

TWO ISOLATED LOOP SUPPLIES

Two isolated non-regulated 24 VDC supplies (50 ma max) are available on the digital I/O connector and may be used for the I/O loop power. These are low level supplies and cannot be used to power relay inputs or outputs! They should be used for LED indicators or transistor type input cards if the PLC does not provide low level DC power for this purpose.

The first supply is available on connector J3 pin 1 (+24 VDC isolated supply #1; cable wire – black) and J3 pin 2 (+24 VDC isolated supply return #1; cable wire – white). The second supply is on J3 pin 3 (+24 VDC isolated supply #2; cable wire – red) and J3 pin 4 (+24 VDC isolated supply return #2; cable wire – green).

See schematic drawing on page 44 for more detail.

I/O TIMING DIAGRAM – AUTOMATION CONTROLS

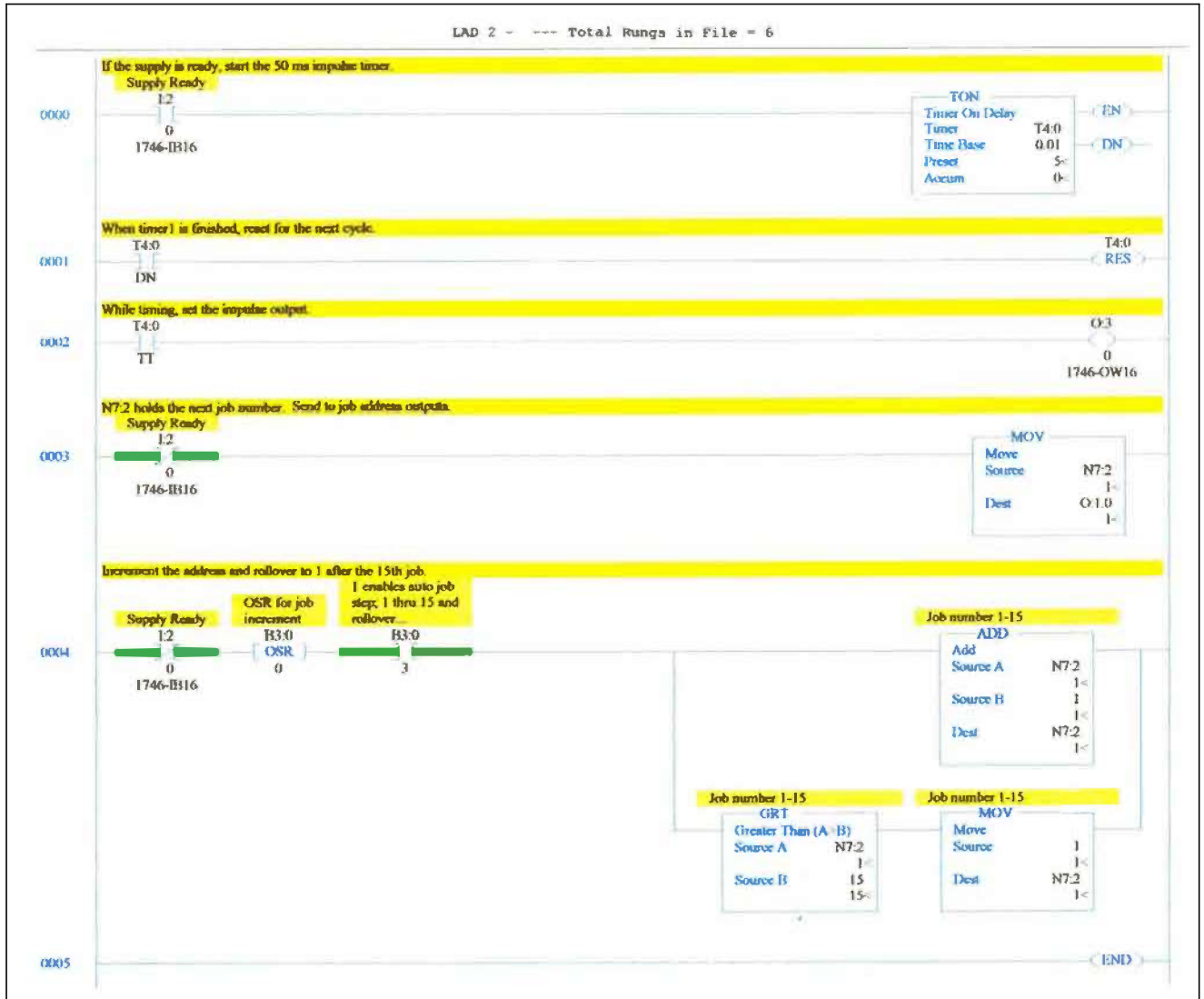
The cycle begins with the impulse contact to start a cycle (note that the impulse signal is not part of the configurable inputs and outputs for compatibility with existing product lines). If the system is using external job selection, the job address lines must be stable 50 ms prior to the impulse contact and remain stable until the cycle is underway as indicated by Ready going low (false). The Good Part/Bad Part lines are also cleared as the cycle begins.

When the weld cycle is complete, the Good or Bad part signal is set prior to the system returning to the ready condition. The impulse (and Palm Button signals) must all be released to complete a cycle and return the Ready Signal.

See schematic drawing on page 45 for more detail.

PLC SAMPLE CODE

The following ladder file is a simple demonstration routine to roll the external job selection from job 1 through 15 then restart at job 1 again. This routine will switch jobs as fast as possible because the next job code is generated and set during the previous weld cycle. The job is ready before the previous cycle is completed.



When the ultrasonic supply is READY a timer is started to generate the 50 ms impulse command in rung 0. When the timer is finished it will be reset by rung 0001 so it will be ready to go as soon as the cycle is completed and ready returns true.

While the timer is timing, output O:3/0 is set causing the ultrasonic system to begin a new cycle. This is the 50 ms impulse signal (rung 0002).

Once the new cycle has started, the ready signal will be false and the next job number is sent to the output at output O:1.0. So the address code for the next cycle is set and stable long before the present cycle is completed (rung 0003).

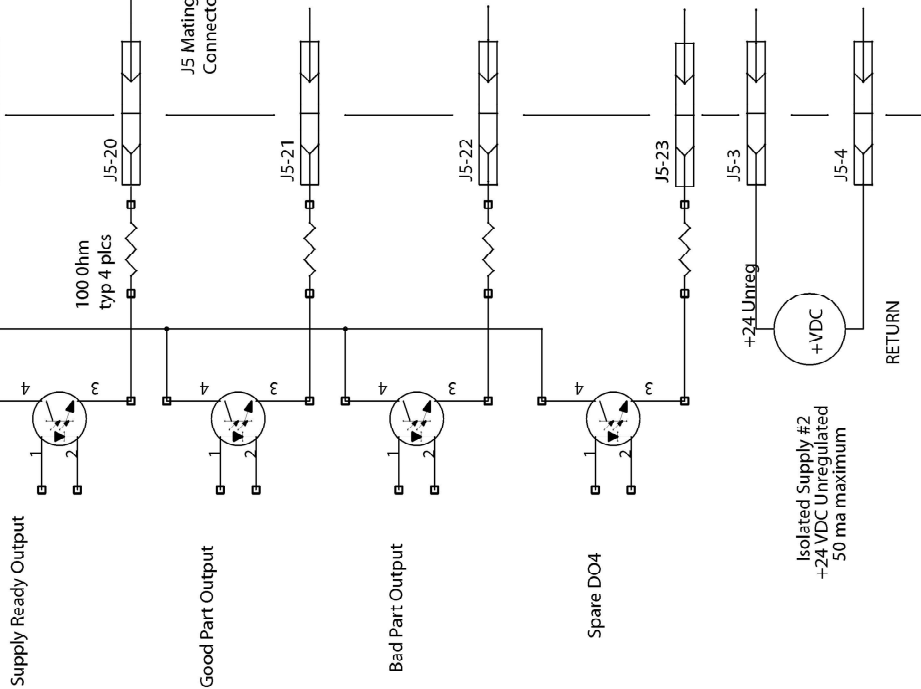
Rung 0004 generates the next job address code and updates the holding register, N7:2, with the next job number. If the number is greater than 15, it gets reset to 1 to start over.

This sample runs round and round as fast as possible limited by the application time settings, the ultrasonic press movement (gap to the fixture and parts) and travel distance. Over 80 weld cycles per minute are possible with very short weld times, higher pressures and shorter press stroke settings.

G series Digital Outputs (DO)

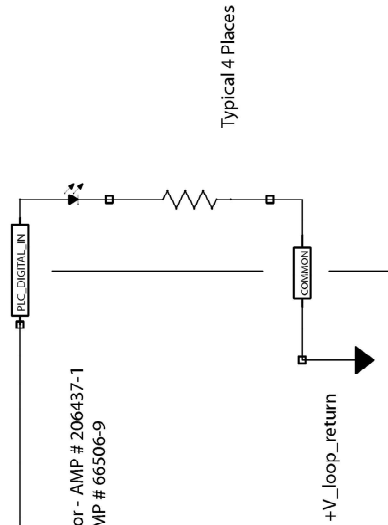
The GX digital outputs are optically isolated from the internal circuits. Each transistor is rated for 30 VDC max @100 ma max; an internal 100 ohm limiting resistor is provided in each transistor output. Do NOT apply AC voltage!

Source Outputs are the default configuration as shipped from the factory. They may be switched to "Sink" if desired. See Section x.xx, "Source/Sink Digital I/O Configuration"



PLC Input Card - typical 4 places

An external loop supply is required to power the output circuit (normally provided by the PLC system). Alternatively, 2 isolated, unregulated, 24 VDC supplies are available on the GX supply (J5 connector). These supplies are NOT regulated and only rated for 50 ma total.



		DRAWING NO.	
		E-3167	
TOLERANCES (EXCEPT AS NOTED)		DRAWN BY	SCALE
DECIMAL X= +/-0.030 XX= +/-0.015 XXX= +/-0.005		WPS	
FRACTIONAL +/- 1/64		CHKD	DATE
ANGULAR +/- 1/2 DEG.		MATERIAL	10-12-05

53 CHURCH HILL RD. NEWTOWN, CT 06470			
SOURCING OUTPUTS TO PLC INPUT DIAGRAM			

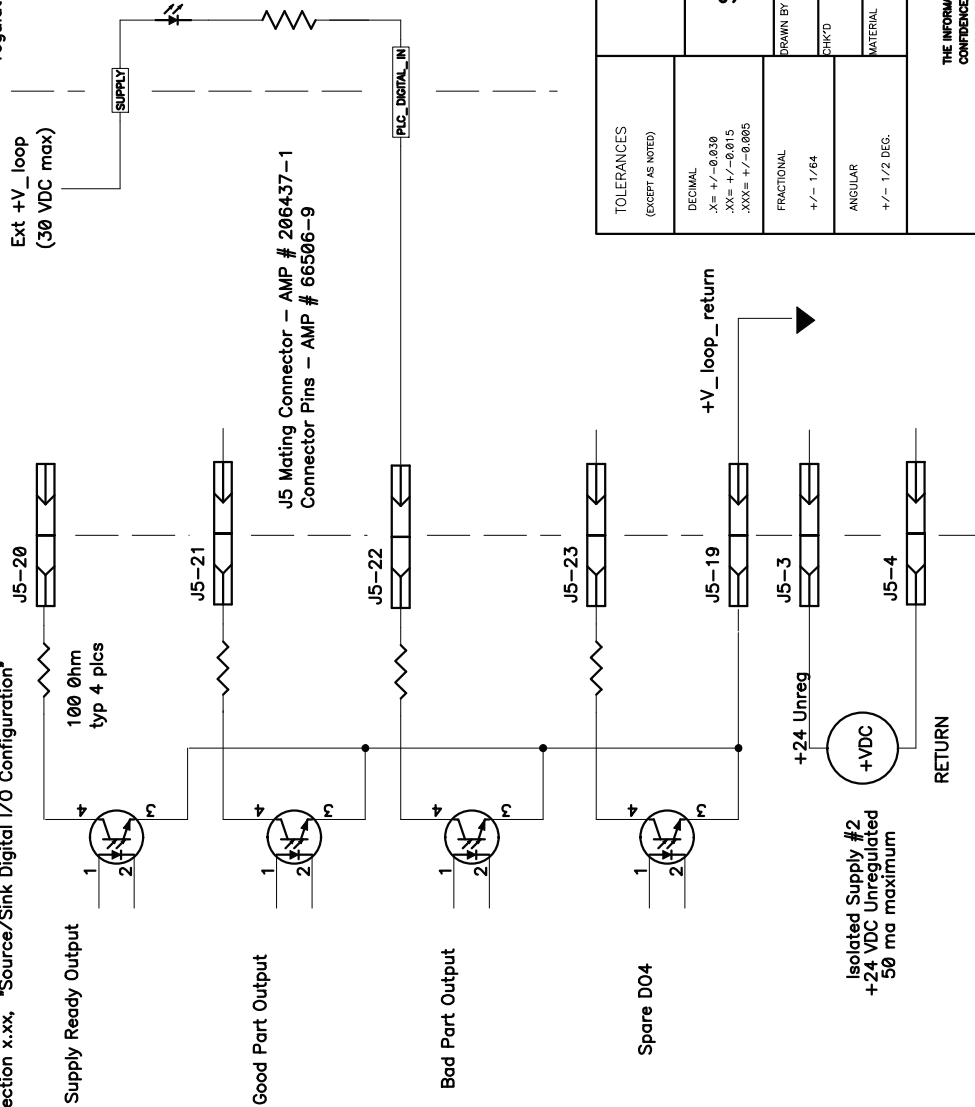
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G series Digital Outputs (DO)

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Source Outputs are the default configuration as shipped from the factory. They may be switched to "Sink" if desired. See Section x.xx, "Source/Sink Digital I/O Configuration"



PLC Input Card – typical 4 places

An external loop supply is required to power the output circuit (normally provided by the PLC system). Alternatively, 2 isolated, unregulated, 24 VDC supplies are available on the GX supply (J5 connector). These supplies are NOT regulated and only rated for 50 ma total.

Typical 4 Places

5			
4			
3			
2			
1	Changed J5-18 to J5-19	BP	12/2/08
NO.	DESCRIPTION	BY	DATE



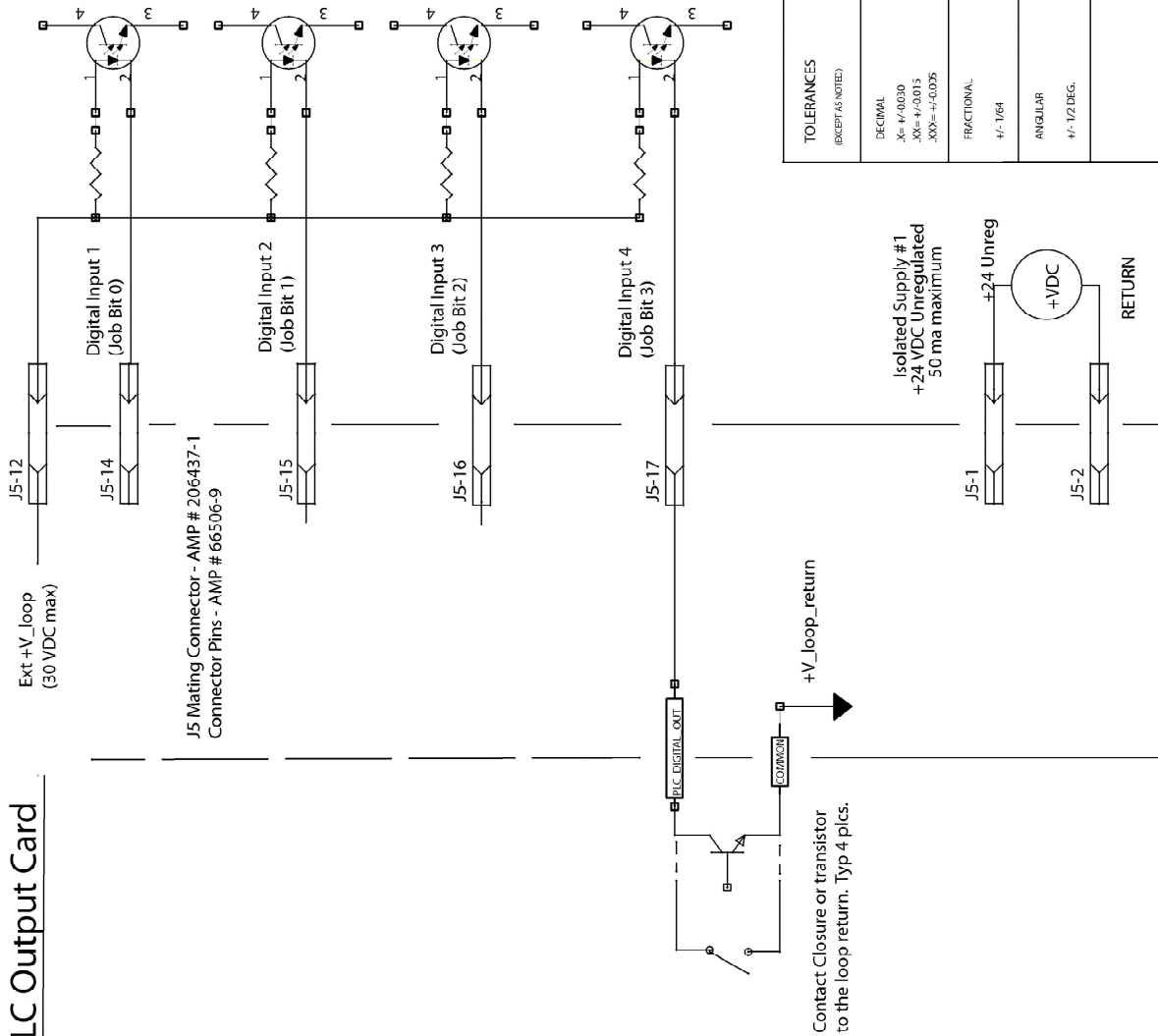
53 CHURCH HILL RD.
NEWTOWN, CT 06470

SINK OUTPUTS TO PLC INPUT DIAGRAM

DRAWN BY	WPS	SCALE	DRAWING NO.
CHECK'D		DATE	10-20-05
MATERIAL			E-3169

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PLC Output Card



G series Digital Inputs(DI)

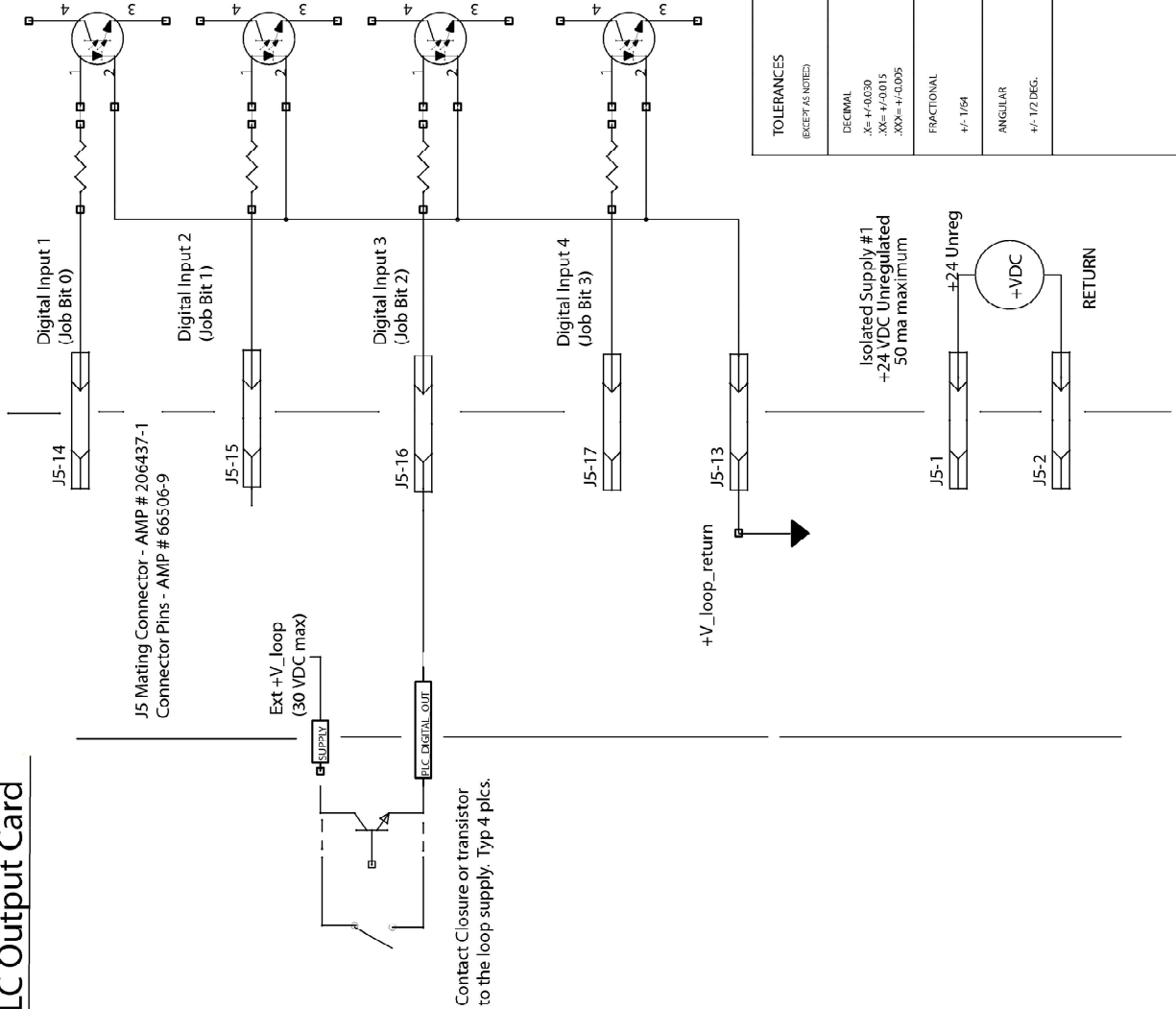
The GX digital inputs are optically isolated from the internal circuits. An internal 2.4 K limiting resistor is provided for each optical input. Do NOT apply AC voltage!

Source Inputs are the default configuration as shipped from the factory. They may be switched to "Sink" if desired. See Section xxx, "Source/Sink Digital I/O Configuration"

An external loop supply is required to power the input circuit (normally provided by the PLC system). Alternatively, 2 isolated, unregulated, 24 VDC supplies are available on the GX supply (J5 connector). These supplies are NOT regulated and only rated for 50 ma total.

		53 CHURCH HILL RD. NEWTOWN, CT 06470	
PLC OUTPUT TO SINKING INPUT DIAGRAM			
TOLERANCES (EXCEPT AS NOTED)	DECIMAL	DRAWING NO.	
	.X = ± 0.030 .XX = ± 0.015 .XXX = ± 0.005	SCALE	WPS CHKD MATERIAL
FRACTIONAL	1/2 1/4 1/8	DATE	10-12-05 E-3170
ANGULAR	1/2 DEG. 1/4 DEG.	CONFIDENTIAL INFORMATION THE INFORMATION AND DATA CONTAINED HEREIN IS PROPRIETARY AND IS SUBMITTED IN CONFIDENCE, AND SHALL NOT BE DISCLOSED OR REPRODUCED FOR ANY PURPOSE, WITHOUT THE PRIOR WRITTEN PERMISSION OF SONICS & M.A. EBALS, INC., NEWTOWN, CT. THIS LEGEND SHALL BE EMPLOYED ON ANY REPRODUCTIONS HEREOF IN WHOLE OR IN PART. RECEIPT OF THIS DOCUMENT SHALL BE DEEMED TO BE AN ACCEPTANCE OF THE CONDITIONS SPECIFIED HEREIN.	

PLC Output Card



G series Digital Inputs(DI)

The GX digital inputs are optically isolated from the internal circuits. An internal 2.4 K limiting resistor is provided for each optical input. Do NOT apply AC voltage!

Source inputs are the default configuration as shipped from the factory. They may be switched to "Sink" if desired. See Section x.xx, "Source/Sink Digital I/O Configuration"

An external loop supply is required to power the input circuit (normally provided by the PLC system). Alternatively, 2 isolated, unregulated, 24 VDC supplies are available on the GX supply (J5 connector). These supplies are NOT regulated and only rated for 50 ma total.

		53 CHURCH HILL RD. NEWTOWN, CT 06470	
TOLERANCES (EXCEPT AS NOTED)		PLC OUTPUT TO SOURCE INPUT DIAGRAM	
DECIMAL .X= +/-.0030 .XX= +/-.0015 .XXX= +/-.0005		DRAWN BY WPS	DRAWING NO. E-3171
FRACTIONAL +/- 1/64		CHECKED DATE 10-12-05	
ANGULAR +/- 1/2 DEG.		MATERIAL	
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POWER SUPPLY CONNECTOR		CUSTOMER I/O CONNECTIONS	
1	BLACK	+24VDC ISOLATED SUPPLY #1	
2	WHITE	+24VDC ISOLATED SUPPLY RETURN #1	
3	RED	+24VDC ISOLATED SUPPLY #2	
4	GREEN	+24VDC ISOLATED SUPPLY RETURN #2	
5	ORANGE	SPARE DIGITAL INPUT	
6	BLUE	GROUND	
7	WHITE/BLACK	N.C.	
8	RED/BLACK	N.C.	
9	GREEN/BLACK	N.C.	
10	ORANGE/BLACK	N.C.	
11	BLUE/BLACK	N.C.	
12	BLACK/WHITE	N.C.	
13	RED/WHITE	+VDC (SINK INPUTS)	
14	GREEN/WHITE	RETURN (SOURCE INPUTS)	
15	BLUE/WHITE	DIGITAL INPUT #1 (JOB BIT 0)	
16	BLACK/RED	DIGITAL INPUT #2 (JOB BIT 1)	
17	WHITE/RED	DIGITAL INPUT #3 (JOB BIT 2)	
18	ORANGE/RED	DIGITAL INPUT #4 (JOB BIT 3)	
19	BLUE/RED	+VDC (SOURCE OUTPUTS)	
20	RED/GREEN	RETURN (SINK OUTPUTS)	
21	ORANGE/GREEN	DIGITAL OUTPUT (READY SIGNAL)	
22	BLACK/WHITE/RED	DIGITAL OUTPUT (GOOD PART SIGNAL)	
23	WHITE/BLACK/RED	DIGITAL OUTPUT (BAD PART SIGNAL)	
24	RED/BLACK/WHITE	DIGITAL OUTPUT (SPARE #4)	
25	GREEN/BLACK/WHITE	N.C.	
26	ORANGE/BLACK/WHITE	N.C.	
27	BLUE/BLACK/WHITE	EXTERNAL AMPLITUDE CONTROL: (0-10VDC = 20-100% AMPLITUDE) ISOLATED SUPPLY (SEE NOTE 5)	
28	BLACK/RED/GREEN	OVERLOAD INDICATION (SEE NOTE 3)	
29	WHITE/RED/GREEN	COMMON EMITTER	
30	RED/BLACK/GREEN	OVERLOAD RESET (SEE NOTE 4)	
31	GREEN/BLACK/GREEN	GROUND	
32	ORANGE/BLACK/GREEN	TUNE LOCK (SEE NOTE 6)	
33	BLUE/WHITE/ORANGE	FREQUENCY/10 (SEE NOTE 7)	
34	BLACK/WHITE/ORANGE	SMPS READY SIGNAL (SEE NOTE 9)	
35	WHITE/RED/ORANGE	WANTS OUTPUT: 0-10VDC = 0-100% (SEE NOTE 6)	
36	ORANGE/WHITE/BLUE	N.C.	
37	WHITE/RED/BLUE	N.C.	
38	BLACK/WHITE/GREEN	N.C.	
39	WHITE/BLACK/GREEN	N.C.	
40	RED/WHITE/GREEN	N.C.	
41	GREEN/WHITE/BLUE	N.C.	
42	ORANGE/RED/GREEN	N.C.	
43	BLUE/RED/GREEN	N.C.	
44	BLACK/WHITE/BLUE	N.C.	
45	WHITE/BLACK/BLUE	N.C.	
46	RED/WHITE/BLUE	N.C.	
47	GREEN/ORANGE/RED	N.C.	
48	ORANGE/RED/BLUE	N.C.	
49	BLUE/RED/ORANGE	N.C.	
50	BLACK/ORANGE/RED	N.C.	
51	N.C.	N.C.	
52	N.C.	N.C.	
53	N.C.	N.C.	
54	N.C.	N.C.	
55	N.C.	N.C.	
56	N.C.	N.C.	
57	N.C.	N.C.	

CONNECTION NOTES:

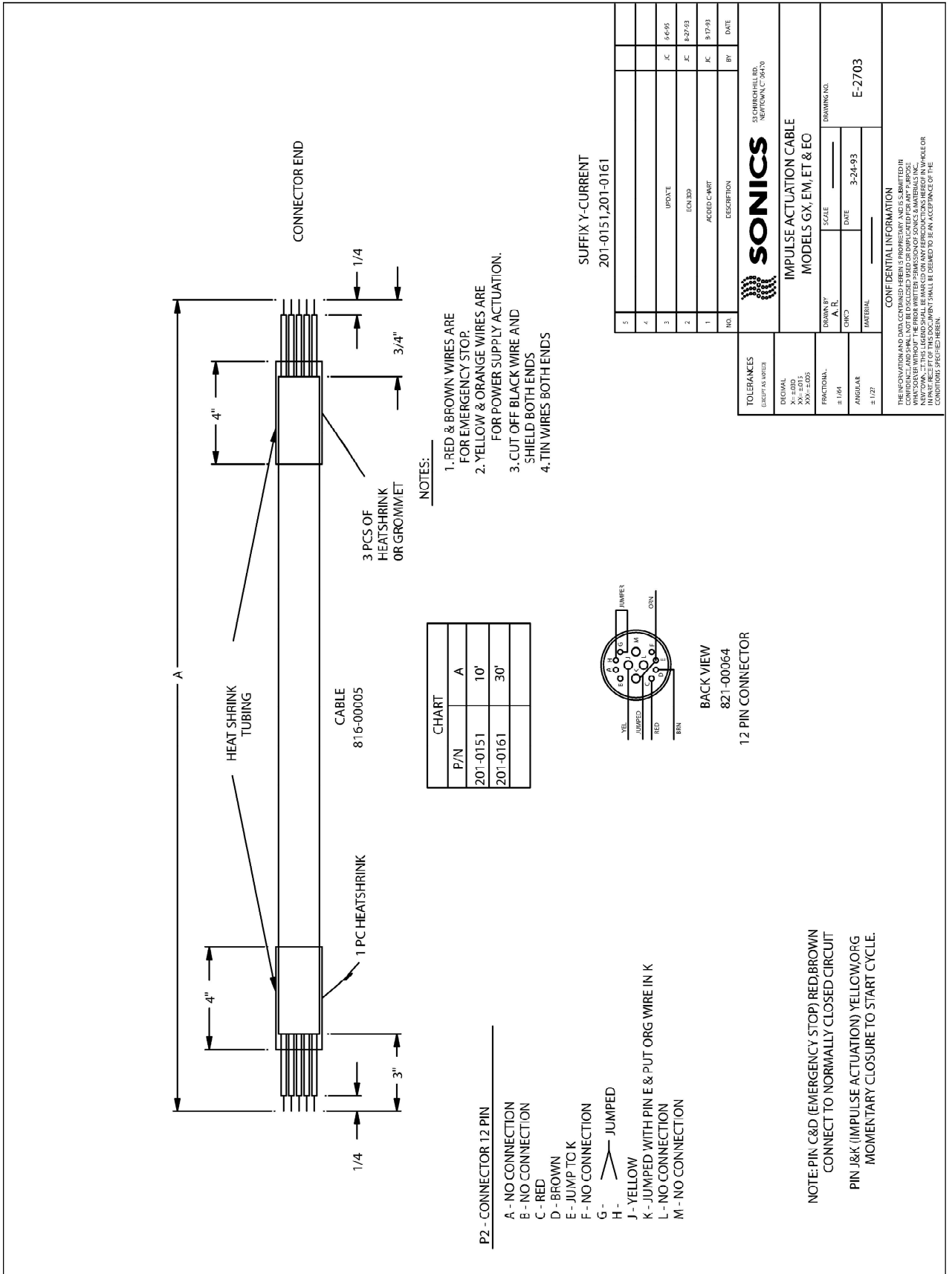
- +24VDC ISOLATED SUPPLIES MAX RATING 24VDC UNREGULATED 50mA MAX
- +24VDC ISOLATED SUPPLY RETURNS ON PINS 2&4 NOT COMMON TO GROUND ON PIN 6, OR PIN 30.
- OVERLOAD INDICATOR - 30VDC; 20ma MAX. NPN OPEN COLLECTOR TRANSISTOR OUTPUT (TO COMMON EMITTER PIN 28)
- NO INTERNAL CURRENT LIMIT.
- TRANSISTOR ON= POWER SUPPLY IS IN OVERLOAD CONDITION.
- OVERLOAD RESET MOMENTARY CONTACT CLOSURE TO GROUND (MIN 20ma), SWITCH OR RELAY CONTACT 30VDC; 20ma MAX BETWEEN PIN 29 AND PIN 30.
- EXTERNAL AMPLITUDE 20ma MAX, 0-10VDC ISOLATED VOLTAGE SOURCE (0-10VDC = 20-100% AMPLITUDE)
- WANTS OUTPUT- DC VOLTAGE OUTPUT TO GROUND (0-10VDC = 0-100% RATED OUTPUT)*
- FOR GXC/GXP MODELS DC VOLTAGE OUTPUT (0-6.16 = 0-100% RATED OUTPUT) TRANSISTOR OUTPUT (TO COMMON EMITTER PIN 28).
- NO INTERNAL CURRENT LIMIT
- OSCILLATING AT ULTRASONIC FREQUENCY/10
- TUNE LOCK - 30VDC; 20ma MAX. NPN OPEN COLLECTOR TRANSISTOR OUTPUT. (TO COMMON EMITTER PIN 28).
- NO INTERNAL CURRENT LIMIT
- TRANSISTOR ON = FORWARD STACK IS IN FREQUENCY RANGE WHEN ULTRASONIC FREQUENCY/10
- SMPS READY SIGNAL - 30VDC; 20ma MAX. NPN OPEN COLLECTOR TRANSISTOR OUTPUT. (TO COMMON EMITTER PIN 28).
- NO INTERNAL CURRENT LIMIT
- TRANSISTOR ON = PLL/CONTROL BD. READY

3			
4			
3			
2			
1	REF. ECH #689, INCREASED COND. FROM 25 TO 50 FOR ADDED SIGNALS.	BP	12-6-96
NO.	DESCRIPTION	BY	DATE

FILE # E_3164.SCH

		55 ORCHARD HILL RD. WESTPORT, CT 06891	
GX-SERIES CONTROLLER EXTERNAL I/O CONNECTIONS			
DRAWN BY BP	SCALE 7-14-05	DRAWING NO. E-3164	
CHECK'D 	DATE 		
MATERIAL 			
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--- CABLE SHIELD (EARTH)



CHART

P/N	A
201-0151	10'
201-0161	30'

- P2 - CONNECTOR 12 PIN
- A - NO CONNECTION
 - B - NO CONNECTION
 - C - RED
 - D - BROWN
 - E - JUMP TO K
 - F - NO CONNECTION
 - G - JUMPED
 - H - JUMPED
 - I - YELLOW
 - J - JUMPED WITH PIN E & PUT ORG WIRE IN K
 - K - NO CONNECTION
 - L - NO CONNECTION
 - M - NO CONNECTION

- NOTES:
1. RED & BROWN WIRES ARE FOR EMERGENCY STOP.
 2. YELLOW & ORANGE WIRES ARE FOR POWER SUPPLY ACTUATION.
 3. CUT OFF BLACK WIRE AND SHIELD BOTH ENDS
 4. TIN WIRES BOTH ENDS

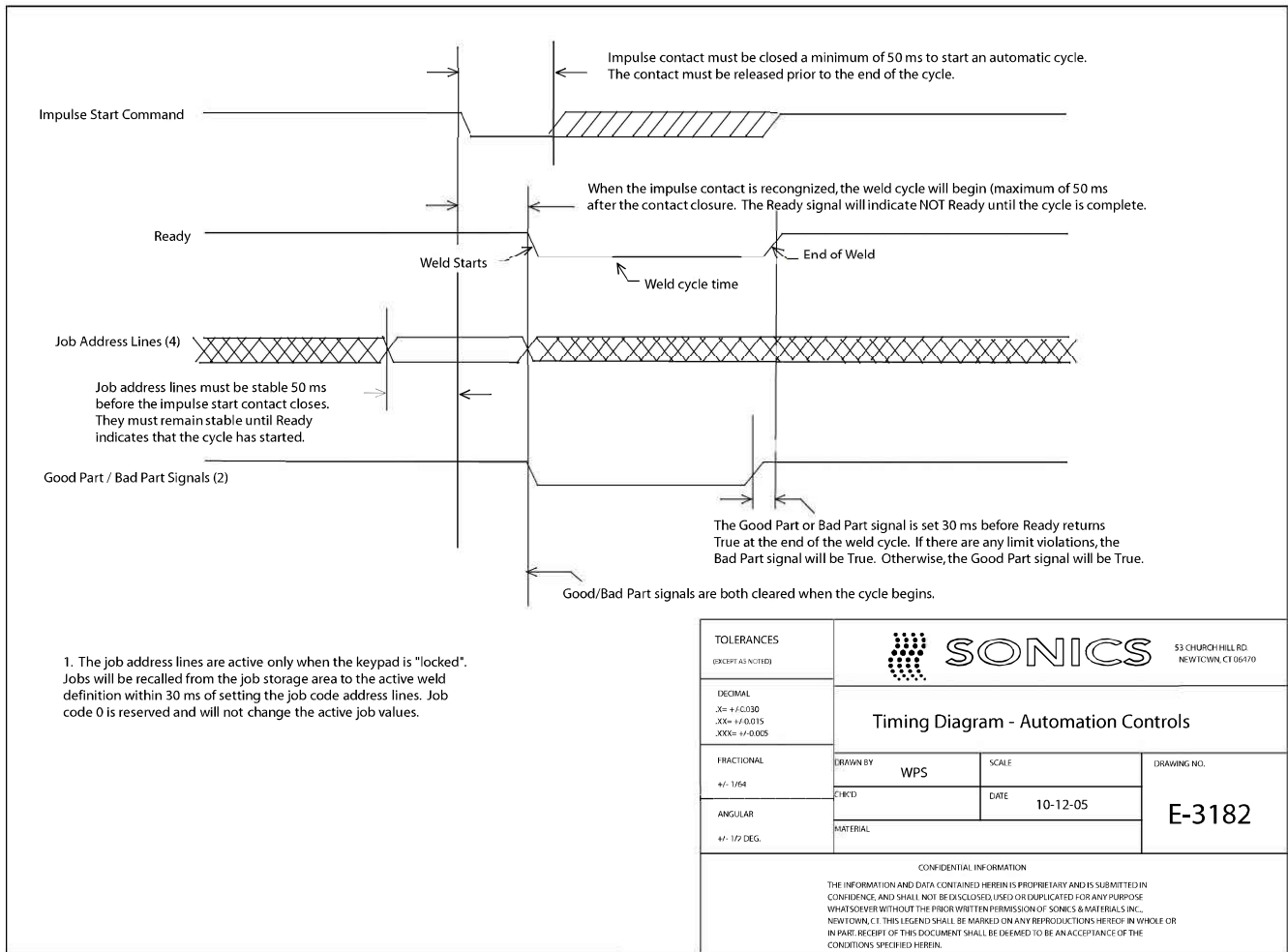
SUFFIX Y-CURRENT
201-0151,201-0161


5			
4			
3	UPDATE	JC	5-6-95
2	EOLN.BEP	JC	8-27-93
1	ASSEMBLY CHART	JC	9-17-93
NO.	DESCRIPTION	BY	DATE

TOLERANCES (EXCEPT AS NOTED)		SONICS B. CHAPMAN HILL, RD. NEWTOWN, CT 06470	
DECIMAL		IMPULSE ACTUATION CABLE MODELS GX, EM, ET & EO	
FRACTIONAL		DRAWN BY A. R.	SCALE
ANGULAR		DATE 3-24-93	DRAWING NO. E-2703
CONFIDENTIAL INFORMATION			

NOTE: PIN C&D (EMERGENCY STOP) RED, BROWN
CONNECT TO NORMALLY CLOSED CIRCUIT
PIN J&K (IMPULSE ACTUATION) YELLOW, ORG
MOMENTARY CLOSURE TO START CYCLE.

BACK VIEW
821-00064
12 PIN CONNECTOR



TOLERANCES <small>(EXCEPT AS NOTED)</small>		 53 CHURCH HILL RD. NEWTOWN, CT 06470	
DECIMAL .XX = ± 0.030 .XXX = ± 0.015 .XXXX = ± 0.005		Timing Diagram - Automation Controls	
FRACTIONAL +/- 1/64	DRAWN BY WPS	SCALE	DRAWING NO. E-3182
ANGULAR +/- 1/2 DEG.	CHECKED	DATE 10-12-05	
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Start Weld Cycle

- Start a Weld Cycle by impulse or palm button command contacts.
- The Ready , the Good Part and the Bad Part signals are all set false as the cycle begins.
- The solenoids are energized and the Air Cylinder starts moving toward the parts.
- If the trigger mode is set for "Distance", Sonics will start when the trigger distance is reached or from the Home position if the trigger distance value is 0.000.
- The Pressure switch closes when the head contacts the parts. If Sonics is ON already the WELD TIME begins immediately.
- If Sonics is NOT running at contact, the pressure switch is de-bounced or the delay time begins or the system waits for a Force Trigger.
- When the PSW debounce is stable or the delay time is complete or the proper Force is achieved, the WELD TIME begins.
- While the system is welding, it will monitor the Time, Distance and Energy setpoints. When the first setpoint value is reached, SONICS will be turned OFF.
- End of Welding: The vibration has stopped because the system has reached one of the setpoints or an external sonic stop signal has terminated the weld so the system starts the Hold time to allow the weld joint to cure.
- When the Hold time is complete, the repulse time begins as the head begins to retract from the welded parts. Sonics will be turned ON for the repulse time length to prevent the parts from sticking to the horn.
- The weld data is captured for examination against the limit windows settings and the Good Part/ Bad Part outputs are set.
- The print line containing the last weld information is sent if it is turned ON (micro board switch 5).
- If the impulse and both palm button signals have been released, the display info is updated with the last weld numbers for time, distance and energy. If the weld terminated by one of the setpoints, the appropriate data label will be blinking as an indication.
- The ready signal returns to true indicating that the cycle has completed and the system is ready for the next weld cycle.

End of Weld Cycle

53 CHURCH HILL RD.
NEWTOWN, CT 06470

SONICS



Basic Weld Cycle Time Line

DRAWN BY	WPS	SCALE	DRAWING NO.
CHKD		DATE	E-3177
MATERIAL			

TOLERANCES (EXCEPT AS NOTED)

DECIMAL
 .X = +/- 0.030
 .XX = +/- 0.015
 .XXX = +/- 0.005

FRACTIONAL
 +/- 1/64

ANGULAR
 +/- 1/2 DEG.

Basic Time Line

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G-SERIES SWITCHES

SWITCH	POS. OFF	POS. ON	DEFAULT
SW2-1	Program Flash (Production only)	Enable-WD (Always on)	ON
SW2-2	Cylinder Pot (Future option)	Optical Encoder	ON
SW2-3	Auto Start	Wait for 'ENTER'	ON
SW2-4	English	Metric	OFF
SW2-5	Print Line-OFF	Print Line-ON	OFF
SW2-6	Reserved For Future Expansion		
SW2-7	TXT Print Line	Future Option	OFF
SW2-8	Reserved For Future Expansion		