addition an error screen will be displayed.

Section 9

Service Routines

9.1 Changing or Cleaning the Nozzle Insert

In the event a severe clog occurs that cannot be overcome through the printhead cleaning routine, or the Backflush service routine the Nozzle Insert may be required to be more thoroughly cleaned or replaced.

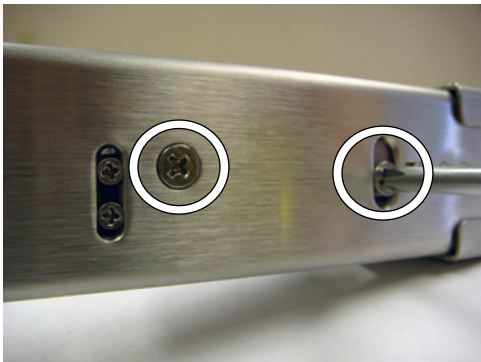


NOTE: A nozzle alignment routine is required to complete this routine.

- 1) Stop the jet.
- 2) Release the thumbscrew securing the printhead front cover and slide off the cover.
- 3) Remove the two screws that secure the Drop Generator and remove from printhead base. This provides direct access to the nozzle. Do not disconnect any cables.
- 4) Remove the two screws that secure the Nozzle to the Drop Generator and remove Nozzle from Drop Generator.



NOTE: The nozzle is press fit into the drop generator. After removing screws, turn nozzle to left and pull out.



- 5) Either flush, ultrasonically clean or replace with new nozzle insert. Insert is replaced by simply pushing in and securing with the two nozzle screws.
- 6) Finalize routine by following the Nozzle Alignment routine.

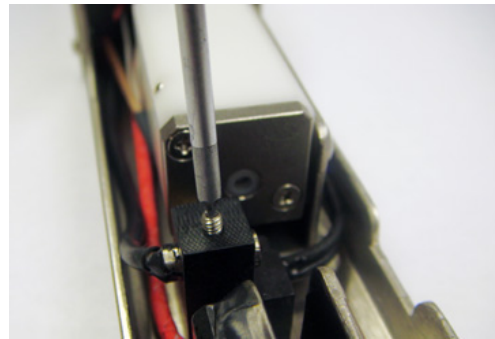
9.2 Nozzle Alignment

Adjusting and aligning the nozzle assembly and the charge block is only necessary after a component has been changed. Take care not to adjust the nozzle to compensate for a nozzle clog.



NOTE: If a nozzle clog is suspected refer to Backflushing the nozzle.

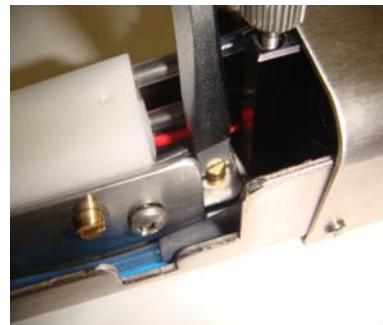
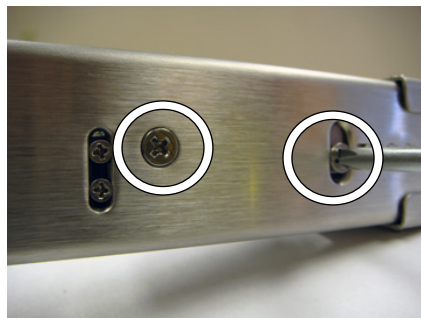
- 1) Stop the jet.
- 2) Release the thumbscrew securing the printhead front cover and slide off the cover.
- 3) Remove the screw that secures the charge block and remove from the print head. Do not disconnect the cables.



- 4) Loosen the screw that secures the phase detector and push phase detector into block, away from natural path of ink stream.
- 5) Access the Service Screen: "Override". Turn all Overrides to "Yes".



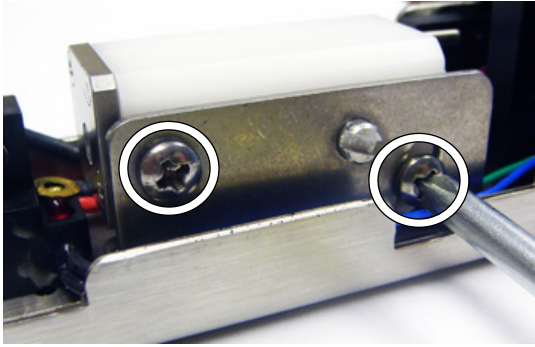
NOTE: At each power-off/on the Overrides will default to "No".



- 6) Place a beaker under the printhead to catch the ink stream in case it misses the gutter.
- 7) Start the jet and observe the stream of ink.
- 8) Loosen set screws by 1/10" of a turn.
- 9) Adjust the horizontal adjusting cam until the jet hits the gutter.



NOTE: Before turning the adjustment cam make sure the nozzle block set screws have been loosened.

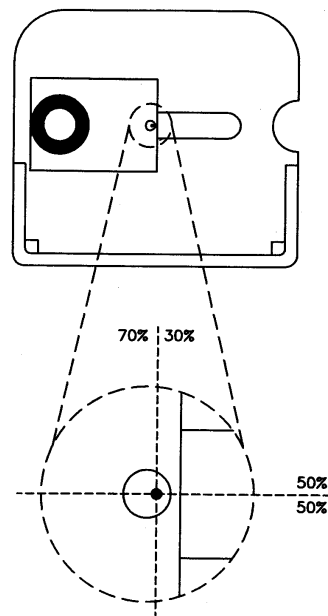
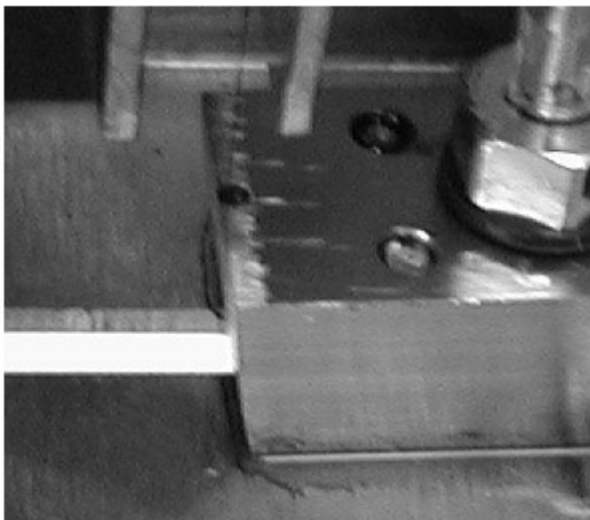


- 10) Place a beaker under the printhead to catch the ink stream in case it misses the gutter.
- 11) Start the jet and observe the stream of ink.
- 12) Loosen set screws by 1/10" of a turn.
- 13) Adjust the vertical adjusting cam until the jet hits the gutter.

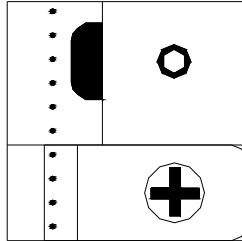


NOTE: Before turning the adjustment cam make sure the nozzle block set screws have been loosened.

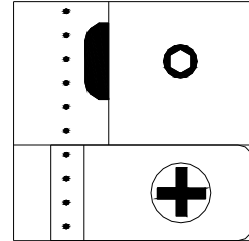
- 14) Correctly adjust the jet in to the gutter; a light can greatly assist in checking the jets position. The jet entry should be a left / right alignment of 70%/30%.



- 9) Turn the jet off and reinstall the charge block. Align the charge block so that visually the slot in the charge electrode is in line with the nozzle.

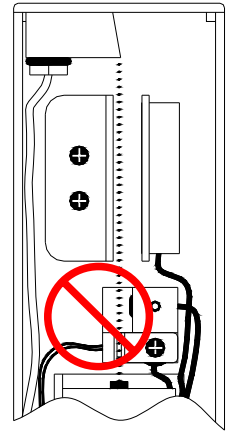
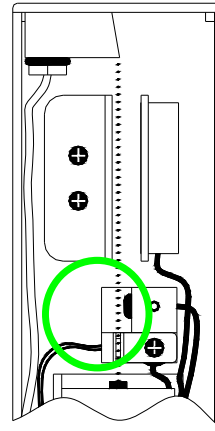
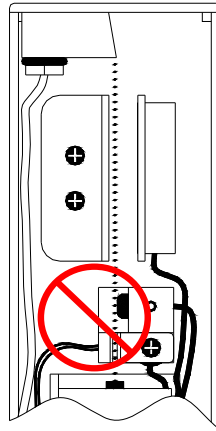
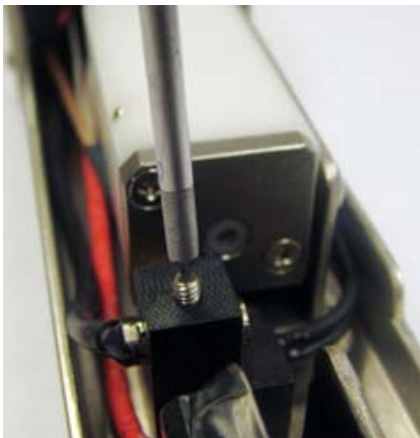


Bad



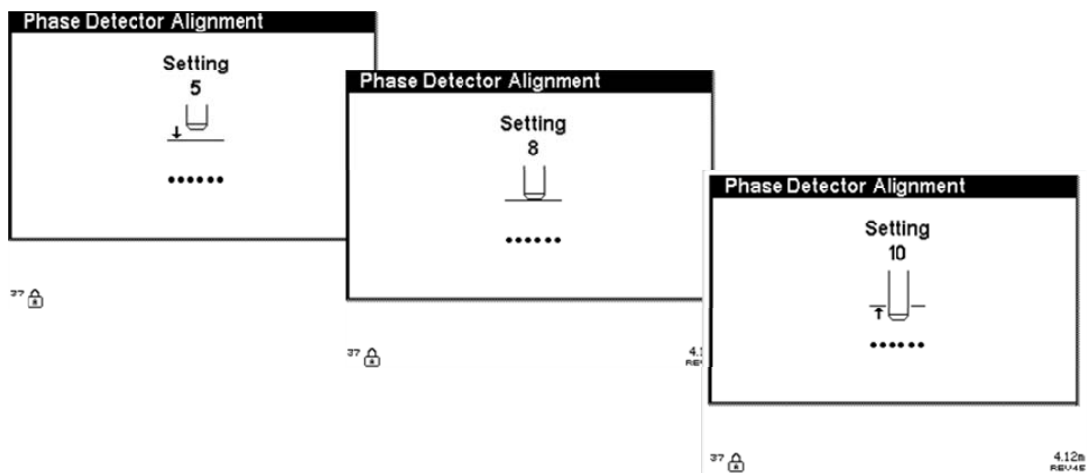
Good

- 10) Start the jet ensuring the Overrides are still on. Observe the jets position in the charge slot and adjust the block so that the jet is in the center of the charge slot. First loosening the mounting screws and then gently levering the block using a screwdriver can accomplish the adjustment. Use an eyeglass to confirm that the jet is centered. Carefully tighten the securing screws.



11) Start the jet ensuring the Overrides are still on. Observe the jets position in relation to the phase detector. Move the phase detector to a position approximately 1mm from the jet.

- Press the "Service" icon key from the main screen.
- Press the "Phase Align" icon key from the service status screen.
- Adjust the phase detector closer or farther from the jet based on the screen instructions.



Phase Calibration:

- Seeking # 8 (perfect), band is 7-9 acceptable.
- Graphic shows distance too close, too far and just right.
- This will offer a Phase Quality of 100.

- 12) Stop the jet after completing the alignments.
- 13) Clean the printhead, refit the printhead cover, turn the Overrides Off.



9.3 Nozzle Cleaning Routine (Ultrasonic Bath)

Tools/parts required:

Ultrasonic Cleaner (not heated)

Microscope

MEK

Ethanol

Water

Clean dry air (canned air recommended)

CAUTION: DO NOT USE A HEATED ULTRASONIC BATH – DAMAGE WILL RESULT TO NOZZLE AND NOZZLE BODY.

Stage 1:

- 1) Clean substantial deposits of ink or other debris with MEK (using a wash bottle).
- 2) Place in an ultrasonic bath of MEK for 30 to 60 minutes in a non-heated ultrasonic cleaner.
- 3) Remove and dry with clean air.
- 4) Inspect interior of nozzle using a microscope. If debris remains continue to stage 2.

Stage 2:

- 1) Place in an ultrasonic bath of clean water for 30 to 60 minutes in a non-heated ultrasonic cleaner.

CAUTION: USE A CLEAN BEAKER (FREE OF MEK) FOR THIS PROCESS. MIXING OF SOLVENTS AND/OR WATER MAY CLOG THE NOZZLE BEOND RECOVERY.

- 2) Remove and dry with clean air.
- 3) Inspect interior of nozzle using a microscope. If debris remains continue to stage 3.

Stage 3:

- 1) Place in an ultrasonic bath of Ethanol for 30 to 60 minutes in a non-heated ultrasonic cleaner.

CAUTION: USE A CLEAN BEAKER (FREE OF MEK) FOR THIS PROCESS. MIXING OF SOLVENTS AND/OR WATER MAY CLOG THE NOZZLE BEOND RECOVERY.

- 2) Remove and dry with clean air.
- 3) Inspect interior of nozzle using a microscope. If debris remains nozzle cannot be recovered and must be replaced.



9.4 Changing Ink, Makeup or Ink, Makeup Tank (Ink Refresh)

It may be necessary to change the ink, makeup or change the ink, makeup tank for various reasons. This could be due to the machine not being used for a period of time and the ink shelf life expired or contamination from incorrect ink being used. This procedure can also be used to ensure correct viscosity of ink. Or this routine can be used to remove the fluid from the system prior to shipping (follow shipping preparation guidelines prior to shipping).

- 1) Turn the system power off using the appropriate shut down routine.
- 2) Remove the ink system housing cover.
- 3) Remove the two screws holding the tank assembly in place.
- 4) Unscrew the tank adapter assembly from the top of the tank.
- 5) Lift the ink tank up and out of the ink system. Use absorbent cloths to collect excess ink as the ink / makeup pickup and return lines are removed from the tank.
- 6) Pour ink or makeup into a suitable container or cap ink or makeup tank for future use.
- 7) Discard ink or makeup in accordance with local regulations.
- 8) Replace ink or makeup tank.
- 9) Refill the tank with new ink or makeup taking care to use the correct ink type.
- 10) Refit the ink system housing cover.

9.5 Shipping / Long Term Storage Preparation



EQUIPMENT DAMAGE: The system should not be shipped or stored long term with makeup fluid, or ink fluids in any part of the system. The system should be completely flushed of all fluids prior to shipment or long term storage.



NOTE: It is unlawful to ship hazardous or flammable goods without declaring them. Following the procedure below will ensure there are no hazardous or flammable fluids contained in the system.

- 1) Turn the system power off using the appropriate shut down routine.
- 2) Remove the ink system housing cover.
- 3) Remove the two screws holding the ink and makeup tank assemblies in place.
- 4) Unscrew the ink tank adapter assembly from the top of the tank.
- 5) Lift the ink tank up and out of the ink system. Use absorbent cloths to collect excess ink as the pickup and return lines are removed from the tank.
- 6) Pour ink into a suitable waste container and discard in accordance with local regulations.
- 7) Unscrew the makeup tank adapter assembly from the top of the tank.
- 8) Lift the makeup tank up and out of the ink system. Use absorbent cloths to collect excess makeup as the pickup lines are removed from the tank. The makeup fluid can be used as a cleaning solution for the flush process.
- 9) Pour roughly 500ml of cleaning solvent or makeup in the ink tank, or utilize the makeup tank with makeup solution. Replace the tank, leaving the tank adapter loose.
- 10) Turn on the system power on.
- 11) Turn all "Override" conditions to "Yes". This will ensure no errors will inhibit this process.
- 12) Start the Jet by pressing the "Start" button on the main screen. This will flush the system of ink.
- 13) During this process, go to the Service menu and select "Viscosity Check".
- 14) Press the "Stop" button on the main screen to stop the system after 2 minutes.
- 15) Follow steps 5 and 6.
- 16) Follow steps 9 – 15, then 5 and 6 twice for shipping, and three times for long term storage.
- 17) Replace an empty tank, leaving the tank adapter loose also ensuring the pickup and return lines are above fluid levels during the process. The intent is to flush the system of all fluids.
- 18) Follow steps 10 – 15.
- 19) Follow steps 5 and 6.
- 20) If shipping, pressurize pickup and return fluid lines out with filtered air pressure of 1-3 psi for a period of 3 minutes each. During the process, go to the Service menu and select "Viscosity Check".
- 21) If low filtered air pressure is not available: Install substantial absorbent cloths in the makeup tank and ink tank. Reinstall the ink and makeup tank with absorbent cloths, ensuring any excess fluid in system is collected/absorbed during transit instead of spilling onto other system components.
- 22) Perform a printhead daily cleaning procedure, ensuring all printhead components are free of ink and any debris.
- 23) Wrap printhead with absorbent cloths and wrap with plastic material to collect in excess fluid during transit.



Shipping Material

- 1) Ensure original Citronix packaging material is used.
 - 2) Wrap printhead with foam packaging and install into tube.
 - 3) Install printing system into box with printhead wrapped around the controller.
 - 4) Make sure both bottom and top foam pieces are used during the shipment process.
- Accessories, and other components should be placed on top of the top foam pieces wrapped appropriately with foam or bubble wrap material.

9.6 Changing the Ink System Pump

- 1) Disconnect the ink tubes from the pump. Place an absorbent material such as a paper towel to catch any ink that is left in the pump head.
- 2) Remove the electrical connection from the pump motor.
- 3) Remove the four screws that secure the pump to the enclosure.
- 4) Carefully remove the pump assembly from the enclosure.

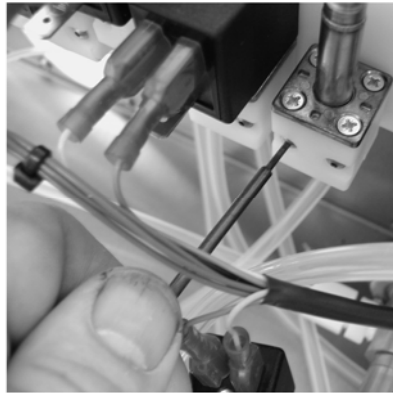


NOTE: If the pump is intended to be re-used make sure the pump head is cleaned using the appropriate solvent for the ink type being used. Failure to do so will result in the ink drying in the pump gears causing damage.

- 5) The pump is reinstalled using the reverse procedure. Ensure that the pump flow direction is correct as shown below:
- 6) Replace the pump ensuring the ink tubes connected directly to the pump are sealed with Teflon tape.

9.7 Changing / Cleaning an Ink System Valve and Gasket

- 1) Remove the ink system housing cover, or access panel.
- 2) Remove the solenoid from the valve stem by removing the plastic hold-down clip on top of the solenoid and pulling the solenoid upwards.
- 3) Remove the two screws securing the valve to the ink manifold. Use a 1/16th inch hex key (003-1051-001).
- 4) Remove the valve from manifold taking care not to lose the valve gasket. Flush valve with solvent to prevent ink from drying in it.
- 5) Replace cleaned valve, replacement valve, or replacement gasket.



- 6) Replace cleaned valve, replacement valve, or replacement gasket.



NOTE: If the valve is intended to be re-used make sure the valve is cleaned using the appropriate solvent for the ink type being used. Failure to do so will result in the ink drying in the valve causing damage.

9.8 Changing / Removing the Pressure Transducer (ci1000)

- 1) Turn the system power off using the appropriate shut down routine.
- 2) Remove the ink system housing cover.
- 3) Loosen the ink valve manifold by removing the two screws that secure it to the ink system.
- 4) Cut the cable ties from the ink system cable harness.
- 5) Pull the pressure transducer cable and plug through the ink system cable grommet.
- 6) Using the appropriate wrench unscrew the pressure transducer from the manifold.



CAUTION: Do not unscrew the transducer without first pulling the cable through the grommet or the cable will twist and damage may result.

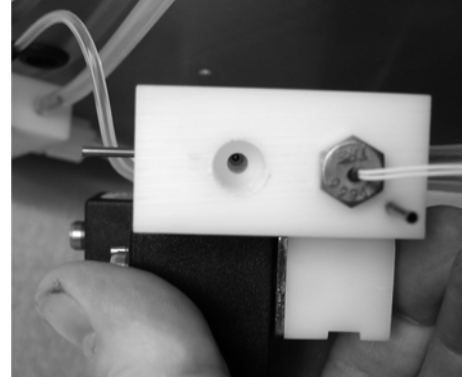


- 7) Replace using the reverse procedure, do not use thread tape or sealant and do not over tighten.
- 8) When reattaching the manifold to the ink system ensure the cable is re-installed correctly and that the cables are secured away from the pump motor.
- 9) Refit the ink system housing cover.

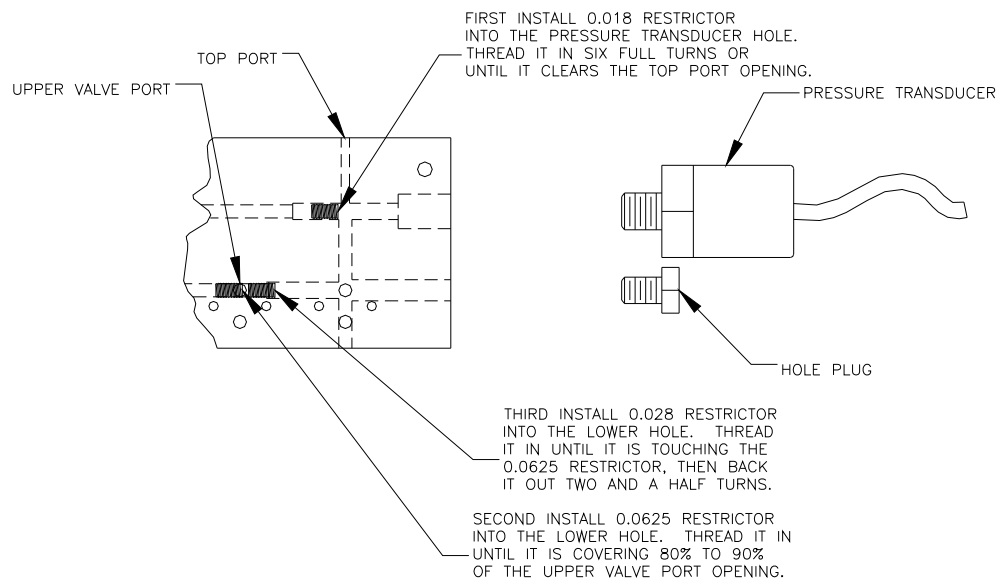
9.9 Changing / Cleaning the Pressure Restrictor

The pressure restrictor may require cleaning or replacement due to the nature of the operation and size of the opening.

- 1) The pressure restrictor is located behind the pressure transducer. It is necessary to remove the pressure transducer to gain access to the restrictor. To remove the pressure transducer, follow the instructions for removing the pressure transducer.
- 2) Once the transducer is removed use a 1/16" hex key (003-1051-001) to remove the restrictor insert.



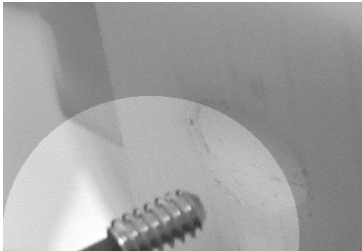
- 3) The manifold is only threaded a short way, if the restrictor does not come out on the end of the hex key it may be necessary to rotate the manifold down and gently tap it until the restrictor falls out.
- 4) If the restrictor is clogged simply wash with solvent until the clog is removed. Hold the restrictor up to the light to inspect for possible blockages.
- 5) Reinstall the restrictor in to the manifold. Screw in to the manifold until restrictor becomes tight. Do not over tighten.
- 6) Hold manifold up and check that restrictor is seated correctly and debris free.
- 7) Reinstall the pressure transducer.



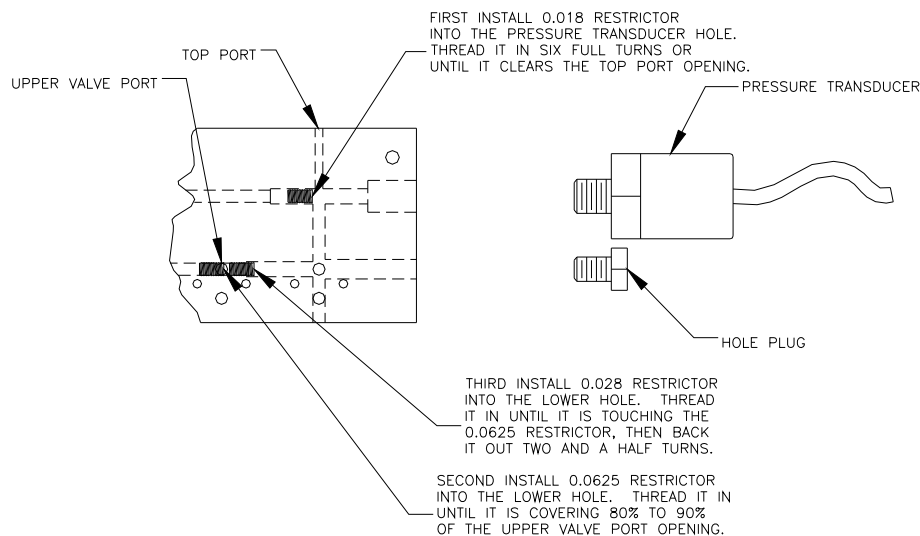
9.10 Changing / Cleaning the Venturi Restrictors

The venturi restrictors may require cleaning or replacement due to the nature of the operation and size of the opening.

- 1) The venturi restrictors are located behind A hole plug. It is necessary to remove this hole plug to gain access to the restrictors. To remove the plug loosen with a 7/16" wrench and remove.
- 2) Once the plug has been removed use a 1/16" hex key (003-1051-001) and remove the venturi insert.



- 3) The manifold is only threaded a short way, If the venturi insert does not come out on the end of the hex key turn the manifold down and gently tap it until the insert falls out.
- 4) Clean or replace the insert, before reinstalling hold it up to the light and ensure that it is clean.
- 5) The insert has to be screwed into the manifold to a precise depth. This is accomplished by first removing the gutter valve.
- 6) Follow the steps illustrated above.
- 7) Replace the gutter valve and the temperature probe.





Section 10 Reference Information

10.1 Ink and Makeup Consumption

Ink Consumption

The following chart details an average number of characters that can be printed by ml, and by 16 oz (473ml) bottle. The data is based on 30% of the dot matrix being printed. Actual consumption will vary dependent on actual characters selected for printing.

Fonts	5	7	9	16	25
Characters/ml	150,602	109,529	63,412	22,732	9,268
Characters/16oz	71,234,940	51,807,229	29,993,659	10,752,444	4,383,689

Makeup Consumption

Makeup is consumed at a rate based on the environment (temperature). Makeup consumption may vary based on actual environment.

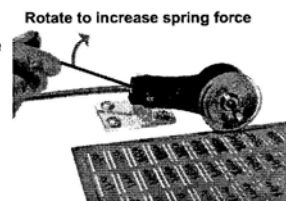
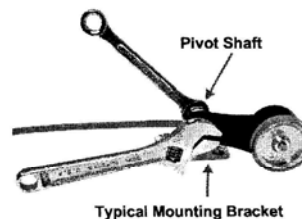
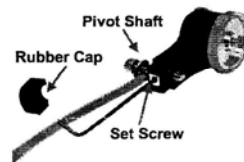
10.2 Shaft Encoder Assembly



Installation and adjustment instructions:

Installation:

1. Remove the rubber cap and verify the set-screw in the spring adjustment collar is **loose**. The TRU-TRAC pivot shaft should rotate easily by hand.
2. Install the threaded end of the pivot shaft through the mounting bracket. Install the washer and nut provided finger tight. The mounting bracket is typically supplied by the customer and would vary from application to application. The recommended hole diameter in the mounting bracket should be just large enough for clearance of the 1/4" or 6 mm pivot shaft and between .5" to 1.5" above the material surface.
3. Hold one end of the pivot shaft with a wrench while the nut is securely tightened.
4. At this point the TRU-TRAC housing assembly should rotate easily around the pivot shaft.
5. Rotate the housing so the measuring wheel is contacting the surface to be measured. Insert the hex key into the setscrew on the spring adjustment collar. Using the hex key arm for leverage, rotate the collar around the pivot shaft in the direction necessary to increase the spring force that holds the measuring wheel against the surface to be measured. Tighten the setscrew securely while maintaining pressure.
Note: The spring adjustment collar should not be rotated so far that it bottoms out against the internal stop or the TRU-TRAC will not have sufficient travel to accommodate variations in the surface height of the material being measured. For most applications the spring setting in it's mid range (about 2 pounds) is satisfactory. The spring force can be checked by carefully lifting up on the wheel. You should be able to lift the wheel 1/8" to 1/4" off the surface being measured. If not, repeat step 5.
6. Install the rubber cap.



Removal

1. Remove the rubber cap.
2. Loosen the setscrew in the spring adjustment collar. The TRU-TRAC should rotate easily around the pivot shaft.
3. Hold one end of the pivot shaft with a wrench while the lock nut is removed.
4. Remove the TRU-TRAC from the mounting bracket and install the washer and lock nut on the shaft by hand.



10.3 ciSeries Installation Report and Checklist

The document detailed on the following page is used when installing a new ciSeries system and/or submitted with the order for a new ciSeries system. This document should be completed to ensure the appropriate steps are completed and left with the customer as part of the customer's on-line training.



Installation Report / Checklist

Date:		Completed by:	
Customer Name:		System Model:	
Customer Email:		System Serial #:	
Customer Tel/Fax:		Date of Install:	
Customer Address:		Comments:	

Printing Information

Print contents (sketch details)	
Pixel:	_____
Fonts:	_____
Quality setting:	_____

Installation Review:

Installation Checklist	
☐ Jet starts straight multiple attempts	☐ Service settings are accurate
☐ Makeup is ejecting from nozzle – Jet Flush	☐ Current firmware is installed
☐ Viscosity measurement is accurate	☐ Customer has ink and makeup in stock
☐ Filter change interval determined and set	☐ Filter change interval reviewed with customer

Printing Conditions:

Status Chart:			
Operating hours/day:		Printhead vibration present:	Yes No
Operating days/month:		Heavy dust environment:	Yes No
Ambient temperature range:		Wet environment:	Yes No
Line speed:		Messages printed / minute:	
Raster pitch (print resolution):		Ink type:	

Operation and Maintenance Training:

Training Checklist	
☐ Describe basic theory of CIJ printing	☐ Instruct start-up and shut-down procedures
☐ Point out and describe major components	☐ Demonstrate basic maintenance procedures
☐ Explain how and when to add ink / makeup	☐ Instruct user interface operation

Peripherals Installed and/or Recommended:

Peripherals Installed and/or Recommended	Comments/Recommendations

Customer Signoff:

Customer Checklist		
☐ Demonstrated successful operation	Customer Name:	
☐ Operation and maintenance staff are trained	Customer Title:	
☐ Satisfied with installation and training	Customer Signature:	



10.4 Routine Cleaning and Maintenance

The document detailed on the following page is used when detailing to a customer how to maintain a ciSeries system on a regular basis. This document should be completed and left with the customer as part of the customer's on-line training. An electronic version of this form can be downloaded from the Distributor section of the Citronix website.



Routine Cleaning and Maintenance

CLEANING AND MAINTENANCE

- Always use the correct ink, makeup, and cleaning solvent for filling and cleaning.
- Never stop the printer by the mains power switch without shutting down the jet.
- Never attempt to open the system or complete any maintenance tasks unless you have received training by Citronix, or a Citronix Authorized Distributor.

Clean the printhead every: _____

Replace the air filter every: _____

Clean the controller / printhead enclosures every: _____

INK, MAKEUP, AND CLEANING AGENTS

Ink Type: _____ Lint Free Wipes Part #: _____

Ink Part #: _____ Stainless Steel Cleaner Part #: _____

Makeup Part #: _____ Cleaning Solvent Part #: _____

Order From: Company - _____

Contact - _____

Telephone - _____

CONTACTS

Citronix Help Desk Contact: 817.568.9800

The Person Responsible for this System is: Name: _____

Telephone: _____

In the Event of a System Breakdown Contact: Name: _____

Telephone: _____



ciSeries Technical Service Manual

10.5 1200-2000 Hour / 3-6 Month Scheduled Maintenance Checklist

The document detailed on the following page is used when completing a scheduled maintenance. This document should be completed to ensure the appropriate steps are completed.



1200-2000 Hour / 3-6 Month Scheduled Maintenance Checklist

Date:		Completed by:	
Customer Name:		System Model:	
Customer Email:		System Serial #:	
Customer Tel/Fax:		Date of Install:	
Customer Address:		Comments:	

System Status Information:

Status Chart:			
Run Time:		Viscosity Measured:	
Filter Hours:		Viscosity Calculated:	
Nozzle Temp:		Pump Pressure:	
Ink Temp:		Pump RPS:	
Electronics Temp:		Firmware Version:	

Maintenance Tasks:

Maintenance Checklist	
☐ Speak with operators to determine problems	☐ Examine electronics wiring and connectors
☐ Examine and clean printing system	☐ Examine printhead components and clean
☐ Replace air filter	☐ Update firmware if required
☐ Replace Pre-pump filter	☐ Ensure service settings are correct
☐ Replace Main filter	☐ Start system and perform start / stop checks
☐ Replace Gutter (vacuum) filter	☐ Operate system on-line
☐ Replace Makeup filter (ci1000, ci700)	☐ Reset filter time intervals

Repairs / Comments:

Repairs Completed	Comments/Recommendations

Customer Signoff:

Customer Checklist		
☐ System is clean and operational	Customer Name:	
☐ Demonstrated successful starting and stopping	Customer Title:	
☐ Satisfied with maintenance work	Customer Signature:	

Section 11 Fault Diagnosis

1. No Power

- a. Check power to unit
- b. Check Power Switch
- c. Check mains fuses
- d. Check mains EMI filter

2. Power on – No display or display rolling

- a. Check display connection to CPU
- b. Press MENU key – this acts as a display reset
- c. Possible ESD fault – reset printer

CiSeries printers can be detrimentally affected by electro-static discharge. Electro-Static Discharge, or ESD, is the discharge of electro-static buildup into electronic components. ESD failure in CiSeries printers often shows as a flickering screen and/or failure to boot up.

Electrostatic charges can be generated from many sources. These include (but are not limited to):

1. Personnel – we are an electronic components worst nightmare!
2. Flooring – carpet, waxed, sealed concrete and vinyl floors.
3. Clothing – synthetic, non-conductive shoes and neck ties.
4. Paper – photocopied, plastic work folders.
5. Tools – soldering irons and solder suckers.
6. Packaging – coffee cups, foam and plastic bags.

Below are examples of the electrostatic voltages generated in different situations. The differences seen are primarily due to differences in relative humidity.

A. Walking across a carpet	1,500 to 35,000v
B. Walking across a vinyl floor	250 to 12,000v
C. A worker at a bench	100 to 6,000v
D. Opening a vinyl plastic work folder	600 to 7,000v
E. Picking up a common plastic bag	1,200 to 20,000v
F. Sitting on a chair with Urethane foam	1,500 to 18,000v

Electronic equipment may be damaged by contacting a charged person or device (most common) or by entering the electrostatic field of a charged person or device. After contact there are three possible modes of failure:

1. No damage occurs (unusual)
2. Fatal damage occurs (also unusual)
3. Device is degraded but no problems are immediately observed.

When device is degraded it can fail days, weeks, or even MONTHS after the ESD originally occurred *or* it can cause intermittent faults.



NOTE: It is estimated that 90% of all ESD failures fail due to degradation and 70% of these were caused by UNGROUNDED PERSONNEL!



3. Pressure High Error (RPS < 70)

- a. Check restrictor(s) for clogs
- b. Check return line to ink tank for clogs
- c. Check pressure transducer (possibly incorrect reading)

4. Pressure Low Error (RPS > 110)

- a. Filters clogged
- b. Ink pickup tube too close to return tubes
- c. Check connections at prepump filter and inlet side of pump
- d. Check location of pickup tube to ensure it is not pressed against the side of the tank (blocking flow)

High Pump RPS (on STATUS screen) and/or low Pump Pressure (high Pump RPS is between 110 and 130 and low Pump Pressure continually below 40 psi)).

Probable Causes:

1. Filters dirty. Ensure filters have been changed recently/within the timeframe specified in the maintenance chart.
2. Air leak on the input side of the pump head.

5. Pump Motor Error

- a. Check fuses
- b. Check pump cable
- c. Disconnect pump head and check operation of pump motor
- d. Check pump head for seizure (if motor operates)

6. Cooling Fan Error

- a. Check fuses
- b. If fan is turning, check wire

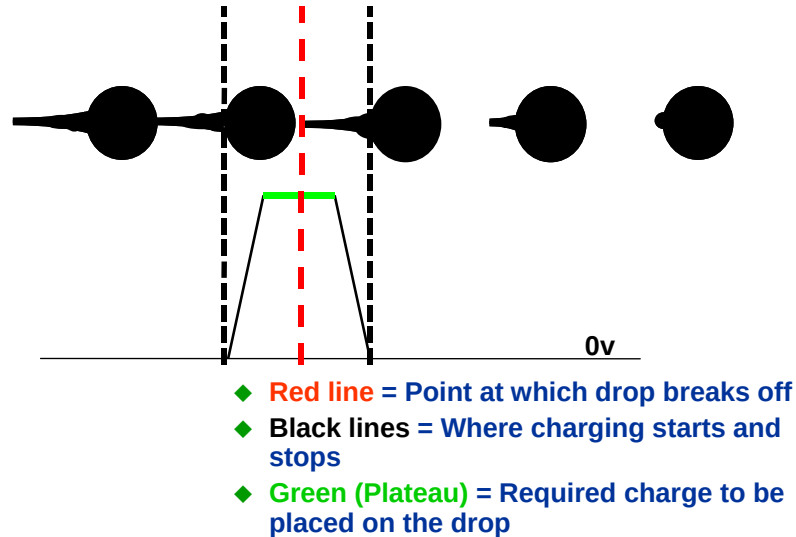
7. Phase Error

- a. Check for ink stream breakup
- b. Check distance from ink stream to phase detector
- c. Ensure ink stream is in center of charge electrode
- d. Check pressure and viscosity (to verify jet velocity)
- e. Check location of phase amplifier to ensure it is NOT too close to the valve, valve wires, or other possible source of noise
- f. Check phase amplifier connections

Phasing is an important aspect of continuous inkjet printing that is not always understood. This section will explain phasing; how it works, how it effects operation and what affects *it*.

WHAT IS PHASING?

Phasing is applying a charge to a drop, monitoring that charge, and continually adjusting the timing to maintain optimum charging of printed drops.



WHAT DOES PHASING DO?

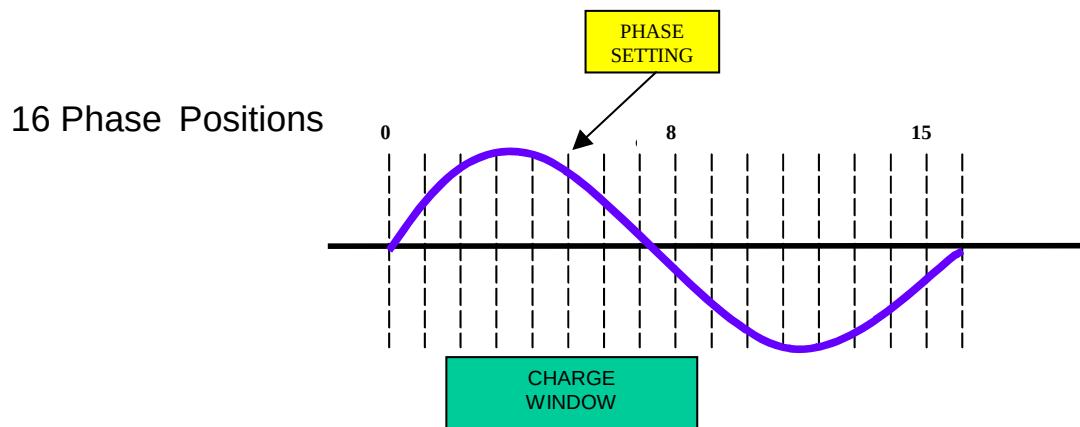
Phasing synchronizes the printing system and ensures each drop contains a full charge. Phasing constantly changes to allow for variations in viscosity, temperature or elevation of printhead. It also makes adjustments when components (nozzle, resonator probe, etc.) or fluids are changed.

WHEN DOES PHASING OCCUR?

Phasing takes place between prints (characters, messages, etc.) or between printed strokes (in very slow printing).

HOW IS PHASING ACCOMPLISHED?

1. A charge of -10v is applied to the drop at the charge electrode.
2. We attempt to charge 8 consecutive drops.
3. Drops are monitored passing in front of the phase detector.
4. Phase clock is advanced 1/16th of signal length.
5. Steps 1-3 are repeated for all 16 positions.
6. Software finds a "window" between where drops are first charged correctly and where charge is no longer detected.
7. Phase is set to center of this "window".



The STATUS screen of a Citronix ciSeries printer shows PHASE DATA and PHASE QUALITY.

PHASE DATA is the position where the software is setting phase (0-15). In a correctly phasing machine this number will typically move up and down one or two positions. This shows that the phasing is actually being adjusted.

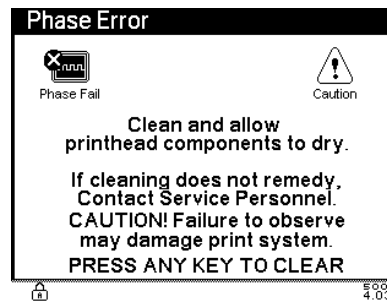
PHASE QUALITY is the percentage of time that the phase is actually found. Phasing is attempted 100 times...if it is found 91 times PHASE QUALITY would be 91.

Status	
Filters	OK
Nozzle Temperature	23 C
Electronics Temp	28 C
Memory Used	6.9%
Phase Data	14
Phase Quality	100
Viscosity	High Steady
Viscosity Time	180 Seconds
Viscometer Cal Constant	Not Calibrated
Measured Viscosity	0.0
Viscosity Set Point	3.6
Pump Pressure	0.5 psi
Pump RPS	0 rps
Line Speed	124.7fpm 24.9ips

 Filters
  Speed
  Error Log
  Viscosity Log
  4.03a

POSSIBLE ERRORS

CiSeries Continuous InkJet printers have 2 possible errors relating to phasing: PRINTHEAD CHARGE ERROR and PHASE ERROR.



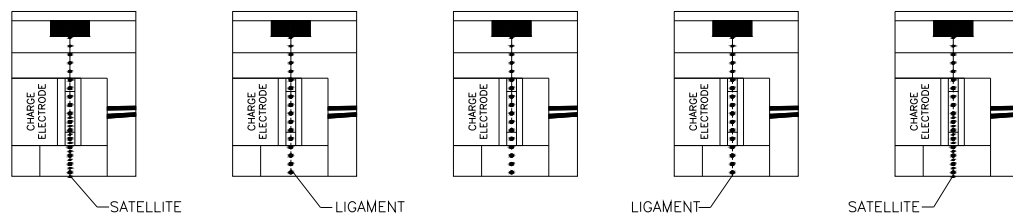
PRINTHEAD CHARGE ERROR occurs if the phase detector detects NO charge.

PHASE ERROR occurs when the PHASE QUALITY drops below 40%.

POSSIBLE CAUSES OF ERRORS

If you get a PRINTHEAD CHARGE ERROR check the following:

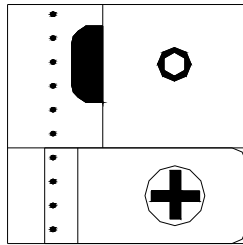
1. Drop velocity (caused by):
 - a. Pump pressure and RPS (high or low)
 - b. Filter status (clogged/dirty)
 - c. Ink viscosity (high or low)
2. Dirty Printhead (phase detector covered in ink)
3. Poor breakup/modulation:
 - a. No breakup (check modulation cable/fuse)
 - b. Satellites, ligaments or not breaking off in center of charge electrode



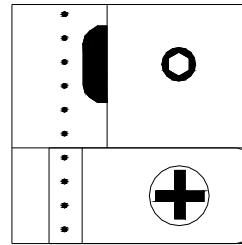
- c. Incorrect modulation (check settings against factory settings label)
4. No charge applied (check charge cable)

If you get a PHASE ERROR check the following:

1. Jet not in center of charge electrode (adjust)

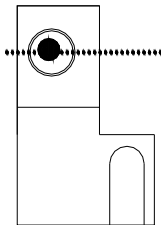


No Good

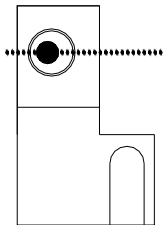


Good

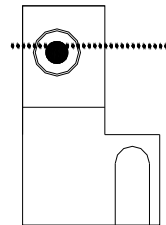
2. Jet not passing center of phase detector (adjust or replace block)



Rotate phase detector
to center on jet



Good



Replace strobe block
or shim to raise up to jet

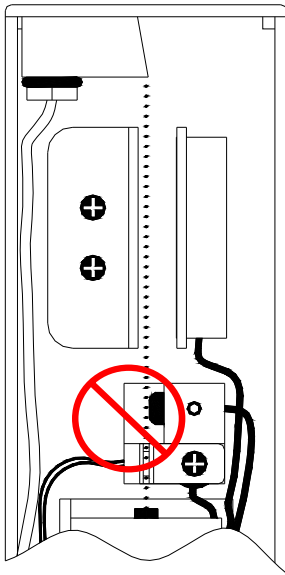
3. Dirty Printhead (phase detector covered in ink)
4. Phase detector too far from jet (adjust)
5. Phase Amplifier too close to valve, valve wires or other source of electronic noise.



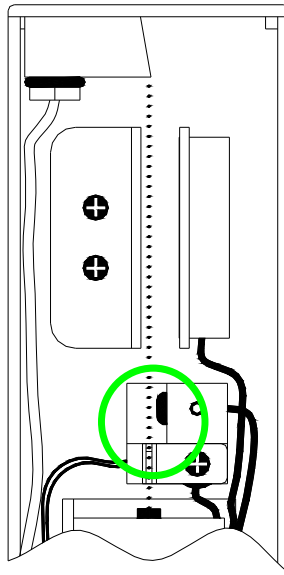
NOTE: Most of the above symptoms may cause *either* a PHASE *and/or* a PRINTHEAD CHARGE ERROR.

Phase detector adjustment is very important and fairly easy to perform. "The phase detector needs to be adjusted as *far away as possible* from the jet while still maintaining a PHASE QUALITY of 90-100".

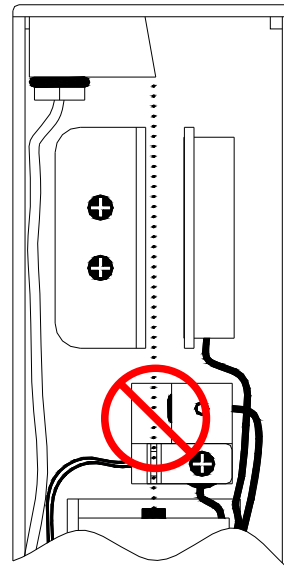
1. Begin by loosening the phase detector setscrew.
2. Move the phase detector to a position approximately 1mm from the jet. The jet is easier to see if you place a small slip of white paper under it.
3. Check your PHASE QUALITY on the STATUS screen, (allow a few seconds for phasing to take place) and insure it is 100.
4. Move phase detector away from jet slightly.
5. Check PHASE QUALITY to insure you have a reading between 90 and 100.
6. Position phase detector as above and tighten setscrew.



TOO CLOSE
Ink will get on detector



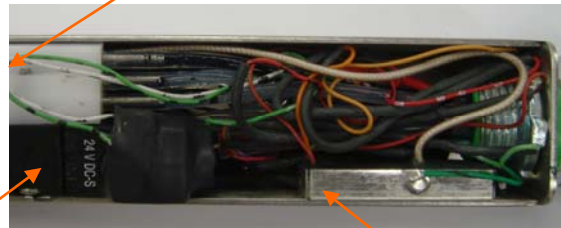
GOOD ADJUSTMENT
Phase Quality of 90-100



TOO FAR
phase quality below 90

Phase Errors may also be caused by electronic interference (noise). This noise may be internal or external. Internal noise is caused by the valve and/or valve wires. When working on or assembling the printhead make sure the phase amplifier is as far away from the valve and wires as possible (see images below). To protect from external noise be sure to mount printhead away from AC equipment such as motors, servos or valves.

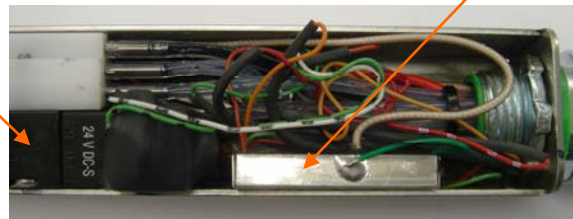
VALVE WIRES
(White/black and green/black)



Good

VALVE

PHASE AMPLIFIER



Bad (Phase Amplifier too close to valve and wires)

8. No Breakup

- a. Check f2 fuse
- b. Check for correct printing – if printing check strobe LED connections

A blown high voltage F2 fuse will cause the F2 LED to go out (second from the bottom on photo 2). This can be caused by:

1. A shorted Resonator Probe (Photo 3-A), which is typically caused by abrupt jarring of the print head (usually dropping the print head).
2. A leaking Resonator Probe Seal (Photo 3-B) that allows ink into the back of the Drop Generator shorting out the Resonator Probe connectors.

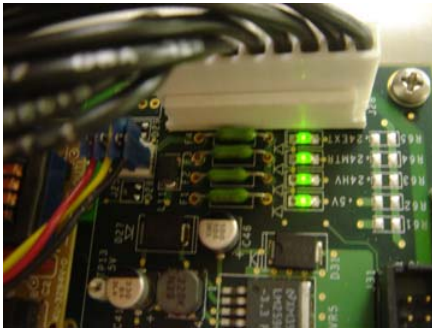


Photo 2

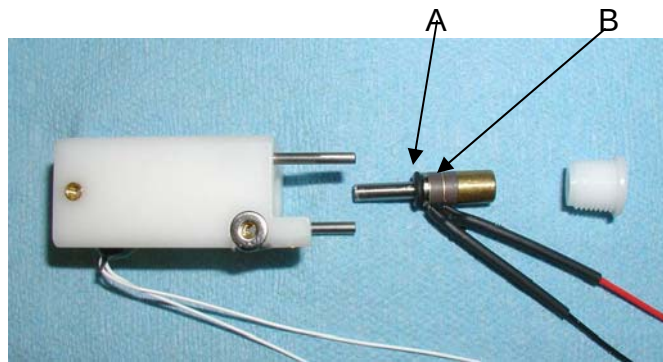


Photo 3

A short can be diagnosed as follows:

- Unplug the red cable from connector J2 on the CPU board.
- Insert the leads of a multimeter into the two positions of the connector (Photo 4).
- Check the resistance of the circuit (Photo 5).
 - i. Infinite resistance = no fault
 - ii. 100 – 5k ohms = potentially has ink on the probe. Clean probe and reinstall
 - iii. Less than 100 ohm = direct short potentially caused by jarring of the print head. Probe must be replaced.

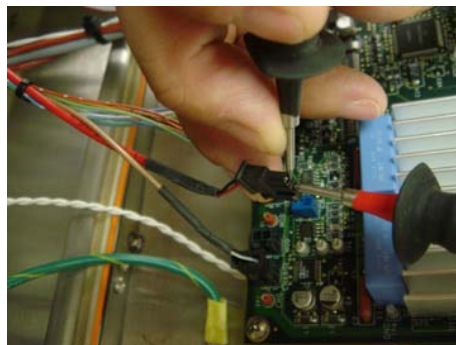


Photo 4



Photo 5

Corrective Action: Prior to replacing fuse F2 (*with a .5 amp only*), the following corrective actions must be taken:

- For a shorted Resonator Probe the probe must be replaced. When replacing probe be sure to install new Resonator Probe Seal.
- For ink on the Resonator Probe the probe may be removed, cleaned, and replaced. When replacing be sure to use new seal as in above. If seal is not leaking fault will not reoccur.

To prevent non-repairable CPU damage to revision 1 CPU's (3-fuse) as the result of these fault conditions Citronix now offers an in-line fuse (Photo 3):

PART NUMBER
004-1073-001

DESCRIPTION
Fuse Assembly, HV, Rev 1 PCB



Photo 3



Photo 4

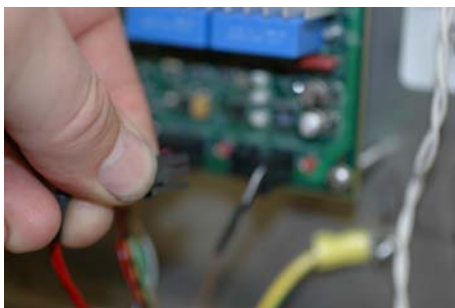


Photo 5

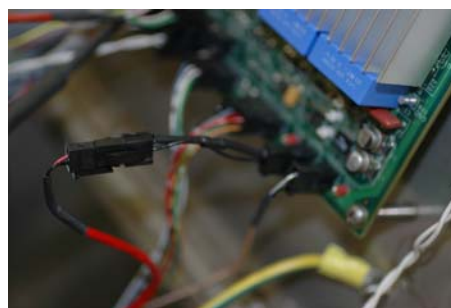


Photo 6

Installation Instructions:

1. Turn power off to machine
2. Disconnect modulation cable (Photos 4 and 5)
3. Attach in-line fuse to modulation cable and plug back into CPU (Photo 6)



9. Charge Error

- a. Check for ink stream breakup (see number 8)
- b. Check modulation calibration
- c. Clean and dry phase detector
- d. Check distance from ink stream to phase detector (see number 7)
- e. Check charge cable continuity (charge electrode to CPU)
- f. Check for clogged filters
- g. Check pressure and viscosity (to verify jet velocity)

10. Gutter Error

- a. Check alignment of jet
- b. Listen for steady vacuum
- c. Check continuity (gutter sensor to CPU)

11. Printhead Temperature Error

- a. Check printhead temperature setting in SERVICE menu
- b. Check temperature probe connections

12. No Deflection Voltage

- a. Ensure printhead cover is closed and HV symbol is displayed on main screen
- b. Check connections of white wire from HV module to CPU
- c. Check connection of red HV wire to HV module
- d. Check continuity from HV deflection plate to end of HV wire (at HV module)

13. Electronics Temperature Error

- a. Ensure fan is operating

14. High Voltage Trip

- a. Verify HV Trip set point
- b. Ensure deflection plates are clean and dry
- c. Watch for ink buildup due to lack of grounding
- d. Check jet alignment

15. Modulation Error

- a. Check for ink stream breakup
- b. Check fuses
- c. Ensure printhead components are clean and dry
- d. Check continuity of drop generator
- e. Verify modulation calibration

16. High Viscosity

- a. Check viscometer calibration
- b. Check makeup add valve (ci700/ci1000) for operation
- c. Ensure makeup is being added when requested (ci500)
- d. Ensure makeup filter is primed (ci700/ci1000)



17. Low Viscosity

- a. Check viscometer calibration
- b. Ensure makeup add valve (ci700/ci1000) is not stuck open (this will also be indicated by the ink tank being overfull while the makeup tank is in a low status)
- c. Ensure 4 ounce cartridge is being added (ci500) and NOT a 16 ounce bottle.

18. Viscometer Sensor Error

- a. Check viscometer calibration
- b. Check operation of viscometer valve
- c. Ensure ball is moving (use test sensor)
- d. Check operation of sensor (observe LED on sensor inside cabinet during operation)

19. Ink Leaking From Gutter (poor vacuum)

- a. Check adjustment of Venturi
- b. Check for correct restrictors
- c. Ensure restrictors are not clogged
- d. Verify jet alignment

Citronix uses three restrictors in the operation of the Continuous InkJet (CIJ) CiSeries printers. Two restrictors are used in the Venturi to create vacuum and one is used to create and maintain pressure.

There is the potential for ink to seep out of the gutter when coding on the side or bottom of a product. This has NOT been reported in any top coding applications. This issue can be recognized by a “*slurping*” sound from the gutter (the vacuum may seem to “come and go”). It can also be seen as ink leaking from the gutter into the printhead.

If this issue is seen the following steps should be taken:

1. Remove and inspect all restrictors.
2. Clean or replace in necessary (dirty and/or partially clogged restrictors will cause the same symptoms).
3. When reinstalling verify correct placement and/or adjustment.