Gap Logix

User's Manual
& Electrical Schematics

By

HYTROL CONVEYOR COMPANY, INC.
JONESBORO, ARKANSAS

GAP Logix

ATTENTION: Only qualified electrical personnel familiar with the installation and operation of this equipment and the hazards involved should install, adjust, operate, or service this equipment. Read and understand this manual and other applicable manuals in their entirety before proceeding. Failure to observe this precaution could result in severe bodily injury or loss of life.

The user is responsible for conforming to all applicable local, national, and international codes. Failure to observe this precaution could result in damage to, or destruction of, the equipment.

WARNING

NEVER... START CONVEYOR UNTIL PERSONNEL ARE CLEAR

NEVER... LUBRICATE OR REPAIR WHILE CONVEYOR IS RUNNING

NEVER... RUN THE CONVEYOR WITH GUARDS REMOVED

NEVER... PUT YOUR HANDS ON THE CONVEYOR OR IN THE CONVEYOR WHEN IT IS RUNNING.

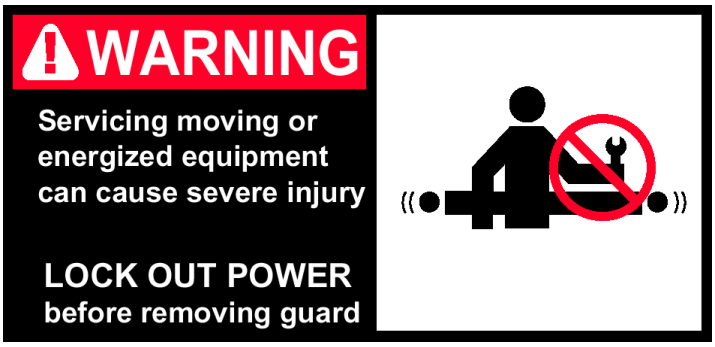
NEVER... ALLOW ANY PART OF YOUR BODY TO COME IN CONTACT WITH THE CONVEYOR PULLEYS WHILE IT IS RUNNING.

IT IS THE EMPLOYERS RESPONSIBILITY TO IMPLEMENT THE ABOVE AND ALSO TO PROVIDE ADEQUATE PROTECTION FOR ANY PARTICULAR USE, OPERATION OR SERVICE.

DO NOT REMOVE THIS SIGN FROM THIS MACHINE

WARNING!

DO NOT START CONVEYOR UNTIL PERSONNEL ARE CLEAR



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Introduction

Gap Logix is a standard control package designed to set a specific gap or pitch on a gapping belt unit (metering belt) independent from product length. *Gap Logix* allows you to quickly and easily customize the controls to your product and be up and running in a short time after installation.

Gap Logix provides stand-alone complete control for an individual gapper making for flexible integration into any conveyor system. Normally there will be accumulation prior to the gapper and a belt unit after the gapper to maintain proper gap/pitch.

After product has gone across the fixed speed change ratio in order to pull a gap between product*, Gap Logix* measures the gap or pitch, makes adjustments, and returns to line speed as the product transfers to the downstream conveyor.

For safety to personnel and for proper operation of your conveyor, it is recommended that you read and follow the instructions provided in this manual. The illustrations, screens, and layout examples shown in this manual are intended solely for purpose of example.

All of the features and details discussed in this manual may or may not apply to your specific controls based on the configuration and custom requirements specified by the customer for this application, which may deviate from the standard package.

Features of *Gap Logix*

View the Table of Contents to find the appropriate section for more detailed information on each subject listed below.

Simple On-Site Calibration

Gap Logix provides the ability to quickly and easily customize the controls to a specific gapper and be up and running. Gap Logix comes with default settings, but they may be customized to properly control the range of product.

Access Protection

Access to all screens is protected by a password. Only the system administrator or other authorized personnel may access the screens to make changes.

Communication Interlocks

Gap Logix accepts a dry contact “Run” signal to start the gapper, and it provides a dry contact “Ready/OK to feed” signal to start the flow of product onto the gapper. Gap Logix will drop out the “OK to feed” signal anytime the gapper stops or is slowing down often enough where product may start pushing onto the gapper.

Outfeed Speed

The speed of the outfeed conveyor (the conveyor immediately after the gapper) can be set so Gap Logix can match this speed as it transfers product off of the gapper.

GapLogix Application Chart

This 'Gap Application Chart' was compiled using all empty boxes. Variables that will affect box performance include: Length/Height ratio, footprint size of box, weight, weight distribution, non-convex surface, conveyor speed, box surface, and others.

This chart may be used as a guideline for determining initial gap required for GapLogix to perform correctly at the various speeds. Performance cannot be guaranteed considering the wide range of variables that can affect it.

This data was compiled setting a 48" gap to ensure each box would have to come to a stop. Certain conditions will exist where the combination of all variables along with specific gaps may cause a rhythmic rocking of product as it ramps down and back up that wouldn't have occurred if it had came to a complete stop. For these conditions the settings will have to be modified until the product is stable. Actual "worse case" product should be tested prior to system design approval. Care should be taken to ensure that boxes can transition across fixed SGR used to create initial gap without tumbling.

Minimum Gap Required for GapLogix								
Discharge Belt Speed	Length vs. Height Box Ratio							
	12" cube	2.25" x 9"	6" lgth by 'x' ht.		Boxes: 4 inches length by 'x' ht. (lgth / ht ratio)			
	1 to 1	4 to 1	2 to 1	1 to 1	3 to 1	2 to 1	1 to 1	1 to 2
100	2	2	2	2	2	2	4	6
150								
200	4	4	4	6	4	4	6	24
250	6	6	6	10	6	6	10	24
300	8	8	8	12	8	8	12	
350	12	10	10		10	10		
400	18	12	12		12	12		
450	24	14	18		18	18		
500	26	18	18		18	24		

* Minimum gap is based on boxes with evenly distributed weight and flat bottom.

Recommended Settings for Application																
Discharge Belt Speed	Length vs. Height Box Ratio															
	12" cube		2.25" x 9"		6" lgth by 'x' ht.				Boxes: 4 inches length by 'x' ht. (lgth / ht ratio)							
	1 to 1		4 to 1		2 to 1		1 to 1		3 to 1		2 to 1		1 to 1		1 to 2	
	Time	Ramp	Time	Ramp	Time	Ramp	Time	Ramp	Time	Ramp	Time	Ramp	Time	Ramp	Time	Ramp
100	.150	.500	.150	.500	.150	.500	.150	.500	.150	.500	.150	.750	.150	1.000	.150	2.500
150																
200	.150	.350	.150	.250	.150	.250	.150	.600	.150	.350	.150	.350	.150	.750	.150	3.500
250	.120	.200	.120	.200	.120	.200	.120	.400	.120	.200	.120	.200	.120	.350	.120	2.000
300	.90	.200	.90	.150	.90	.180	.90	.275	.90	.200	.90	.200	.90	.275		
350	.70	.150	.70	.150	.70	.150			.70	.150	.70	.150				
400	.70	.150	.70	.120	.70	.120			.70	.120	.70	.120				
450	.70	.200	.70	.110	.70	.120			.70	.120	.70	.120				
500	.70	.250	.70	.120	.70	.120			.70	.110	.70	.120				

Gap Logix Support Services

It is Hytrol's goal to ensure your greatest possible satisfaction with the operation of our controls. We are dedicated to providing you fast, friendly, and dependable assistance.

Technical Support

Technical Support for this product extends from the date of shipment to one year from this date. Support is available Monday through Friday during normal business hours from 8 a.m. to 5 p.m. central time. Please include serial number from label on the inside of panel door in all correspondence.

Technical Support Number

(870) 935 – 9444 (Please have serial number from label on the inside of panel door ready before calling.)

Technical Support Fax

(870) 935 – 9460 (Please include serial number from label on the inside of panel door in all correspondence.)

Correspondence Address

Attn: Technology Center / Gap Logix Support
Hytrol Conveyor Company, Inc.
2020 Hytrol Drive
Jonesboro, Arkansas 72401

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1 Installation

Inspection and inventory of components should be conducted upon receiving packages. Check the number of items received against the parts checklist below. Examine condition of equipment to determine if any damage has occurred during shipment.

Electrical Code: All motor controls and wiring shall conform to the National Electrical Code (Article 670 or other applicable articles) as published by the National Fire Protection Association and as approved by the American Standards Institute, Inc.

1.1 Parts Checklist

1 each - Main Control Panel
1 each - Panel Mounting Bracket
2 each - Photo Eye Kit
1 each – Encoder Cable

1.2 Mounting The Hardware

1.2.1 CONTROL DEVICE MOUNTING CONSIDERATIONS

A) Control stations should be so arranged and located that the operation of the equipment is visible from them, and shall be clearly marked or labeled to indicate the function controlled.

B) A conveyor shall not be started until employees in the area are alerted by a signal or by a designated person that the conveyor is about to start. When a conveyor would cause injury when started and is automatically controlled or must be controlled from a remote location, an audible device shall be provided which can be clearly heard at all points along the conveyor where personnel may be present. The warning device shall be actuated by the controller device starting the conveyor and shall continue for a required period of time before the conveyor starts. A flashing light or similar visual warning may be used in conjunction with or in place of the audible device if more effective in particular circumstances. Where system function would be seriously hindered or

adversely affected by the required time delay or where the intent of the warning may be misinterpreted (i.e., a work area with many different conveyors and allied devices), clear, concise, and legible warning shall be provided. The warning shall indicate that conveyors and allied equipment may be started at any time, that danger exists, and that personnel must keep clear. The warnings shall be provided along the conveyor at areas not guarded by position or location. If the supplied warning device is not loud enough to easily be heard the full length of the conveyor because of length and/or noise, then either a louder device or an additional device should be installed to properly warn personnel.

C) Remotely and automatically controlled conveyors, and conveyors where operator stations are not manned or are beyond voice and visual contact from drive areas, loading areas, transfer points, and other potentially hazardous locations on the conveyor path not guarded by location, position, or guards, shall be furnished with emergency stop buttons, pull cords, limit switches, or similar emergency stop devices. Connection points are provided in the control panel to put these 'customer supplied' devices in series with the E-Stop safety circuit. See the schematics provided for the proper connection points.

All such emergency stop devices shall be easily identifiable in the immediate vicinity of such locations unless guarded by location, position, or guards. Where the design, function, and operation of such conveyor clearly is not hazardous to personnel, an emergency stop device is not required.

The emergency stop device shall act directly on the control of the conveyor concerned and shall not depend on the stopping of any other equipment. The emergency stop devices shall be installed so that they cannot be overridden from other locations.

D) Inactive and unused actuators, controllers, and wiring should be removed from control stations and panel boards, together with obsolete diagrams, indicators, control labels, and other material that serve to confuse the operator.

1.2.2 MOUNTING THE PANELS

A) The control panels have a NEMA 12 rating, which is a rating for use in indoor environments that require a degree of protection against dust, falling dirt, and dripping non-corrosive liquids. This rating should be considered when determining where to mount the panels.

B) The main control panel should normally be mounted under the discharge end of the gapper with the mounting brackets provided. Take into consideration the length of the supplied encoder cable before mounting the panel elsewhere.

1.2.3 SAFETY DEVICES

A) All safety devices, including wiring of electrical safety devices, shall be arranged to operate in a "Fail-Safe" manner, that is, if power failure or failure of the device itself would occur, a hazardous condition must not result.

B) Emergency Stops and Restarts. Conveyor controls shall be so arranged that, in case of emergency stop, manual reset or start at the location where the emergency stop was initiated, shall be required of the conveyor(s) and associated equipment to resume operation.

C) Before restarting a conveyor, which has been stopped because of an emergency, an inspection of the conveyor shall be made and the cause of the stoppage determined. The starting device shall be locked out before any attempt is made to remove the cause of stoppage, unless operation is necessary to determine the cause or to safely remove the stoppage.

Refer to ANSI Z244.1-1982, American National Standard for Personnel Protection – Lockout/Tagout of Energy Sources – Minimum Safety Requirements and OSHA Standard Number 29 CFR 1910.147 "The Control of Hazardous Energy (Lockout/Tagout)."

1.3 Wiring Specifications

Power required to Gap Logix's control panel is 15 amps at 460 VAC 3 phase with a range of 400 – 490 VAC. Improper voltage / wiring may damage controls.

1.3.1 RECOMMENDED WIRE SIZES

A) Wiring from VFD to motor should be of suitable size and type to carry up to 20 amps. Wire phasing is critical for correct operation. Wires from U,V, and W from the VFD must go to U, V, and W on the motor along with proper grounding. If phases are not correct, the VFD will fault on "F-08" (Drive fault 08).

1.3.2 COMMUNICATING WITH OTHERS

A) Conveyor Run Signal The gapper will normally be started by the central controls of the system, so that it can easily coordinate the sequence in which all the conveyors in the system start up. This "Run" signal is sent to Gap Logix on the input "DI00". Refer to Chapter 3: Communicating with Gap Logix for the details on how to use this signal.

B) Ready Signal The "OK to feed" signal is sent after the gapper is running, up to speed, and ready to be fed product. This signal is a contact closure where the system's voltage is supplied to terminal DO01-C and it is sent back on terminal DO01-NO when the contact is closed. Refer to Chapter 3: Communicating with Gap Logix for the details on how to use this signal.

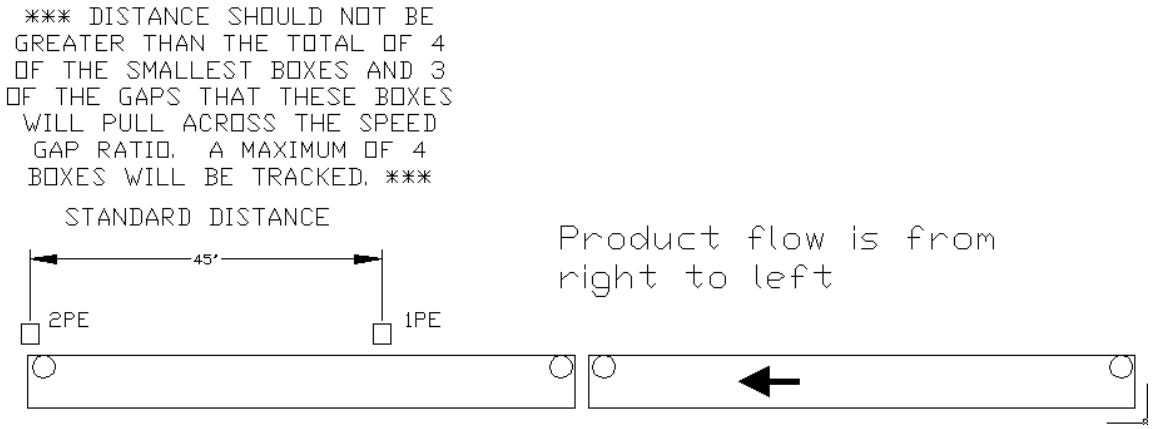
1.4 Device Specifications

1.4.1 DEVICE REQUIREMENTS

A) The **two photo eyes** will be of the type and connected for 'dark operation' (input "Off" until eye is blocked). The output signal will be a sourcing (PNP) output. The amp draw for each photo eye will not exceed 100 mA.

1.4.2 DEVICE MOUNTING LOCATIONS

A) The **photo eyes** should be mounted on the discharge belt of the gapper as illustrated below. The discharge photo eye should be mounted at the point where the tail end of a box will lose contact with the discharge belt of the gapper. The other photo eye should be mounted upstream from the discharge photo eye at a point so no more than four of the smallest products with the three gaps between them that will be pulled across the speed gap ratio that can be in the zone between the photo eyes at one time.



2 Configuring *Gap Logix* for Product

One of great features of Gap Logix is the ability to use this one software package to optimize the gapper's performance to your unique product through the following parameters.

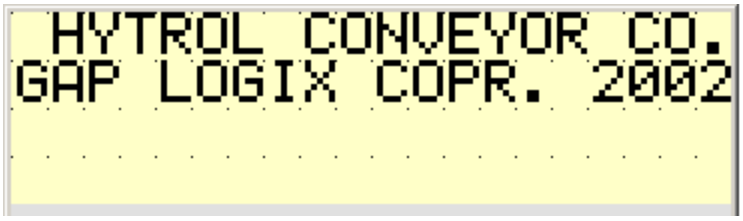
2.1 Access Protection

All setup screens are protected by a password. The password relocks 10 minutes after the correct password was entered. If you are unable to change screens or change any values on a screen, access has expired and you must re-enter the password.

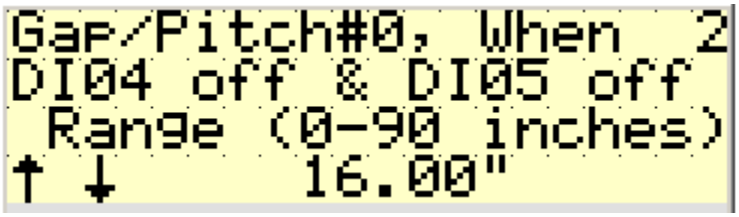
To enter the password, press the F1 key to bring up the password entry screen. After you have the password entry screen up with the blinking cursor, you can enter the password. Press the left pointing arrow key to bring up the first digit of the password, press the up pointing arrow key to increment the first digit to the first value of the code, press the left arrow key again to get to the second digit, press the up arrow key to increment the second digit to the second value in the code, and repeat the left and up arrow keys for digits three and four. After you have set the four digits to the access code and they appear as four flashing blocks, press the blue enter button. The password will time out after 10 minutes and will need to be re-entered.

2.2 Explanation of Screens

After access is allowed you will be able to navigate through the configuration parameters by pressing the right and left arrow keys. The up and down arrow keys will be used to adjust the values. It is not necessary to press the enter button. The changes take affect dynamically as you are changing them.



2.3 Settings Gap/Pitch Distance (Access: Password)



X10.13 DI04	X10.14 DI05
OFF	**OFF**

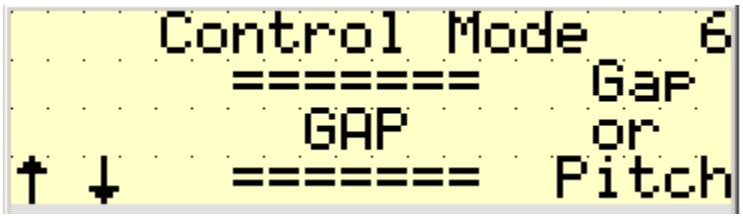
The first parameter on screen 2 is the "Desired Gap #0" in inches. This parameter can relate to either gap or pitch according to which method is selected. If setting gap, the value is associated with the distance between boxes. If setting pitch, the value is associated with the distance from the leading edge of one box to the leading edge of the next box. The range is 0 – 90 inches. Gap #0 will be used to set the gap/pitch for all products while DI04 and DI05 inputs are off. To change the value, press the up or down arrow key to set the desired gap.

It is possible to dynamically change the gap being set by manipulating these inputs to select the gap value to use. See chart below.

GAP #	**DI04**	**DI05**
0	OFF	OFF
1	ON	OFF
2	OFF	ON
3	ON	ON

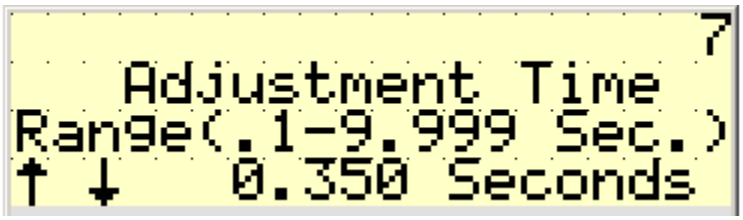
You can set the distance for Gap/Pitch values # 1-3 just as you did for Gap #0 using the up and down arrow keys to change the values. The active gap will be determined by the state of the two inputs DI04 and DI05.

2.4 Gap / Pitch Mode Selection (Access: Password)



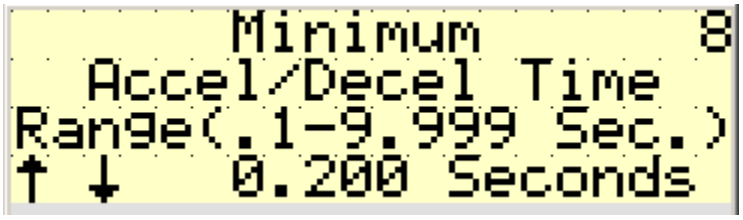
The next parameter on screen 6 is the "Control Mode". The up and down arrow keys will toggle the value between gap and pitch. The distance is set in first parameters gap/pitch (0 – 3) on screens 2 through 5.

2.5 Adjustment Time (Access: Password)



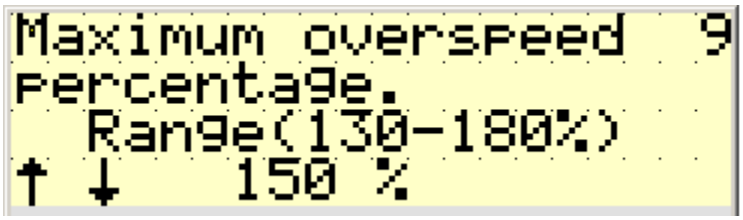
On screen 7 the "Adjustment Time" is in seconds. This parameter along with others is used to customize the speed and slope of the adjustment to the specific product. The adjustment time is the amount of time for the correction to take place. At higher speeds this value will have to be lower so the product will be back to line speed before it leaves the gapper belt. At lower speeds you may be able to adjust this value higher. If the gap is inconsistent or is too small, try lowering the adjustment time. At 250 FPM it is usually around 0.250 seconds.

2.6 Minimum Accel/Decel Time (Access: Password)



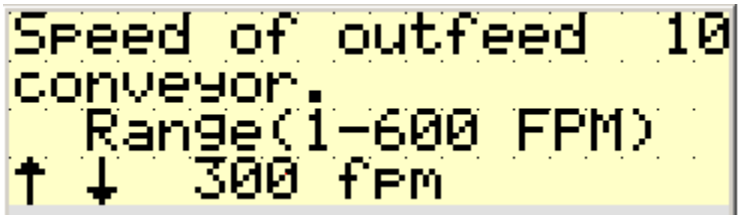
On screen 8 is the "Minimum Accel/Decel Time" in seconds. This parameter adjusts the rate (slope) at which the belt speed ramps up and down. This can be a lower value for low profile, heavy, stable boxes that can withstand the rapid speed changes without rocking. For top heavy or tall boxes you may need to set this at a higher value.

2.7 Maximum Overspeed Percentage (Access: Password)



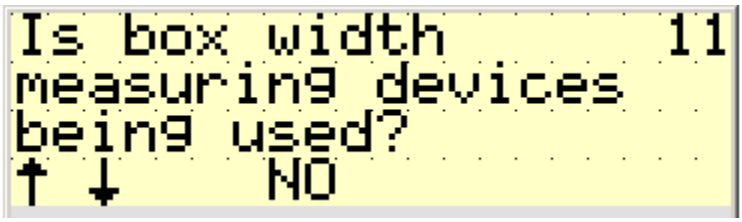
On screen 9 is the “Maximum overspeed percentage”. This is a percentage of the line speed of the conveyor immediately downstream of the gapper. It is used in conjunction with the “Minimum Accel/Decel Time” to control the maximum speed the gapper will reach while making a correction. These two variables allow the controls to take into effect the physics of the product while making corrections.

2.8 Speed of Outfeed Conveyor (Access: Password)



On screen 10 is the “Speed of outfeed conveyor” in feet per minute. This value should be the hand tached speed of the conveyor belt immediately downstream of the gapper. This is the speed that Gap Logix will try to match when the product is being transferred from the gapper to the next belt.
NOTE: It is important that the gapper belt exactly matches the down stream conveyor’s speed to prevent errors in the gap caused by the speed difference.

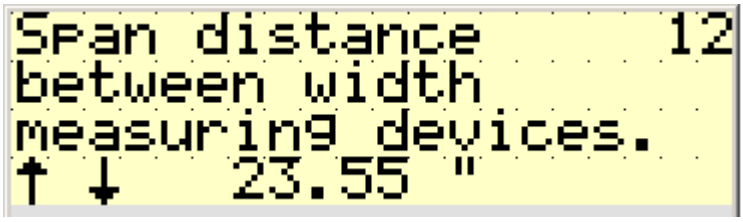
2.9 Is width measuring device used (Access: Password)



On screen 11 is the option to “Include box width measuring devices” to set gap based on box width. If this option is not applicable, set this value to “No”. If the

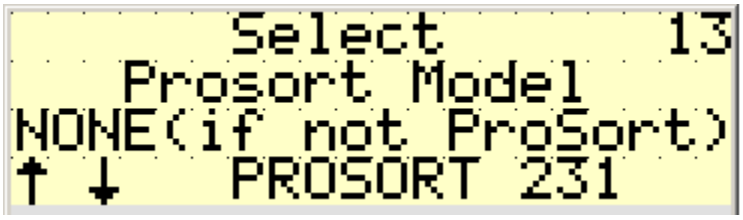
system was designed and provided with this option, select “Yes”. There is additional devices and cost associated with this type of gapping.

2.10 Distance between width devices (Access: Password)



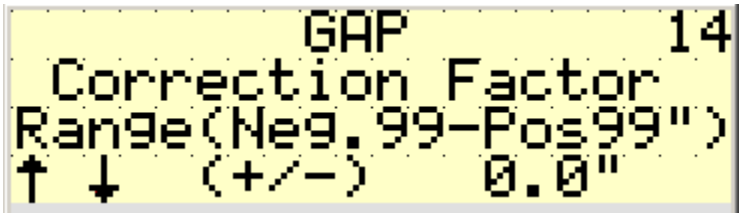
On screen 12 is the parameter to set the distance between the width measuring devices if used. If not applicable, just skip this parameter.

2.11 Select ProSort Model (Access: Password)



On screen 13 is a selection for “ProSort Model”. If gapper is going to be feeding the induction belt of a ProSort model 100 or 200 series sliding shoe sorter, make the selection for the proper model. If this gapper will not be feeding a ProSort 100 or 200 series shoe sorter, select “NONE” as the value for this parameter.

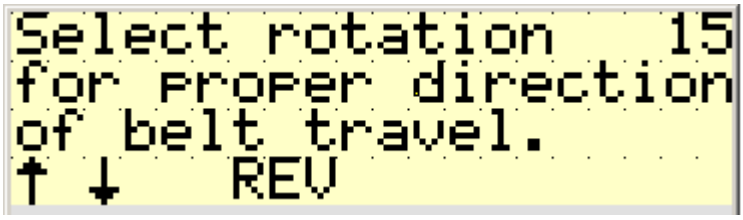
2.12 Gap Correction Factor (Access: Password)



On screen 14 is a “Gap Correction Factor” in inches. This parameter can be used to correct any differences in the “Desired Gap” parameters on screens 2 - 5 and the actual gap being seen between boxes. This value can be either positive or negative. For example, if the “Desired Gap” is set for 12 inches, but

the actual gap seen is 11.75", the "Gap Correction Factor" could be set to 0.25" to compensate for the difference.

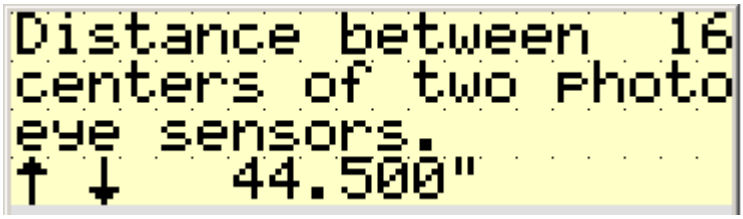
2.13 Direction of Rotation (Access: Password)



On screen 15 is the "Direction of Rotation" parameter. This allows the selection of 'forward' or 'reverse' according to how the motor and gearbox is mounted to achieve the needed direction of belt travel. The motor must be on the downstream belt. This parameter will only be needed during initial setup.

This parameter will not correct VFD errors. If an "F-08" (Drive fault 08) error is occurring, the problem may be caused by incorrect motor and/or encoder wiring. See the installation and troubleshooting sections for more detailed information of wiring and fault diagnostics. Before this parameter is needed the conveyor should be able to run without errors.

2.14 Distance between Photo Eyes (Access: Password)



On screen 16 is the "Distance between photo eyes" parameter in inches. The discharge photo eye should be mounted at the point where the tail end of a box will lose contact with the discharge belt of the gapper. The other photo eye should be mounted upstream from the discharge photo eye at a point so no more than four of the smallest products with the three gaps between them that will be pulled across the speed gap ratio that can be in the zone between the photo eyes at one time.

3 Communicating with *Gap Logix*

Gap Logix provides the ability to interlock signals to allow for flexible integration into any conveyor system.

3.1 Interlock Signals with Others

There are two signal interlocks provided to allow the system to coordinate the gapper with the other associated conveyors. The wiring connections for these signals are explained in Chapter 1: Installation.

- **Conveyor Run Signal:** The "Conveyor Run Signal" can be sent to Gap Logix through a dry contact closure. This allows the system to start and stop the gapper. When the signal is dropped the gapper will stop. This "Run" signal is sent to Gap Logix on the input "DI00".
  Once the gapper is started, the central control system should wait until it receives the "Ready, OK to Feed" signal before starting the upstream conveyors.
- **Conveyor Ready Signal:** The "Conveyor Ready Signal" will be sent to the system after the gapper is running and up to speed. This signal is a contact closure where the system's voltage is supplied to terminal DO01-C and it is sent back on terminal DO01-NO when the contact is closed.

4 Operating Your Gapper

Once the gapper has been initially calibrated to optimize the performance based on the product in this application, there should be no need to make further changes in the future. The gapper will be started and stopped remotely by the main system and Gap Logix will automatically make corrections based on the values of the parameters set during initial calibration.

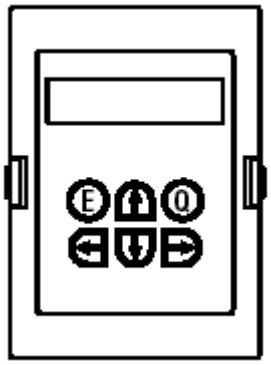
Normally a system will set a specific gap 100% of the time. Occasionally variables such as running different size products at different times of day, allowing for a different number of print-and-apply applicators to be in production at any one time, etc. could dictate being able to dynamically change the gap. There can be a maximum of four preset gap settings and can be selected by a combination of input signals. See chapter 2 in section 2.3 for details on configuring these parameters.

5 Using the MOVIDRIVE® Keypad

The Movidrive keypad can be used for multiple functions. You can use it for troubleshooting the VFD, saving, and loading the program and parameters. This section will explain how to use the keypad to perform these functions.

5.1 Basic functions of the keys

This document is a step-by-step example for saving and loading parameter files and programs with the DBG Keypad for the MOVIDRIVE® and MOVIDRIVE® *compact*.

DBG Keypad for MOVIDRIVE® and MOVIDRIVE® *compact*	
	
General function of the keys.	
	Next menu command or increase value in edit mode.
	Previous menu command or decrease value in edit mode.
	One menu level down or activate edit mode for the menu command.
	One menu level up or deactivate edit mode for the menu command.
	Cancel and return to main display.
	Pressing this key in the event of a fault gives direct access to Parameter 840 [Manual Reset].

5.2 Changing the language

Should the keypad display come up in a language other in English, do the following (this example is in German with the default SHORT MENU on).		
Press Key	Display	Description/Comments
	REGLERSPERRE STROM: 0 A	Press the Q key to return to the main display.
	840/ NEIN MANUELLER RESTE	Press the down arrow key.
	835/ KEINEREAKT REAKT. TF-MELDUNG	Press the down arrow key.
	820/ EIN 4-Q-BETRIEB1	Press the down arrow key.
	803/ AUS PARAMETWESPERRE	Press the down arrow key.
	802/ NEIN WERSEINSELLUNG	Press the down arrow key.
	801/ DEUTSCH SPRACHE	Press the down arrow key.
	801/ DEUTSCH SPRACHE	Press the right arrow key. This will put you in “EDIT” mode.
	801/ ENGLISH LANQUAGE	Press the up arrow key; the display will change to ENGLISH.
	CONTR. INHIBT CURR.: 0 A	Press the Q key to return to the main display.

5.3 Accessing full parameter set

To access the full parameter set of the drive the SHORT MENU must be set to OFF		
Press Key	Display	Description/Comments
	CONTR. INHIBT CURR.: 0 A	Press the Q key to return to the main display.
	840/ 0FF MANUAL RESET	Press the down arrow key.
	835/ NO RESPONSE RESP. TF-SIGNAL	Press the down arrow key.
	820/ ON 4-QUADR-OPER.1	Press the down arrow key.
	803/ OFF PARAMETER LOCK	Press the down arrow key.
	802/ NO FACTORY SETTING	Press the down arrow key.
	801/ ENGLISH LANGUAGE	Press the down arrow key.
	800/ ON SHORT MENU	Press the down arrow key.
	800/ ON SHORT MENU	Press the right arrow key. This will put you in “EDIT” mode.
	800/ OFF SHORT MENU	Press the up arrow key to turn the SHORT MENU off.
	CONTR. INHIBT CURR.: 0 A	Press the Q key to return to the main display.

5.4 Saving program & parameters from VFD to Keypad

Following is the procedure to save the inverter program from the drive to the DBG Keypad. This can be done while the drive is running:		
Press Key	Display	Description/Comments
	CONTR. INHIBT CURR.: 0 A	Press the Q key to return to the main display.
	9.. IPOS PARAMETERS	Press the down arrow key.
	8.. UNIT FUNCTIONS	Press the down arrow key.
	80. SETUP	Press the right arrow key.
	800 OFF SHORT MENU	Press the right arrow key.
	807 NO COPY MDX--> DBG	Press the down arrow key.
	807 NO COPY MDX--> DBG	Press the right arrow key. This will put you in “EDIT” mode.
	807 YES COPY MDX--> DBG	Press the up arrow key, the display will change from “NO” to “YES”.
-- WAIT--	COPYING DATA	Display while data is copying.
—	807 NO COPY MDX--> DBG	When copying is complete display will return to “NO”.
	CONTR. INHIBT CURR.: 0 A	Press the Q key to return to the main display (display example if the drive is not running).
	SPEED: 1500 rpm CURR.: 1.68 A	Press the Q key to return to the main display (display example if the drive is running).
The parameter file and any inverter program are now saved on the DBG Keypad.		

5.5 Loading program / parameters from Keypad to VFD

Following is the procedure to copy the program from the DBG Keypad to the inverter. NOTE: input DI00 (terminal X13:1 on the MOVIDRIVE® or terminal X10:9 on the MOVIDRIVE® *compact* must be low (24VDC must be removed while copying).		
Key	Display	Description
	CONTR. INHIBT CURR.: 0 A	Returns to main display (drive not running)
	9.. IPOS PARAMETERS	Press the down arrow key.
	8.. UNIT FUNCTIONS	Press the down arrow key.
	80. SETUP	Press the right arrow key.
	800 OFF SHORT MENU	Press the right arrow key.
	807 NO COPY MDX--> DBG	Press the down arrow key.
	806 NO COPY DBG--> MDX	Press the down arrow key.
	806 _ NO COPY DBG--> MDX	Press the right arrow key. This will put you in “EDIT” mode.
	806 _ YES COPY DBG--> MDX	Press the up arrow key, the display will change from “NO” to “YES”.
-- WAIT --	COPYING DATA	Display while data is copying.
—	806 _ NO COPY DBG--> MDX	When copying is complete display will return to “NO”.
	CONTR. INHIBT CURR.: 0 A	Press the Q key to return to the main display.
The parameter file and any inverter program saved on the DBG Keypad are now loaded on the inverter.		

6 Troubleshooting *Gap Logix*

Gap Logix will immediately display an error message whenever one of the conditions below occurs. The gapper will immediately shut down when one of these conditions occur. Ensure that the cause of the error condition has been remedied and all personnel are clear before attempting to restart the sorter. After repairing the condition that caused the error, go through section 6.3 of this chapter or the steps explained in chapter 5 for resetting errors. Warning: the gapper is started by the main control system; it may start at any time. Disconnect and lock out power before performing any maintenance on the gapper to ensure the unit will not start unexpectedly.

6.1 Error Messages

Error messages most likely to occur are listed below with a "Possible Cause", and a "Corrective Action", for all other error messages please refer to the MOVIDRIVE® compact manual for details.

6.1.1 Drive Fault-01: Overcurrent

Possible Cause	Corrective Action
Short circuit on output	Rectify the short circuit
Defective output stage	Contact SEW Service

6.1.2 Drive Fault-02: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.3 Drive Fault-03: Ground Fault

Please refer to the MOVIDRIVE® compact manual for details.

6.1.4 Drive Fault-04: Brake Chopper

Possible Cause	Corrective Action
Excessive regenerative power	Extend deceleration ramps
Brake resistor circuit interrupted	Check brake resistor wiring
Brake chopper defective	Replace MOVIDRIVE®

6.1.5 Drive Fault-05: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.6 Drive Fault-06: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.7 Drive Fault-07: Over Voltage

Please refer to the MOVIDRIVE® Compact manual for details.

6.1.8 Drive Fault-08: n-Monitoring (Over Current)

Possible Cause	Corrective Action
Incorrect direction of rotation ***NOTE: This situation will only occur during initial start-up***	• Swap two of the output leads from the MOVIDRIVE® to the motor. If the conveyor direction is not correct this can be altered by setting the Motor Sense of Rotation to 'ON' (MOVIDRIVE® parameter 350, this can also be changed on the EXOR, see section 2.13)
Problem with encoder connection	Check encoder wiring to ensure proper connection and integrity of cables and connections
Insufficient drive current, the unit is unable to maintain the speed setpoint	• Reduce load • Increase Speed Monitoring Delay Time (MOVIDRIVE® parameter 501) • Increase Current Limit (MOVIDRIVE® parameter 303 up to the maximum of 150%) • Insure that the motor is receiving voltage from the MOVIDRIVE® (i.e. no intervening disconnect is off, motor terminals are properly connected)

6.1.9 Drive Fault-09: Commissioning

Please refer to the MOVIDRIVE® compact manual for details.

6.1.10 Drive Fault-10: IPOS - ILLOP

Please refer to the MOVIDRIVE® compact manual for details.

6.1.11 Drive Fault-11: Over Temperature

Possible Cause	Corrective Action
Thermal overload of MOVIDRIVE®	Insure there is adequate cooling in the enclosure

6.1.12 Drive Fault-12: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.13 Drive Fault-13: Control Signal

Please refer to the MOVIDRIVE® compact manual for details.

6.1.14 Drive Fault-14: Encoder Signal

Possible Cause	Corrective Action
Encoder cable or shield not connected correctly	Check encoder cable and shield for correct connection
Short circuit or open circuit in encoder cable	Check encoder cable
Defective encoder	Replace encoder

6.1.15 Drive Fault-15: Internal 24 VDC

Please refer to the MOVIDRIVE® compact manual for details.

6.1.16 Drive Fault-16: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.17 Drive Fault-17: System Fault

Please refer to the MOVIDRIVE® compact manual for details.

6.1.18 Drive Fault-18: System Fault

Please refer to the MOVIDRIVE® compact manual for details.

6.1.19 Drive Fault-19: System Fault

Please refer to the MOVIDRIVE® compact manual for details.

6.1.20 Drive Fault-20: System Fault

Please refer to the MOVIDRIVE® compact manual for details.

6.1.21 Drive Fault-21: System Fault

Please refer to the MOVIDRIVE® compact manual for details.

6.1.22 Drive Fault-22: System Fault

Please refer to the MOVIDRIVE® compact manual for details.

6.1.23 Drive Fault-23: System Fault

Please refer to the MOVIDRIVE® compact manual for details.

6.1.24 Drive Fault-24: System Fault

Please refer to the MOVIDRIVE® compact manual for details.

6.1.25 Drive Fault-25: EEPROM

Please refer to the MOVIDRIVE® compact manual for details.

6.1.26 Drive Fault-26: Ext. Terminal

Please refer to the MOVIDRIVE® compact manual for details.

6.1.27 Drive Fault-27: Limit Switches Missing

Please refer to the MOVIDRIVE® compact manual for details.

6.1.28 Drive Fault-28: Fieldbus Timeout

Please refer to the MOVIDRIVE® compact manual for details.

6.1.29 Drive Fault-29: Limit Switch Reached

Please refer to the MOVIDRIVE® compact manual for details.

6.1.30 Drive Fault-30: Time Out

Please refer to the MOVIDRIVE® compact manual for details.

6.1.31 Drive Fault-31: TF Sensor

Please refer to the MOVIDRIVE® compact manual for details.

6.1.32 Drive Fault-32: IPOS Index Overrun

Please refer to the MOVIDRIVE® compact manual for details.

6.1.33 Drive Fault-33: Set Point Source

Please refer to the MOVIDRIVE® compact manual for details.

6.1.34 Drive Fault-34: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.35 Drive Fault-35: Operating Mode

Please refer to the MOVIDRIVE® compact manual for details.

6.1.36 Drive Fault-36: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.37 Drive Fault-37: System Watchdog

Please refer to the MOVIDRIVE® compact manual for details.

6.1.38 Drive Fault-38: System Software

Please refer to the MOVIDRIVE® compact manual for details.

6.1.39 Drive Fault-39: Reference Travel

Please refer to the MOVIDRIVE® compact manual for details.

6.1.40 Drive Fault-40: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.41 Drive Fault-41: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.42 Drive Fault-42: Lag Error

Please refer to the MOVIDRIVE® compact manual for details.

6.1.43 Drive Fault-43: Timeout RS-485

Possible Cause	Corrective Action
Communication between EXOR and MOVIDRIVE® interrupted	Check connection between EXOR and MOVIDRIVE®

6.1.44 Drive Fault-44: Unit Utilization

Please refer to the MOVIDRIVE® compact manual for details.

6.1.45 Drive Fault-45: Initialization

Please refer to the MOVIDRIVE® compact manual for details.

6.1.46 Drive Fault-46: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.47 Drive Fault-47: SBUS Timeout

Please refer to the MOVIDRIVE® compact manual for details.

6.1.48 Drive Fault-48: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.49 Drive Fault-49: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.50 Drive Fault-50: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.51 Drive Fault-51: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.52 Drive Fault-52: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.53 Drive Fault-53: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.54 Drive Fault-54: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.55 Drive Fault-55: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.56 Drive Fault-56: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.57 Drive Fault-57: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.58 Drive Fault-58: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.59 Drive Fault-59: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.60 Drive Fault-60: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.61 Drive Fault-61: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.62 Drive Fault-62: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.63 Drive Fault-63: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.64 Drive Fault-64: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.65 Drive Fault-65: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.66 Drive Fault-66: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.67 Drive Fault-67: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.68 Drive Fault-68: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.69 Drive Fault-69: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.70 Drive Fault-70: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.71 Drive Fault-71: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.72 Drive Fault-72: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.73 Drive Fault-73: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.74 Drive Fault-74: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.75 Drive Fault-75: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.76 Drive Fault-76: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.77 Drive Fault-77: IPOS Control Word

Please refer to the MOVIDRIVE® compact manual for details.

6.1.78 Drive Fault-78: IPOS SW Limit Switches

Please refer to the MOVIDRIVE® compact manual for details.

6.1.79 Drive Fault-79: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.80 Drive Fault-80: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.81 Drive Fault-81: Start Condition

Please refer to the MOVIDRIVE® compact manual for details.

6.1.82 Drive Fault-82: Output Open

Please refer to the MOVIDRIVE® compact manual for details.

6.1.83 Drive Fault-83: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.84 Drive Fault-84: Motor Protection

Please refer to the MOVIDRIVE® compact manual for details.

6.1.85 Drive Fault-85: Copy

Please refer to the MOVIDRIVE® compact manual for details.

6.1.86 Drive Fault-86: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.87 Drive Fault-87: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.88 Drive Fault-88: Flying Start

Please refer to the MOVIDRIVE® compact manual for details.

6.1.89 Drive Fault-89: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.90 Drive Fault-90: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.91 Drive Fault-91: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.92 Drive Fault-92: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.93 Drive Fault-93: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.94 Drive Fault-94: Check Sum EEPROM

Please refer to the MOVIDRIVE® compact manual for details.

6.1.95 Drive Fault-95: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.96 Drive Fault-96: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.97 Drive Fault-97: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.98 Drive Fault-98: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.1.99 Drive Fault-99: Unused

Please refer to the MOVIDRIVE® compact manual for details.

6.2 Symptoms and Solutions

6.2.1 Gaps are not being corrected

- Check to make sure that both photo eyes are aligned with their reflectors and are working properly.
- Check the distance entered on screen 16, as explained in section 2.14, to ensure that the entered value is exactly equal to the distance between the centers of the photo eyes.

- Check that the photo eyes are properly wired.

6.2.2 Gapper will not start

- Check to ensure the “Run” signal from the system is present on input DI00.
- Check to ensure that the VFD is not faulted. The indicator on the front of the VFD should not be red. If there is a fault it should be displayed on the main screen on the display also.
- Check to ensure the proper voltage is present on all three legs of the supply power.

6.3 Resetting Errors

If an error occurs on the Gapper’s VFD the status light on the VFD will be red instead of green or amber. It this occurs, the VFD has faulted. Note the error displayed and try cycling power to reset the error. If the error is still present after powering up, the cause of the error must be corrected before it can be cleared. Look up the error code in the instruction manual to determine the cause of the error. Correct the cause of the error.

You may directly view the fault code on the VFD using these steps. Unplug the communication module on the front of the VFD and put in the DBG keypad provided. Write down the error code displayed on the DBG keypad for future reference. Press the “E” push button will take you to the “Manual Reset” parameter (840). Press the up arrow key to reset the error. If this clears the error, you can attempt to restart the gapper to checks its operation. Refer to chapter 5 for a more detailed step-by-step procedure for resetting an error with the DBG keypad.

You must remove the DGB keypad and replace it with the communication module before the HMI display will be functional. The gapper will still function while the display is unplugged. The HMI display is only necessary to make parameter changes.

Notes