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**I. OUTPUTS:**

LS 1 - LS 8 are normal "FROM" - "TO" or "FROM" - "TIME ON" Limit Switch outputs.

LS 9 - LS 11 are not used,

LS 12 is the JAW output,

LS 13 is the ARM output,

LS 14 is the INITIATED output,

LS 15 is the MOTION DETECTOR output,

LS 16 is the TRY output.

M.DET is the RUN output.

**II. INPUTS:**

IN 1 is the REMOTE STOP input,

IN 2 is the RESET FAULTS input,

IN 3 is the CYCLE HOLD (enable I.H. cycle) input,

IN 4 is the INHIBIT (stop LS timers) input,

IN 5 is the TRYIN input,

IN 6 is the TRY MODE input,

IN 7 is the PROGRAM INHIBIT input,

IN 8 is not used.

INPUTS 2 through 4 are normally high; active low.  
INPUTS 1 & 5 - 7 are normally low; active high.

INPUTS 2 through 4 of the iPLC1-33 controller must be set to their normal logic 1 level by external means (external pull up resistors).

Logic Low level (0-1 Vdc)  
Logic High level (3-15 Vdc)

All input Logic levels are referenced to Pin 16 of the J1 Connector and all inputs are debounced for 50 msecs. If an input pulse is less than 50 mSecs it will be ignored by the Iron Hand Controller.

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### III. PROGRAMMING OF iPLC 1 - 33:

1. SCALE FACTOR : 360 degree. Not programmable.
2. OFFSET : Can be programmed in the same manner as a standard iPLC 1.
3. MOTION DETECTOR: Can be programmed in the same manner as a standard iPLC 1.
4. PROGRAM CODE: Can be programmed in the same manner as a standard iPLC 1.
5. IRON HAND: Can be examined or programmed by consecutively depressing the < REP > key using the following procedure:
  - a. Depressing the < REP > key will change the display to:

I. ANGLE xxx

xxx = Initiate angle of the Iron Hand  
Must be greater than or equal to 180.

In Program mode ( Program LED " on " ) the xxx can be altered to the desired value by using the digit keys and then stored by depressing the < ENTER > key. If the initiate angle is less than 180 the Controller will not enter the number.

- b. Depressing the < REP > again key will change the display to:

ARM.OUT. x.xx

x.xx = Arm Out timer in seconds.

The Programming procedure is the same as Initiate angle. The timer cannot be programmed to a value of 0.00 Secs.

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### III. Programming of iPLC1 - 33: (cont'd)

- c. Depressing the <REP> key again will change the display to:

JAW.REL. x.xx

x.xx = Jaw Release timer in seconds.

The Programming procedure is the same as the Arm.Out timer. The timer can not be programmed to a value of 0.00 Secs.

- d. Depressing the < REP > again key will change the display to:

ARM.RET. x.xx

x.xx = Arm Return timer in seconds.

The Programming procedure is the same as Arm.Out timer. The timer cannot be programmed to a value of 0.00 Secs.

- e. Depressing the < REP > key consecutively will repeat the sequence ( a ) to ( d ).

### IV. LIMIT (LS) PROGRAMMING:

Programming of the Limits LS 1 to LS 8 is accomplished in the following manner:

1. Depress the < LS > key and the display will change to:

L.S. x

x = Limit Switch number

2. Select "x" equal to the desired L.S. number by using the digit keys or consecutively depressing the < NEXT > key.

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**IV. Limit Programming: (cont'd):**

3. Depress the < ENTER > key and the display will change to:

L.x - yyy - zzz

yyy = "FROM" limit point in degrees

zzz = "TO" limit point in degrees

or:

L.x - yyy < zzz

yyy = "FROM" limit point in degrees

z.zz = "TIME On" in seconds.

or:

L.x - yyy \* zzz

yyy = "FROM" limit point in degrees

z.zz = "TIME On" in seconds.

"\*" indicates that the L.S. will be affected by the INHIBIT input. (IN4).

4. In program mode, (Program LED "on") the following changes can be made:

- a. The values of yyy and zzz can be altered by using the digit keys or by using the < + > and < - > keys in the same manner as a standard iPLC1 unit.
- b. The L.S. can be changed from a "FROM - TO" Limit to a "FROM - TIME ON" Limit by using the < T/C > key:

L.x - yyy - zzz

1. Depress the < FUNCTION > Key, (Func. LED "on" ) then depress the < T/C > key and the display will change to:

L.x - yyy < z.zz

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**IV. Limit Programming: (cont'd):**

2. Depress the < T/C > key again and the display will change to:

L.x - yyy \* z.zz

"\*" indicates that the L.S. will be affected by INHIBIT input. (IN4).

**Note:** The values of the TIME ON z.zz cannot be stored as 0.00 Secs.

- c. The limit switches can be program inhibited.

Depress the < FUNCTION > key, (FUNC. LED "on") then depress the < A > key and the display will change to:

L.X - yyy -, zzz  
or: L.X - yyy <, z.zzz  
or: L.X - yyy \*, z.zzz

Depressing the < ENTER > key will store the displayed values and the blinking cursor will disappear.

When a limit is program inhibited, it will not function under any circumstances

**V. PROGRAM INHIBIT:**

When the Program Inhibit input (IN7) is tied high, the following limits and functions can not be programmed.

1. L.S. 1 to L.S.3
2. Offset
3. Program Code
4. Program Clear

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## VI. FAULT DISPLAYS:

1. On Power up or after any Hardware Reset of iPLC 1 - 33 its display will show the repeating sequence:  

	RESET	on for 1 second,
then:	* FAULT *	on for 1 second.
2. When the REMOTE STOP input is brought to logic (3 - 15VDC) the display will show the repeating sequence:  

	REM. STOP	on for 1 second,
then:	* FAULT *	on for 1 second.
3. If the iPLC 1 -33 detects a Transducer malfunction or a cable brake the display will show the repeating sequence:  

	TRANSDUCER	on for 1 second,
then:	* FAULT *	on for 1 second.
4. Reverse Motion of 10 degrees will cause the display to show the repeating sequence:  

	REV. MOTION	on for 1 second,
then:	* FAULT *	on for 1 second.

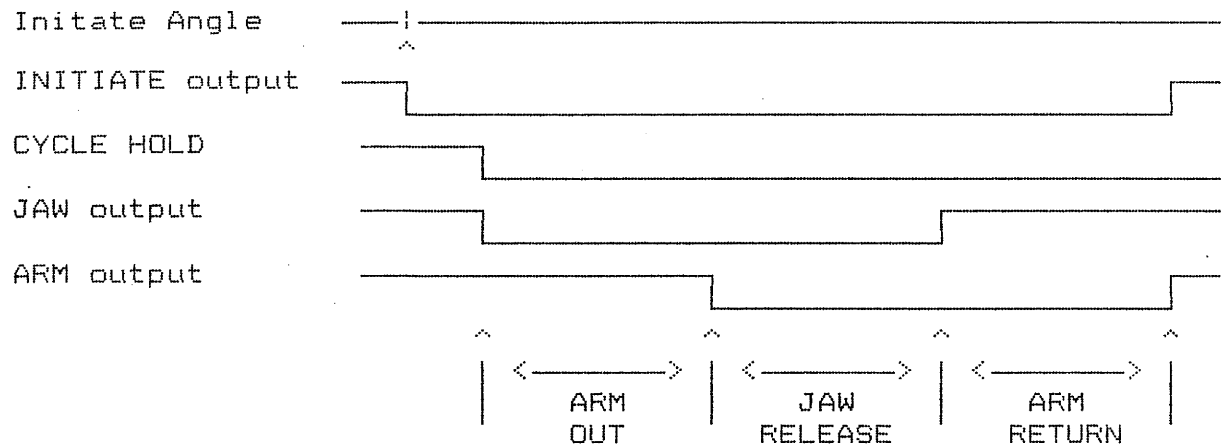
**Note:** All of the Fault Displays are only available in POS/TACH mode, so that the rest of the functions of iPLC1 - 33 can be examined and / or programmed during a Fault condition.

A Fault causes the RUN and all of the other outputs to become inactive.

Clearing a Fault or Faults can be accomplished by using the < CLEAR > key or by Logic 1 to 0 Transition on the RESET FAULTS input: (IN2), The faults can be cleared by the keyboard only if the fault message is being displayed. The RESET FAULTS input will function regardless of what is being displayed.

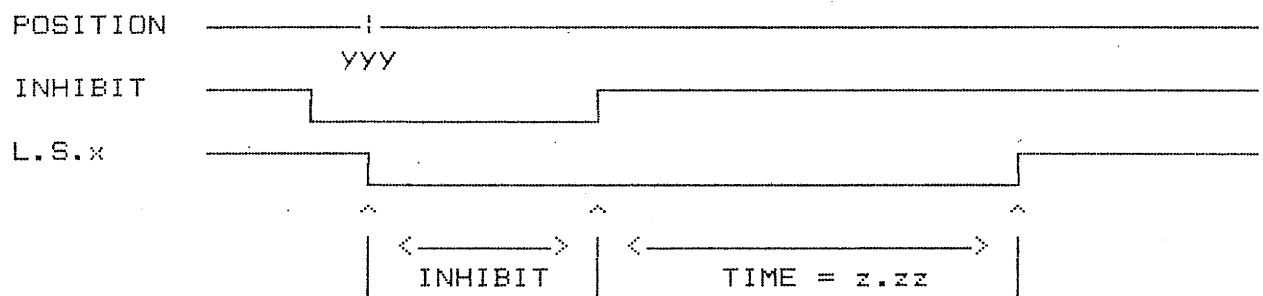
07.18.89

## VII. IRON HAND OUTPUTS:

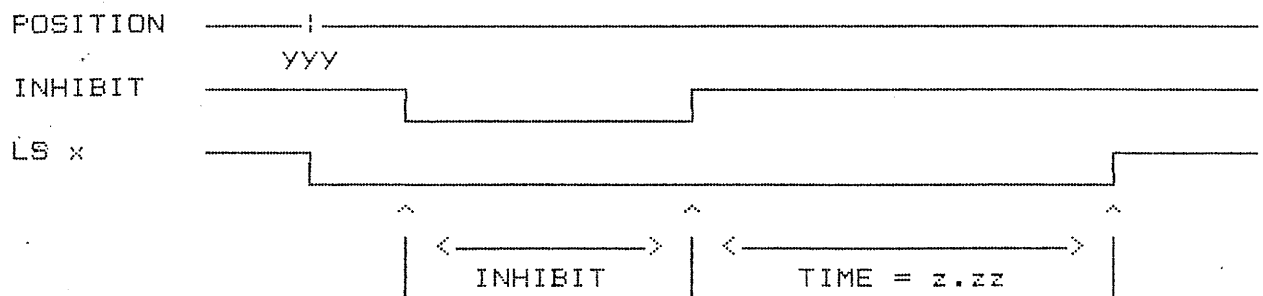


## VIII. INHIBIT LS ( "FROM" - "TIME ON" ): (L.x - yyy \* z.zz)

1. Inhibit applied before " FROM " angle :



2. Inhibit applied after " FROM " angle :



## IX. TRY MODE

The Try Mode is used to check the functionality of the Iron Hand outputs.

- a. By pulling Input 6 high, the unit enters the TRY MODE. The RUN Output will become inactive and LS16, the TRY output will become active.
- b. To check the Iron Hand outputs tie the Cycle Hold input (IN3) low and pulse the TRYIN input (IN5) high. The Iron Hand will initiate and the timers will time out.
- c. To leave TRY MODE, release input 6 to a logic 0 level. The controller will initiate a hardware reset and the reset fault will be displayed. (See section VI: FAULT DISPLAYS.)

## X. REMOTE DISPLAY:

The Remote Display is a RS422A serial interface that provides AMCI's D6000 Remote Display with position, tachometer, and fault data.

The serial data frame is 10 bits long and it consists of 1 Start bit, 7 Data bits, 1 Parity bit which always equals 0, and 1 Stop bit. All numeric data are ASCII characters that represent Hexidecimal numbers. The transmission rate for all characters is 9600 Baud.



X. REMOTE DISPLAY: (cont'd)

The following describes the serial data sequence.

#xxx##xxx##xxx# ..... #xxx##yyy/zzz##xxx##xxx where:

xxx = unscaled 11 bit position data.

yyy = tachometer 10 bit data.

zzz = 12 bit fault data.

"#" and "/" are ASCII characters.

Position Data is sent out at 10 mSec intervals.

Tach and Fault Data is sent out together at  
500 mSec. intervals.

If the Remote Display is sent data indicating a fault  
with the unit, the Remote Display will show the  
message "**Error**" and will continue to show it until the  
fault is cleared.

The following is a diagram showing how to connect the  
serial cable to one of AMCI's RB-1 Relay Boards.

