

REGISTRATION CONTROL

iPLC PROGRAMMABLE LIMIT CONTROLLER OPTION R

Option R provides programmable registration control on iPLC controllers. The purpose of the registration control is the synchronization of a registration mark imprinted on the processed material and the rotating parts of the processing machine. The registration control can be used in processes such as: cutting, stamping, printing, punching, etc. An example of a system with registration control used for cutting material to a predetermined length is shown in Fig. A.

ELECTRICAL CHARACTERISTICS

- 1] REGISTRATION INPUT [Input 1, pin 3 of J1, iPLC-1].
 - a] 0-1Vdc indicates absence of registration mark.
 - b] 3-15Vdc indicates presence of registration mark.
 - c] The delay of the photo cell should be less than 20 μ sec.
 - d] If the output of the photo cell is open collector, a pull up resistor of 1K to 2K Ohm must be provided.
- 2] FORWARD CORRECTION OUTPUT [L.S. 16]

All outputs from iPLC are open collector, therefore a pull up resistor and a dc supply must be provided. [see dwg. B1031]. This output will be HIGH [off] and become LOW [on] during Forward Correction.
- 3] REVERSE CORRECTION OUTPUT [L.S.15]

See 2.

Note: 2 and 3 do not apply if relay outputs are used. For relay outputs, contact closure represents Correction output.

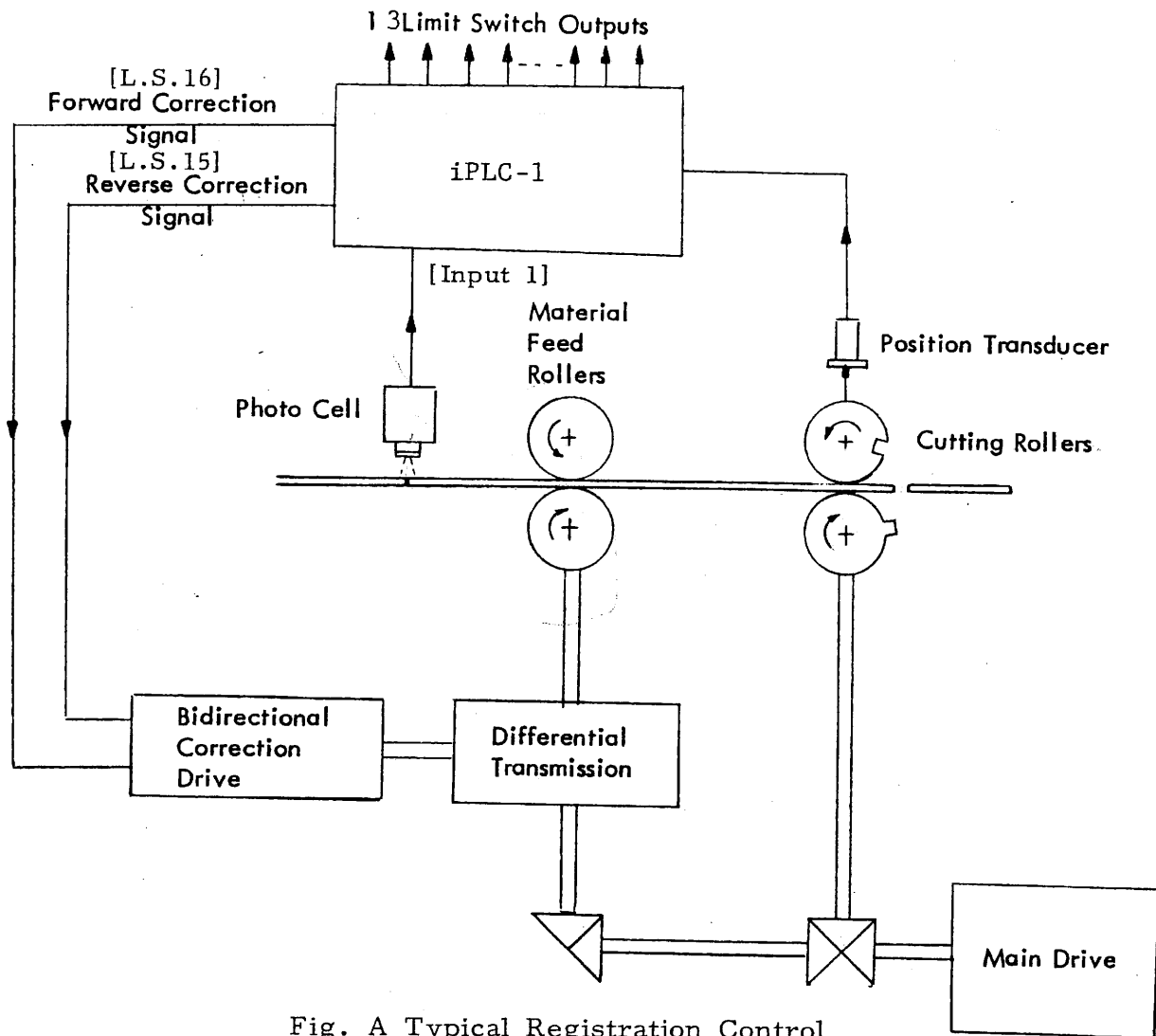


Fig. A Typical Registration Control

iPLC receives a position input from the resolver based transducer driven by the cutting roller, and a registration input from the photo cell activated by the printed marks on the processed material. The ZERO position of iPLC controller is programmed to coincide with the cutting rollers being in the "cut" position. At the same time the photo cell should be activated by the registration mark printed on the material. Thus, under ideal conditions with the material feed rollers and the cutting rollers having matched speed, the registration signal will occur exactly when the rollers are in the "cut" position. The function performed by iPLC is to measure the position of the cutting rollers at the instant of receiving the registration signal and to generate a correction output if necessary. This output signal's pulse width is proportional to the difference of the measured transducer position and the programmed ZERO reference position. The pulse width is programmable in increments of $400\mu\text{sec.}$ per unit difference and is equal to:

$$P.W. = [P.W.MULT.] \times [d] \times [400\mu\text{sec.}]$$

where [P.W.MULT.] - Pulse Width Multiplier is a programmable constant from 1-255 and [d] - Gain Constant is equal to $2.845/\text{degree difference}$.

The correction signal is applied to the Forward or Reverse Correction Output depending on whether the registration input signal was received before or after the ZERO ref.

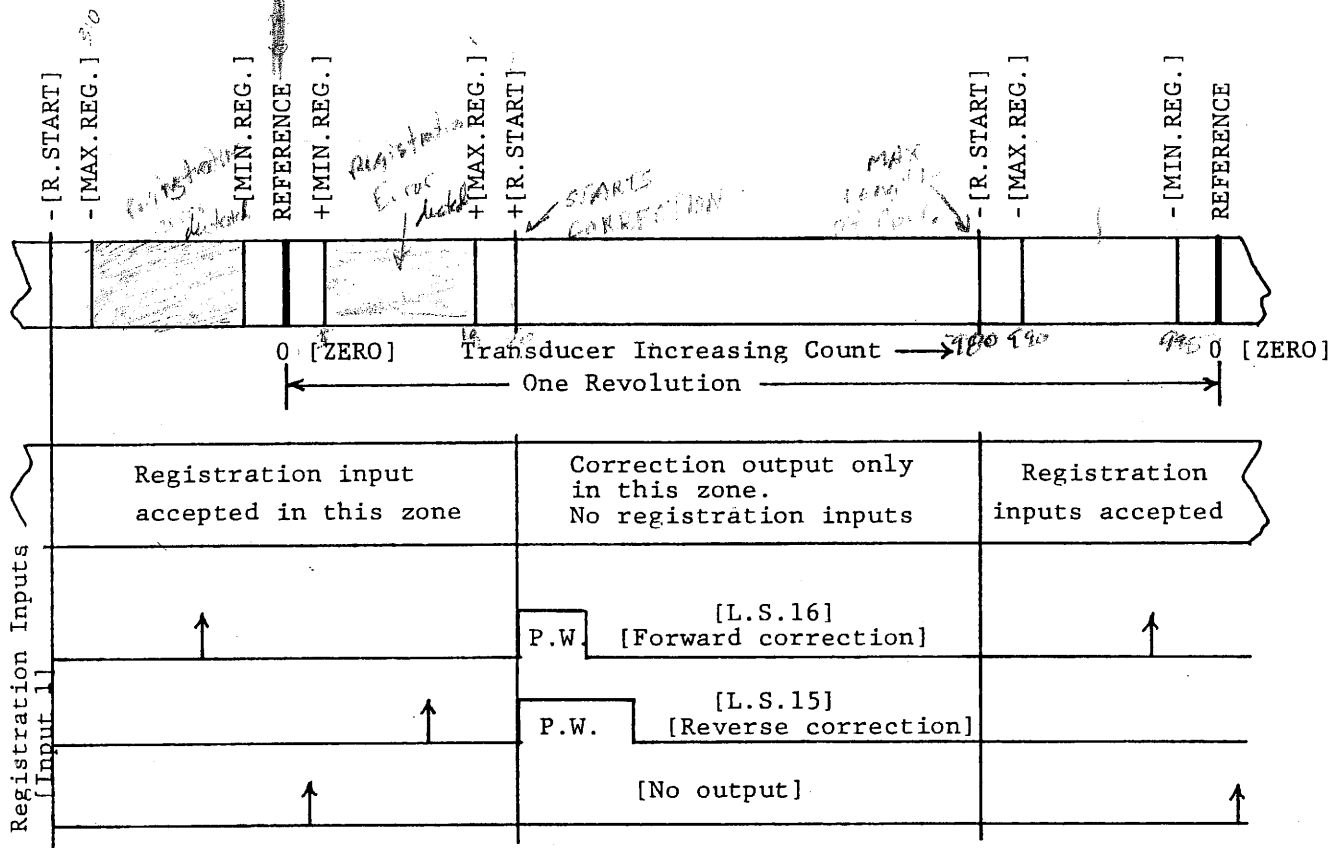


Fig. 1 Timing Diagram

S.F. Scale Factor of iPLC controller.

MIN.REG. Minimum registration error that is recognized. [deadband] Registration inputs received between \pm MIN.REG. will not generate correction outputs.

MAX.REG. Maximum registration correction that is allowed. If a registration input is received outside of this limit, the pulse width of the correction output is limited by the value of MAX.REG.

$$*P.W.max = [P.W.MULT.] \times \left[\frac{[MAX.REG.] \times [1024]}{S.F.} \right] \times [400 \mu sec.]$$

R.START Determines the start and finish of the correction period. If the output correction pulse is longer than this period, it will be truncated.

P.W. Correction pulse width output proportional to the difference of the position measured by iPLC at the instant of receiving the registration signal, and the electrical ZERO position.

$$P.W. = [P.W.MULT.] \times [d] \times [400 \mu sec.]$$

[P.W.MULT] - Pulse width multiplier. Programmable constant from 1-255.

[d] - The gain constant. $d = 2.845/\text{degree}$

Notes:

- 1] All above functions are scaled counts/turn; $360^\circ/S.F.$ units.
- 2] The reference for all functions is ZERO electrical transducer position.
- 3] The actual position [count] for the -[functions] in Fig. 1 is $S.F. - [\text{function}]$

OPTION R PROGRAMMING INSTRUCTIONS

- 1] Programming of the basic iPLC functions remain the same as a standard unit. On iPLC-1 units, limit setpoint outputs 15 and 16 have been replaced by the Reverse and Forward Correction Outputs.
- 2] All Programmable functions of Registration Control Option R are accessed through the [A] key. The following is the order they will be displayed by repeated pressing of the [A] key.
 - a] [MAX. REG. XX] XX: 0-99 or 1/8 S.F., whichever is less.
 - b] [MIN. REG. XX] XX: 0-99
 - c] [R. START XXX] XXX: less than $\frac{1}{2}$ S.F.
 - d] [P.W.MULT. XXX] XXX: 0-255

Program Example: S.F. = 1000, You want to program MAX. REG.=99, MIN. REG. = 5, P.W. MULT. = 20.

PRESS	DISPLAY	COMMENTS
*		Must be in the program mode. See 12.1 or 12.3 of general program instructions.
[A]	[MAX. REG. <u>XX</u>]	Max. Registration limit display.
[9,9],[ENTER]	[MAX. REG. 99]	
[A]	[MIN. REG. <u>XX</u>]	Deadband display.
[0,5],[ENTER]	[MIN. REG. 05]	
[FUNCTION],[A]	[P.W. MULT. <u>XXX</u>]	Pulse Width Multiplier display.
[0,2,0],[ENTER]	[P.W. MULT. 020]	

3] REGISTRATION ERROR DISPLAY

Registration Error is the difference between the transducer position measured by the iPLC at the instant of receiving the registration signal, and the ZERO reference position.

To display the REGISTRATION ERROR in +/- scaled counts; 360°/S.F. units, press [B] key. [Does not require being in the program mode].

XX- Any two digit number.

* - A reminder to be in the program mode.

4] REFERENCE ADJUSTMENT

Delay times of photo cell, iPLC-1 scan time [200 μ sec.] and mechanical devices will produce Registration Offset Errors, especially at higher operating speeds. By operating the machine at the designed speed, these errors can easily be compensated for by moving the ZERO reference position. The following procedure will be useful.

PRESS	DISPLAY	COMMENTS
*		Must be in program mode See 12.1 or 12.3
[OFFSET],[FUNCTION]	[P.XXX-OF.XXX]	Offset display.
[+or-]	[P.XXX-OF.XXX]	Each keystroke will increment/ decrement the Offset by 1 count.