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3. DIGISPENSE 700 CONTROLLER MODULE

3.1 DESCRIPTION

The Digispense 700 Controller Module, hereafter referred to as the Controller Module, contains all the control, monitoring, and interface components for the dispensing operations. The Controller Module measures 14 3/4" wide, 11 3/4" deep, 5 1/4" high (feet included) and weighs approximately 17 pounds. The operator controls are located on the front panel and the interface connections are located on the rear panel.

3.1.1 Front Panel Controls & Indicators (Figure 3.1)

The front panel contains the switches and pushwheels for controlling the system. The following standard controls are located on the front panel.

Switches
- (2) DISP/PRIME
- (3) FWD/REV
- (4) START/STOP
- (6) 1/0 (On/Off)
- (7) NORML/DRWBK

Pushwheels
- (1) VOL STROKES
- (6) RATE

3.1.1.1 DISP/PRIME Switch (Figure 3.1 Item 2)

This 2-position, illuminated, rocker switch selects either "DISP" (Dispense) or "PRIME" (continuous cycle) mode.

A yellow indicator in the switch illuminates on the active switch setting.

3.1.1.2 FWD/REV Switch (Figure 3.1 Item 3)

This 2-position, illuminated, rocker switch selects the liquid flow direction "FWD" (forward) or "REV" (reverse).

A yellow indicator in the switch illuminates on the active switch setting.

3.1.1.3 START/STOP Switch (Figure 3.1 Item 4)

This momentary, illuminated rocker switch activates pump operation when "START" is pressed and halts pump operation when "STOP" is pressed.

A green indicator illuminates in the switch after pressing "START".

A red indicator illuminates in the switch after pressing "STOP".

3.1.1.4 1/0 Switch (Figure 3.1 Item 6)

This 2-position, illuminated, rocker switch turns controller main power (AC input) "ON" (1) or "OFF" (0).

A green indicator light in the switch illuminates when controller power is "ON".

3.1.1.5 NORML/DRWBK Switch (Figure 3.1 Item 7)

This 2-position, illuminated, rocker switch sets the Controller Module in either the Normal or Drawback mode.

Figure 3.1 Digispense 700 Controller Module Front Panel

A green indicator light in the switch illuminates on the active side.

3.1.1.6 VOLUME STROKES Pushwheel (Figure 3.1 Item 1)

This 3 digit, pushwheel switch determines the number of pump rotations per cycle.

Pressing the "+" will increase the selected number by 1 and pressing "-" will decrease the selected number by 1. This allows the user to select any number of pump rotations from "000" to "999".

3.1.1.7 RATE Pushwheel (Figure 3.1 Item 5)

This 3 digit, pushwheel switch determines the Dispense or Prime rate by directly controlling the speed of the stepping motor drive. The minimum is "0" and the maximum is the maximum RPM (revolutions per minute) of the motor. (see the Title Page section of this manual)

Example: A controller setting of "250" represents 25% of the motor's maximum RPM.

Pressing the "+" will increase the selected number by 1 and pressing "-" will decrease the selected number by 1. This allows the user to select any motor speed from "000" (0%) to "999" (99.9%). The suggested minimum is "150" (15%).

3.1.2 Rear Panel Detail (Figure 3.2)

The rear panel contains the interface connections for the system. The following components are located on the rear panel.

1. Power Entry Module
2. Terminal Strip
3. Cable Connector

3.1.2.1 Power Entry Module (Figure 3.2 Item 1)

The power entry module contains a receptacle for a standard IEC power cord, a voltage selector switch and main fuse holder.

CAUTION

Before plugging in the system, insure the line voltage setting appearing in the window agrees with the available line voltage. Damage to the equipment could result if the two voltages do not match.

Refer to the Title Page section of this manual to determine the power connection and fuse specifications for this Controller Module.

The design of the power entry module requires the line cord be disconnected before either the voltage select switch is changed or a line fuse is removed. Perform the following steps if it is necessary to change the setting of the line voltage select switch. (Refer to Figure 3.4)

1. Disconnect the line cord at the power entry module and open its cover.

2. Remove the selection cam from the unit and replace it oriented so the desired voltage will appear in the window when the cover is closed.

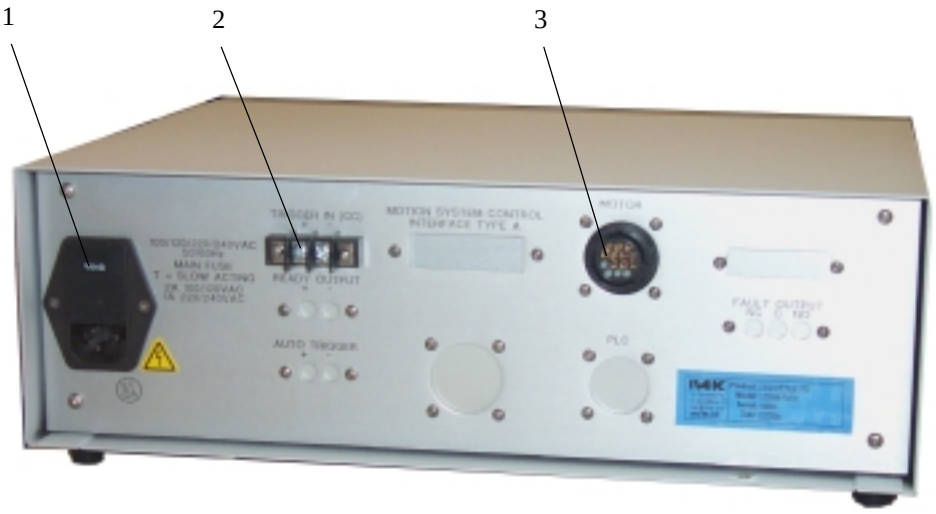


Figure 3.2 Digispense 700 Controller Module Rear Panel

CAUTION

Rotating the voltage select cam while it is in the module may damage the module.

3. With the voltage select cam in the proper position, close the cover and replace the line cord. If the cover does not completely close, open the cover and slightly reposition the voltage select cam.

3.1.2.2 TRIG IN (CC)Terminal Strip (Figure 3.2 Item 2)

The TRIG IN (CC) (Contact Closure) terminal strip has two screw terminals (+/-) used for triggering a Dispense or Meter. A signal at this terminal strip initiates pump operation (dry contact or solid state). The signal rating is 20mA at 12VDC.

NOTE

The front panel mounted START switch or a contact closure wired through the rear panel terminal strip will activate the pump.

3.1.2.3 Pump Connector (Figure 3.2 Item 3)

The pump connector (Amp Series One CPC 14 pin) is used for making the electrical connections to the Motor/Base Module.

CAUTION

Never connect or disconnect the cable from this connector while power is on. Damage to the equipment may result.

3.2 OPERATION

The Controller Module provides all the control, monitoring, and interface functions for the dispensing operations. Controlled rapid acceleration and deceleration of the stepping motor, stroke counting, and rotation monitoring are some of the functions required to properly drive precision metering pumps.

The Controller and Motor/Base Modules are electrically connected together by a cable. The pump is activated when either the START/STOP switch is switched to START or a trigger signal is received through the terminal strip. The operation of the controller is divided into four sections; Motor Control, Priming, Dispensing, and Emptying.

3.2.1 Motor Control

The rotation of the piston within the Pump Module is monitored by a spindle sensor that provides three functions; Volume Strokes, Stopped Location, and Stall Detect. The sensor is mounted on the frame of the Motor/Base Module and detects a target mounted on the spindle.

3.2.1.1 Volume Strokes

The spindle sensor counts the motor revolutions to ensure the requested number of revolutions (volume strokes) has been completed. The sensor signals the stepper motor drive circuitry to decelerate when the required count is reached. This assures the stopped location is the same each time.

3.2.1.2 Stopped Location

The spindle sensor stops the piston during the intake stroke of the pump. The sensor signals the stepper motor drive circuitry to decelerate, thereby insuring the position at the end of the dispense is based on a sensed position, and not on the accumulation of motion commands to the motor drive circuitry.

If the piston is at a random position, such as after reassembly due to cleaning, the piston will be properly indexed to stop during the intake stroke following the completion of the first dispense cycle (with no faults). By stopping during the intake stroke, variations in the exact stopping position will not effect dispense accuracy.

3.2.1.3 Stall Detect

A motor stall condition is generated if a signal from the spindle sensor is not detected for each revolution commanded to the motor. In a stepping motor system, a stall has occurred if more steps than the 200 required for a revolution have been commanded without a subsequent signal from the spindle sensor. A small margin above 200 steps is allowed to prevent minor variations from incorrectly signaling a stall.

When a stall occurs, you will hear the motor starting, but then it will stop. It will continue to start then stop until the power is turned off.

3.2.2 Priming

In Prime mode, the rate of liquid flow is directly controlled, but the volume of liquid displaced is not directly controlled. The volume of liquid dispensed is the result of the rate and the length of time the system is activated.

3.2.2.1 Controller Setup

Set the switches on the front panel to the following settings:

- The 1/0 power switch to "0".
- The DISP/PRIME switch to "PRIME".
- The FWD/REV switch to "FWD".
- The START/STOP switch to "STOP".
- The NORML/DRWBK switch to "NORML".
- The RATE pushwheel setting is dependent on the application. As a general guideline, start with 500 (50%). The rate during metering may be the same, higher, or lower than the rate during dispensing, based on the application.
- The VOLUME STROKES pushwheel setting is not critical for this mode but must be set for a value other than "000". The only effect would be the length of time the motor continues to operate if the Prime operation is stopped by switching the DISP/PRIME switch to "DISP".

3.2.2.2 Priming Operation

Switch the 1/0 power switch to "1"

Pressing the START push-button will start the priming operation. The motor will operate until either the STOP button is pushed or the DISP/PRIME switch is switched to DISP. If a Prime operation is terminated by moving this switch to the DISP position, the motors will continue to run for the number of rotations set on the VOLUME STROKE pushwheel. Stopping in this fashion (not using the STOP switch) will properly position the dispense mechanism, readying it for immediate operation.

When this switch is in the DISP position, upon triggering, the unit dispenses a volume determined by the volumetric displacement of the dispense head and the number of forward dispense strokes (VOLUME STROKES - DRWBK).

In either mode, at the end of each operation, the pump will 'drawback' if 'DRWBK' mode is selected.

Start priming mode by using either the START push-button or asserting a trigger signal at the optional PLC input.

3.2.3 Dispensing Without Drawback

Dispense without drawback is used to deliver a discrete, specific volume of liquid at a specific flow rate.

The Controller Module provides an accurate adjustment of both the rate and volume of the dispense. The exact volume of liquid dispensed is dependent on the volume setting and the configuration of the Pump Module.

3.2.3.1 Controller Setup

Set the switches on the front panel to the following settings:

- The 1/0 power switch to "0".
- The DISP/PRIME switch to "DISP".
- The FWD/REV switch to "FWD".
- The NORML/DRWBK switch to "NORML".
- The RATE pushwheel setting is dependent on the application. As a general guideline, start with "500". The rate may need to be higher or lower, based on the application.
- The VOLUME STROKES pushwheel setting, combined with the pump displacement, determines the volume dispensed for each trigger. Since the VOLUME STROKES setting determines the number of revolutions of the pump, and the pump displacement determines the volume per pump revolutions, multiplying the two will produce the total volume dispensed for each Trigger.

3.2.3.2 Dispensing Operation

Switch the 1/0 power switch to "1".

Set the VOLUME STROKES pushwheel to the desired number.

Start Dispensing mode by either switching the START/STOP switch to "START" or asserting a trigger signal at the terminal strip.

The operation is initiated at the false-to-true transition on the trigger signal. The length of the trigger signal has no effect provided the true-to-false transition is clean with no contact bounce. Contact bounce at the end of a trigger signal longer than the duration of the dispense can initiate a second dispense cycle.

The system will continue to operate until the number of volume strokes set on the VOLUME STROKES pushwheel is reached. The spindle sensor counts the revolutions of the spindle and initiates a signal when the VOLUME STROKES pushwheel setting is reached.

3.2.4 Dispensing With Drawback

Dispense with drawback is used to deliver a discrete, specific volume of liquid at a specific flow rate with a drawback of the liquid after the dispense.

Drawback is a controlled reverse flow at the end of a dispense to improve volume repeatability when 'stringy' liquids are being dispensed. At the end of the dispense cycle, the motor will reverse for one revolution pulling the liquid back into the liquid line.

The Controller Module provides an accurate adjustment of both the rate and volume of the dispense. The exact volume of liquid dispensed is dependent on the volume setting and the configuration of the Pump Module.

NOTE

After priming the liquid system, the first dispense will produce an incorrect volume when drawback is used.

3.2.4.1 Controller Setup

Set the switches on the front panel to the following settings:

- The 1/0 power switch to "0".
- The DISP/PRIME switch to "DISP".
- The FWD/REV switch to "FWD".
- The NORML/DRWBK switch to "DRWBK".
- The RATE pushwheel setting is dependent on the application. As a general guideline, start with "500". The rate may need to be higher or lower, based on the application.
- The VOLUME STROKES pushwheel setting, combined with the pump displacement, determines the volume dispensed for each trigger. Since the VOLUME STROKES setting determines the number of revolutions of the pump, and the pump displacement determines the volume per pump revolutions, multiplying the two will produce the total volume dispensed for each Trigger.

NOTE

Using Drawback reduces the Volume Strokes by one. Increase the VOLUME STROKES pushwheel by one to compensate for the one reverse motor rotation.

3.2.4.2 Dispensing Operation

Switch the 1/0 power switch to "1".

Set the VOLUME STROKES pushwheel to the desired number.

Start Dispensing mode by either switching the START/STOP switch to "START" or asserting a trigger signal at the terminal strip.

The operation is initiated at the false-to-true transition on the trigger signal. The length of the trigger signal has no effect provided the true-to-false transition is clean with no contact bounce. Contact bounce at the end of a trigger signal longer than the duration of the dispense can initiate a second dispense cycle.

The system will continue to operate until the number of volume strokes set on the VOLUME STROKES pushwheel is reached. The spindle sensor counts the revolutions of the spindle and initiates a signal when the VOLUME STROKES pushwheel setting is reached.

3.2.5 Emptying

Empty is used to empty the pump inlet tubing, pump chamber, and outlet tubing of liquid when metering and(or) dispensing operations are completed. This is the reverse of Prime mode and is used to return liquid to the supply reservoir rather than forward into a waste container.

3.2.5.1 Controller Setup

NOTE

It is not necessary to shut the power off before switching to the Empty mode.

Set the switches on the front panel to the following settings:

- The FWD/REV switch to "REV" .
- The RATE pushwheel setting is not critical for this mode. The only effect is the rate the system will empty. It is acceptable to leave this at the setting used in Dispense mode.
- The VOLUME STROKES pushwheel setting is not critical for this mode, **but must be set for a value OTHER THAN "000"**.

3.2.5.2 Emptying Operation

Pressing the START push-button will start the Emptying operation. The motor will operate until either the STOP button is pushed or the DISP/PRIME switch is switched to DISP. If an Empty operation is terminated by moving this switch to the DISP position, the motors will continue to run for the number of rotations set on the VOLUME STROKE pushwheel.

At the end of each operation, the pump will 'drawback' if 'DRWBK' mode is selected.

Start Emptying mode by using either the START push-button or asserting a trigger signal at the optional PLC input.

3.3 INSTALLATION

General operating practices provide the best guidelines for locating the components of the system. The Controller Module should be located for ease of use during all phases of operation and maintenance.

3.4 OPTIONS

IVEK Corporation offers a variety of options to best meet the customers needs. Following is a list and description of available options for the Controller Module. Refer to the Title Section of this manual for the list of options provided with this system.

3.4.1 Totalizer

A totalizer provides a digital display of the total number of motor revolutions during the Dispense mode. The totalizer will not count revolutions when the controller is in the Reverse or Prime modes. A reset push-button allows the operator to reset the counter when required.

3.4.2 Continuous Auto Trigger W/Dwell

This option adds automatic retriggering of the system with an adjustable 'wait' time between dispenses. A terminal strip and potentiometer/dial are added to the rear panel and a locking action foot switch is recommended for activation. The foot switch can either be active (depressed) or inactive (released). The dwell adjustment is a ten turn potentiometer/dial with a range of "000" to "999".

When the foot switch is released, the system will cycle as described in Section 3.2 'Operation'. When this switch is depressed, the system will continuously retrigger until interrupted.

The dwell potentiometer adds an adjustment for a time period at the end of the dispense during which the system is in a 'wait' state. During this period of time, any trigger signals (including transitions) are ignored.

The dwell control can be used to synchronize other machine operations, reduce susceptibility to trigger noise, or allow control of the repetition rate.

The dial provides a linear scale across the entire range. A setting of “999” on the vernier represents 2 seconds of delay time. A setting of “000” is approximately 0.5 seconds.

3.4.3 Contact Closure Ready Output

The contact closure ready output provides a contact output indicating the status of the system. The system is either in a "READY" or "WAIT" state.

The "READY" state occurs when the system is not in a Dispense or Prime operation. The "WAIT" state occurs when the system is either dispensing or priming.

The Controller Module is ready to accept a trigger when this signal is true. The signal will remain false during any operation. The output conducts when the signal is true. Refer to Section 3.7 for the signal specifications.

3.4.4 Reset Switch/Fault Indicator

The reset switch/fault indicator signals the operator when a stall fault has occurred. A fault is generated if four stalls of the motor are detected. When a fault occurs, the RESET switch starts flashing and a fault output is generated.

The RESET switch starts flashing when a fault has occurred. Pressing the switch, stops it from flashing and resets the system. If the system immediately faults again, refer to Table 3 'Common Operation Problems and Solutions' in Chapter 2 'Operation'.

An output is provided that can be designed to either inhibit further dispensing, alert the operator, or provide a reject signal for integrated process control.

3.4.5 PLC Interface

The PLC interface option replaces the external contact closure trigger signal with a number of signals, including the trigger. This option comes equipped with a Reset Switch/ Fault Indicator.

3.4.5.1 Signal Description

Following is a list of the signals and their associated descriptions.

TRIGGER IN - A signal applied to this input will trigger operation in Dispense or Prime mode. Operation is initiated at the false-to-true transition of this signal, if the Controller Module is not faulted, with any further activities on the signal ignored until the operation is completed.

READY OUT - The ready output signal indicates the active/idle state of the Controller Module. The Controller Module is ready to accept a trigger, if the Controller Module is not faulted, when this signal is true. The signal will remain false during any operation or if it's faulted.

FAULT OUT - The fault output signal indicates that a fault has been detected in the operation of the Motor/Base Module. This output is complemented, i.e., the output is true when no fault exists, and is false when the controller is faulted. Four stalls during an operation are required to activate this signal.

3.4.5.2 Signal Levels

All signals are optically isolated. The power for all signals is provided by the customer's equipment.

All inputs accept a 24 VDC signal and require 20 mA.

All outputs conduct when the signal is 'true' and do not conduct when the signal is 'false' (see FAULT OUT). Outputs can switch a signal of up to 24 VDC and 50 mA. The output consists of the emitter and collector connections to an IC opto-isolator.

3.4.5.3 Connections

All connections are through a 9 pin circular plastic connector, with the mating connector and pins supplied with the unit. The connector on the controller is an AMP CPC series 206705-1. Table 3.1 contains a list of each pin in the connector and its associated signal.

Table 3.1 PLC Pin Configuration

PIN	SIGNAL	PIN	SIGNAL
1	TRIGGER IN +	6	FAULT OUT -
2	TRIGGER IN -	7	(not used)
3	READY OUT +	8	(not used)
4	READY OUT -	9	(not used)
5	FAULT OUT +		

3.4.6 Motion Control System Interface Type A

The Motion Control System Interface Type A option allows convenient connection to a Cartesian robot or an IVEK X-Y-Z Table. The interface connector is mounted on the rear of the Controller Module and mates with the input/output cable. This option comes equipped with a Reset Switch/Fault Indicator.

3.4.6.1 Signal Description

Following is a list of signals and their associated descriptions.

TRIGGER IN - A signal applied to this input will trigger operation in Dispense or Prime mode. Operation is initiated at the false-to-true transition of this signal, if the Controller Module is not faulted, with any further activities on the signal ignored until the operation is completed.

READY OUT - The ready output signal indicates the active/idle state of the Controller Module. The Controller Module is ready to accept a trigger, if the Controller Module is not faulted, when this signal is true. The signal will remain false during any operation or if it's faulted.

FAULT OUT - The fault output signal indicates that a fault has been detected in the operation of the Motor/Base Module. This output is complemented, i.e., the output is true when no fault exists, and is false when the controller is faulted. Four stalls during an operation are required to activate this signal.

3.4.6.2 Signal Levels

The input accepts a contact closure signal (dry contact or solid state). The signal rating is 20mA at 12 VDC.

All outputs conduct when the signal is 'true' and do not conduct when the signal is 'false' (see FAULT OUT). Outputs can switch a signal of up to 24 VDC and 50 mA. The output consists of the emitter and collector connections to an IC opto-isolator.

3.4.6.3 Programming Language

For systems using Asymtek's Motor Control System, Asymtek's Easymove language is recommended over the newer Fluidmove language. At the time this was written, Fluidmove does not permit the detailed input and output functions allowing confirmation of the operation of input and output functions allowing confirmation of the Controller Module operation. Fluidmove is a 'higher level' language than Easymove. A program written with Easymove allows confirmation of operation using the 'Ready output, and can monitor and detect faults. Following are typical programming sequences:

Dispense:

```
Begin procedure 100
Execute procedure/pattern 92 if inputs - --11--, else 90
Change outputs to --1--
Await inputs --0--, time-out 1 sec.
Execute procedure/pattern 90 if inputs = --1--
Change outputs to --0--
Await inputs --11--, time-out 5 sec.
Execute procedure/pattern 92 if inputs = --11--, else 90
End procedure
```

Prime:

```
Premove outputs deactivated
Multi-mid-move outputs cleared/deactivated
Premove outputs --1--, wait 0.05 sec.
Multi-mid-move outputs --0-- at 0.03 inches
Temporary mode no outputs

Comment:          Check dispenser
Execute procedure/pattern 92 if inputs = --11--, Else 90
Comment:          Lower tip
Z move absolute 1.5 inches
Temporary mode normal
Comment:          Draw line
Move incremental 0, 10 inches
Comment:          Raise tip
Z move incremental 0.5 inches
Temporary mode no outputs
Comment:          Check dispenser
Await inputs --11--, Time-out 1 sec.
Execute procedure/pattern 92 if inputs = --11--, else 90
.
.
Begin procedure 90
Pause
End procedure

Begin procedure 92
Comment "Do nothing"
End procedure
```

3.4.6.4 Multiple Dispensers

If multiple Controller Modules are to be used on a single Motion Control System Interface Type A unit, a custom cable assembly is used to connect the Motion Control System Interface Type A unit to all IVEK Controller Modules being used. The wiring of this cable assembly will reassign the Controller Module functions to new signals in the unit.

3.4.6.5 Connections

The signal assignments in the controller are shown in Table 3.2.

Table 3.2 Controller Module To Motion Control System Interface Type A Signal Conversion

CONTROLLER FUNCTION	SYSTEM SIGNAL
READY OUT	IN5
FAULT OUT	IN4
TRIGGER IN	OUT4

3.4.7 Drawback 0, 1, 2 Switch

The Drawback 0, 1, 2 switch replaces the NORML/DRWBK switch. This adds the ability to drawback the liquid by providing drawback for one or two rotations of the motor.

With the switch set for '0', the system operates as described in 'NORML' operation. (no drawback)

With the switch set for '1' the system operates as described in 'DRWBK' operation. (drawback with one reverse motor revolution)

With the switch set for '2' the system operates as described in 'DRWBK' operation except the motor will rotate in reverse for two revolutions.

NOTE

Using Drawback reduces the Volume Strokes by the selected number. Increase the VOLUME STROKES pushwheel by that same number to compensate for the reverse motor rotation(s).

3.4.8 DWELL Dial/Pot

This option adds an adjustable 'wait' time between dispenses. A potentiometer/dial is added to the front panel. The dwell adjustment is a ten turn potentiometer/dial with a range of "000" to "999".

The dwell potentiometer adds an adjustment for a time period at the end of the Dispense during which the system is in a ‘wait’ state. During this period of time, any trigger signals (including transitions) are ignored.

The dwell control can be used to synchronize other machine operations, reduce susceptibility to trigger noise, or allow control of the repetition rate.

The dial provides a linear scale across the entire range. A setting of “999” on the vernier represents 2 seconds of delay time. A setting of “000” is approximately 0.5 seconds.

3.4.9 DRAWBACK DWELL Dial/Pot

This option provides the ability to adjust the delay between the completion of the forward portion of the Dispense cycle and the start of the reverse drawback stroke(s).

A setting of "999" on the vernier scale represents 3 seconds of delay time. A setting of "000" is approximately 270 milliseconds.

3.4.10 Drawback Rate

This option provides the ability to adjust the rotational rate of the motor during drawback separately from the Dispense rate. Different fluidic applications require the drawback rate to be greater than, less than, or equal to the rate during Dispense.

3.5 MAINTENANCE

No periodic maintenance is required on the Controller Module, beyond standard practices for electronic equipment.

3.5.1 Assembly/Disassembly Procedures

The Controller Module contains the following replaceable parts.

- Switch LED's
- Main Power Fuse

3.5.1.1 Switch LED's (Figure 3.1 Items 2,3,4)

The LED's in the DISP/PRIME, FWD/REV, START/STOP and NORML/DRWBK switches are replaceable. (Refer to Figure 3.3 images 1,2,3 and 4)

Disassembly

1. Use your fingers to remove the switch cover. (Image 1 to 2)
2. Locate the metal pull tab and pull out slowly until the LED comes out. (Image 2 to 3)

Assembly

1. Locate the "+" side of the bulb (upper LED sockets have the "+" on the right and lower LED sockets have the "+" on the left) and place into the socket. (Image 4)
2. Snap the switch cover into place. (Image 1)

3.5.1.2 Main Power Fuse (Figure 3.2 Item 1)

The main power fuse, located in the power entry module on the rear panel, is replaceable. The proper fuse value is described in the Title Page section of this manual. (Refer to Figure 3.4)

Disassembly

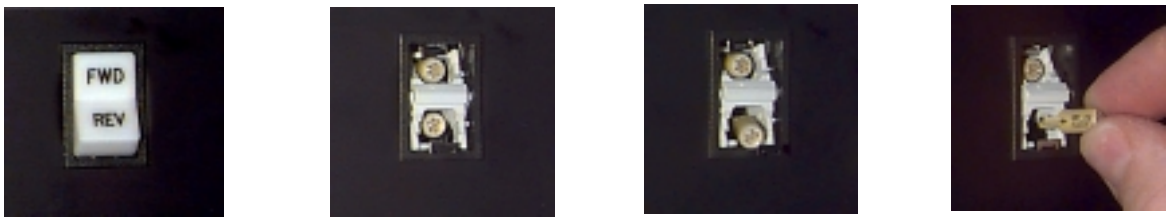
1. Remove the power cord.
2. Using a small flat blade screwdriver, open the power entry module's cover.
3. Slide the fuse tray out and remove the fuse.

Assembly

1. Install the new fuse into the fuse tray and slide the tray in. The arrow on the fuse holder should point to the right.
2. Close the power entry module's cover.
3. Connect the power cord.

3.6 PROBLEM GUIDE

Table 3.3 contains a list of possible problems, causes and solutions for the Controller Module.



1 2 3 4

Figure 3.3 LED Disassembly/Assembly

WARNING

Hazardous voltages exist inside the Controller Module. Under no circumstances should the Controller Module be opened. There are no user serviceable parts inside. Any unauthorized access to the inside will void the warranty.

3.7 SPECIFICATIONS

Trigger Signal Requirements (Standard):
Mechanical contact closure or solid state
Held closed for 100msec typical. Signal length less than the time of the Dispense or Prime operation (whichever is less).

Voltage Trigger Requirements (Option):
+24 VDC @ 20mA max
Held active for 100msec

Length of Dwell: (Standard) Fixed: 50msec.
(Option) Variable: 0.5sec - 2sec.

Motor Speed: 23 Frame (A series): 1000RPM Max.
34 Frame (B,C,D series): 750RPM Max.

Contact Closure:
Max. Switching Power: 60W 110VA
Max. Switching Voltage: 220V AC, DC
Max. Switching Current: 2A
U.L Rating: 0.5A 125VAC, 2A 30VDC, 0.25A 220VDC

Figure 3.4 Power Entry Module

3.8 MODEL NUMBER

The model number provides important information about the specifics of your Controller Module at time of order. Refer to this number when calling IVEK Technical support. The model number for your Controller Module is located in the Title Page section of this manual and on the rear of the Controller Module.

520086 - # # # # #

Motor/Base
- **A** - Microspense AP Single End
- **B** - Microspense AP Dual End
- **C** - Microspense AP Rare Earth Motor
- **E** - Heavy Duty 1 Stack
- **F** - Heavy Duty 2 Stack
- **G** - Heavy Duty 3 Stack

Enclosure Finish
- **A** - Powder Coat
- **B** - Stainless Steel

Logic Interface
- **A** - Trig In (CC)
- **B** - PLC (OI)
- **D** - Motion System Interface Type A
- **E** - Trig In (CC), Ready Out (CC), Fault Out (CC)

Front Panel
- **A** - No Front Panel Options
- **C** - Drawback Dwell, Re-Trig Dwell, Auto Trig
- **F** - Drawback Rate, Drawback 0,1,2
- **G** - Drawback Dwell, Re-Trig Dwell, Auto Trig and Drawback Rate, Drawback 0,1,2

Line Cord & Agency Approval
- **A** - US Cord
- **B** - International Cord
- **C** - US Cord & CE Approval
- **D** - International Cord & CE Approval

NOTE

A 'Z' in the model number or a model number not listed indicates a custom option and will be described in either the Title Page or Chapter 4.

3.9 ILLUSTRATED PARTS BREAKDOWN

The illustrated parts breakdown (Figure 3.5) contains the information required for identifying and ordering replacement parts.

Table 3.3 Common Operational Problems And Solutions

PROBLEM	PROBABLE CAUSE	POSSIBLE SOLUTION
No power, nothing works.	AC power may be absent or inadequate. Unit not plugged in.	Ensure AC power cord is plugged into a properly grounded three-prong outlet capable of supplying 100/120/220/240 volts, 50/60Hz, rated at 5.0 amps.
	Fuse is blown.	Unplug main power cord from outlet. Remove fuse from rear panel fuse holder. (Refer to section 3.5.1.2) Test fuse conductivity. Install good fuse in rear panel fuse holder.
Power is on, Controller Module accepts trigger, motor spindle fails to rotate and motor makes a sound that fluctuates in tone. * This condition does not harm the system.	Supply Breaker is tripped.	Check or reset breaker at panel.
	A Pump Module or motor malfunction can cause this problem.	Turn off Controller Module power. Remove Pump Module from Motor/Base Module. Turn on Controller Module and try again. If the motor operates correctly, the pump may need to be cleaned or serviced.
Power is on, Controller Module accepts a trigger, (START indicator illuminates, STOP indicator does not), motor spindle fails to rotate, and motor is silent.	The Volume Strokes push-wheel is set to "000".	Change the setting to a value other than "000".
	The Rate pushwheel is set to "000".	Change the setting to "250".
	A motor malfunction can cause this problem.	Turn off Controller Module power. Check to ensure Motor/Base Module is properly connected to Controller Module. Turn on and try again. If the motor operates incorrectly, servicing may be necessary to the motor or the Controller Module. Return complete Controller, Motor/Base and Pump Modules to IVEK Corporation for repair.
Controller Module power on and operational, but will not actuate pump motor.	I/O Cable	Check the cable connection between the Controller Module and Motor/Base Module. Inspect and repair faulty cable. **If none of the above solves the problem, contact IVEK technical support for assistance.**

INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY
		Standard Digispense 700 Controller Module	**1**
1	662039-05	Switch Lens, Rocker, 662041 Legend; Disp/Prime	1
2	662029-005SY	LED, Wedge Based, Multichip, 5 VDC, Std Yellow	6
3	662039-03	Switch Lens, Rocker, 662041 Legend; Fwd/Rev	1
4	662039-01	Switch Lens, Rocker, 662041 Legend; Start/Stop	1
5	662029-005SG	LED, Wedge Based, Multichip, 5 VDC, Std Green	1
6	662029-005SR	LED, Wedge Based, Multichip, 5 VDC, Std Red	1
7	662039-04	Switch Lens, Rocker, 662041 Legend; Norml/Drwbk	1

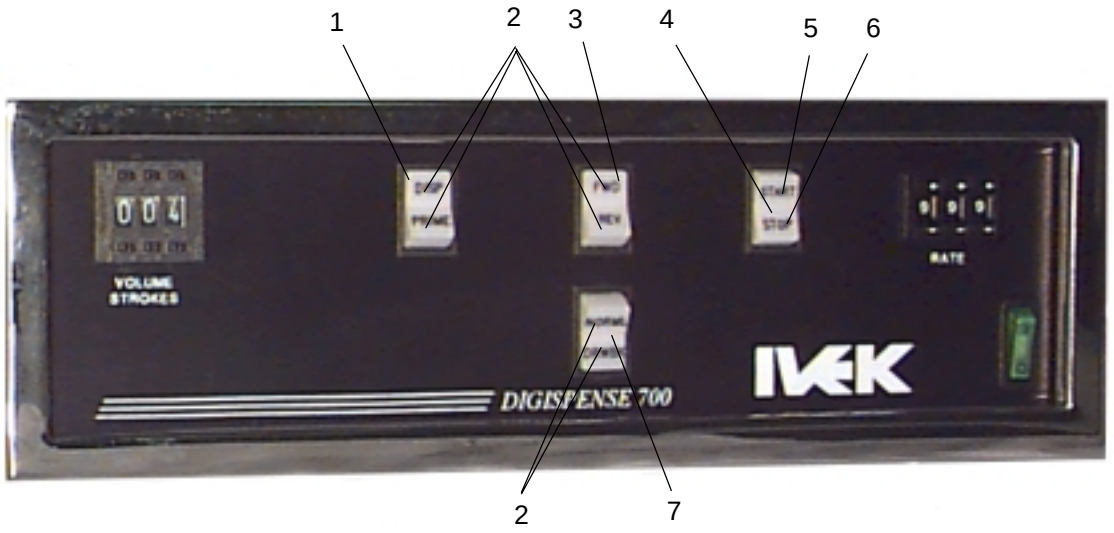


Figure 3.5 Digispense 700 Controller Module (Sheet 1 of 1)