



OPERATING MANUAL: PUMP DRIVE

77420-00 Pump Drive, shown with 77600-62 High Performance I/P Pump Head.

77420-00

A-1288-0990
Edition 01

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SAFETY PRECAUTIONS

DANGER: *High voltages exist and are accessible in the Console Drive. Use extreme caution when servicing internal components.*



WARNINGS: *Tubing breakage may result in fluid being sprayed from pump. Use appropriate measures to protect operator and equipment.*



Turn drive off before removing or installing tubing. Fingers or loose clothing could get caught in drive mechanism.

CAUTION: *Power must be turned off before connecting the external remote control cable to prevent damage to the drive.*



WARNING: PRODUCT USE LIMITATION

This product is not designed for, nor intended for use in, patient-connected applications, including, but not limited to, medical and dental use, and, accordingly, has not been submitted for FDA approval.

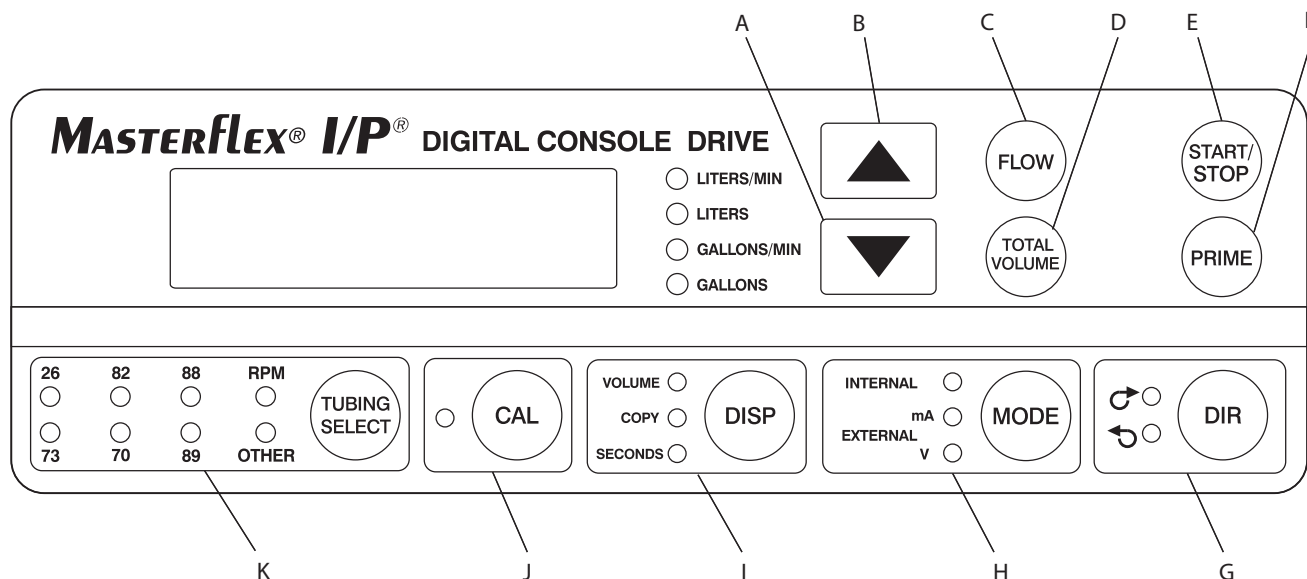
INTRODUCTION

The Console Drive controls the speed of MASTERFLEX I/P Pump Heads to provide flow rates from 0.12 to 17 L/min, or 26 L/min with two pump heads.

Mount up to 2 MASTERFLEX I/P EASY-LOAD or Standard Pump Heads or 1 MASTERFLEX High-Performance I/P Pump Head.

CONTROL/DISPLAY FUNCTIONS

Press keys to activate function. Use UP/DOWN (▲, ▼) arrow keys to correct/change a flashing display. Press any key to enter new values.



- A. DOWN ARROW (DECREMENT) —Decrease value of a flashing display.
- B. UP ARROW (INCREMENT) —Increase value of a flashing display.
- C. FLOW CONTROL —Set flow rate for selected tubing size. To change flow rate, press ▲ or ▼ arrows. (If pump is running, its speed will change with new settings.)
- D. TOTAL VOLUME —Display cumulative dispensed volume.
- E. START/STOP —Start/Stop motor.
- F. PRIME —Run pump at full speed to fill or clear lines.
- G. DIRECTION —To change motor direction.
- H. MODE SELECT —INTERNAL for internal control; mA for remote current control; V for remote voltage control.
- I. DISPENSE/COPY —Select dispensed volume, number of copies of a dispensed volume, or the dispense interval.
- J. CAL CONTROL —Refine built-in calibration using a measured volume.
- K. TUBING SELECT —Select tubing size.

SETUP AND DRIVE OPERATION

1. Mount pump head and load tubing. (See pump head manual.)
2. Turn pump on and select tubing size by pressing "TUBING SELECT."

NOTE: If CAL LED is lit, that tubing size has been previously field calibrated. If LED is not lit, the drive is operating with the built-in factory calibration. To clear a field calibration, press and hold the CAL key until the CAL light goes out. This will take about 3 seconds. To recalibrate for better accuracy, see Calibration section.

3. MODE selection (INTERNAL, mA, V).
4. Select MOTOR DIRECTION (CW or CCW).
5. PRIME and CALibrate the pump (if required).
6. Press FLOW key and watch display to set the flow rate with UP/DOWN (▲, ▼) keys.
7. Press START/STOP key to begin pumping.

NOTE: Pump normally will not restart automatically after a brownout or powerout condition.

Automatic Start Enable/Disable

Press and hold START/STOP on power-up. After five (5) seconds, display will change to all dashes. Then, while holding START/STOP, press PRIME five (5) times. Display will flash "ON" or "OFF". Use UP/DOWN (▲, ▼) arrow keys to set automatic start option. Press any other key to exit. When "ON" is selected, pump will start automatically at power-up if it was "ON" when powered down.

CALIBRATION

***Use only MASTERFLEX precision tubing with MASTERFLEX pumps to ensure optimum performance.
Use of other tubing may void applicable warranties.***

1. Select correct tubing size and flow rate.
2. Press CAL; calibration volume appears.
3. Press START/STOP; the pump will use its stored memory to dispense the specified calibration sample quantity. The pump will stop automatically.
4. Weigh/measure the sample.
5. Use UP/DOWN (▲, ▼) arrow keys to correct the flashing display.

NOTE: If the adjusted calibration is too great, "Err" will appear in the display. If this occurs, press the CAL control and repeat the calibration procedure. The microprocessor will retain one special calibration value per tubing size, even when power is turned off. The next calibration will replace the existing value.

6. Press TUBING SELECT to exit the calibration cycle.

Maximum Flow Rate ("OTHER" Tubing)

1. To set the maximum flow rate for non-standard pump heads or "OTHER" tubing sizes, press CAL, then FLOW. The maximum flow rate will then flash on the display.
2. Use UP/DOWN (▲, ▼) arrow keys to set desired flow rate.
3. Press TUBING SELECT to exit.

DISPENSE/COPY

A first press of the DISP key results in the last entered dispense volume being displayed. The VOLUME annunciator will illuminate and flash. The INC/DEC (▲, ▼) keys are used to change the dispense volume, if desired. The START/STOP key then initiates delivery of the set volume. The amount remaining to be dispensed will be displayed during countdown. Resetting cumulative dispensed volume can be done by pressing START/STOP while holding TOTAL VOLUME. Display flashes “999999” when cumulative volume is greater than 999999. The dispense function is exited by pressing any key except Increment (▲), Decrement (▼), DISP, or START/STOP.

A second press of the DISP key causes the COPY annunciator to illuminate and flash. The START/STOP key is then used to deliver the desired volume without the need to know the volume in specific units. A third press of the DISP key enters the volume dispensed. The COPY annunciator stops flashing. The START/STOP key is then used to initiate delivery of the copied volume. The number of copies dispensed is displayed after each dispense. The maximum number of copies is 999999. The START/STOP key is used to pause the copy dispense during dispensing; copy dispense can then be continued using the START/STOP key.

A fourth press of the DISP key results in the last entered dispense interval being displayed. The SECONDS annunciator will illuminate and flash. The INC/DEC (▲, ▼) keys are used to change the dispense time, if desired, from 1 to 999999 seconds. The START/STOP key then initiates delivery for the set time interval. The remaining time will be displayed during countdown. Pressing the DISP key a fifth time exits this mode.

Keypad Lockout Enable/Disable

Press and hold FLOW. After five (5) seconds, display will change to all dashes. Then, while holding FLOW, press PRIME five (5) times.

REMOTE CONTROL

Selectable input (0–20 mA, 4–20 mA, 0–10V DC)

±0.5% linearity control

±50V common mode range

START/STOP; CW/CCW; PRIME via contact closure

Remote Control Setup

1. Place the power switch in the off position.

CAUTION: *Power must be turned off before connecting the external remote control cable to prevent damage to the drive.*



2. Connect the cable from the external remote control to the mating receptacle on the rear panel.

3. Select type of remote control input and output required as follows:

- a. Press and hold the MODE control while turning the power switch to the on position. After two seconds, release the MODE control. The initial display will show: “inP”. After two seconds, the display shows either 0–20 or 4–20.

NOTE: Press the UP (▲, increment) or DOWN (▼, decrement) arrow keys to select between 4–20 and 0–20 for current loop control.

- b. Press the MODE control again. The initial display will show: “out”. After two seconds, the display shows either 0–10 or 0–20 and 4–20.

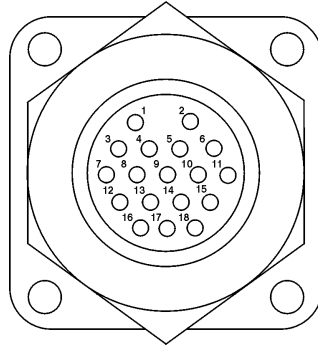
NOTE: Press the UP (▲, increment) or DOWN (▼, decrement) arrow keys to select between 4–20 or 0–20 and 0–10 for current loop or voltage output.

4. Press the MODE control to select mode of operation. The LEDs indicate the selected mode. Select either mA or V.

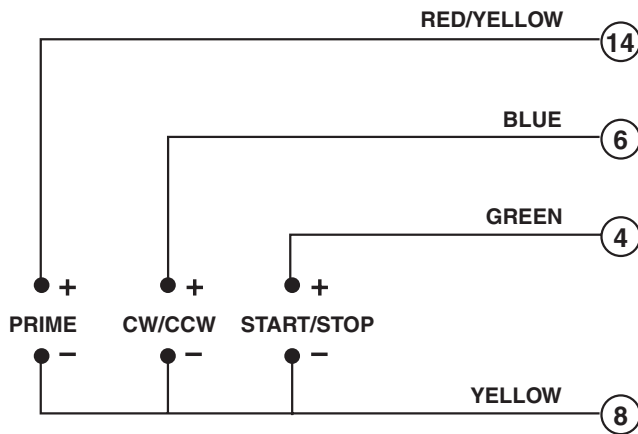
NOTE: If using only remote START/STOP, PRIME and/or CW/CCW, the MODE control can be set to any of the three positions.

5. To adjust the voltage or current scaling for other than zero to full scale, Press and hold the MODE key while pressing the FLOW key. This display will show "LO" for 2 seconds and then a flow rate. Use the UP/DOWN (▲, ▼) arrow keys to set the minimum control level. Press the FLOW key again. The display will show "HI" for 2 seconds and then a flow rate. Use the UP/DOWN (▲, ▼) arrow keys to set the maximum control level. Press any other key to exit. The same scaling will be used for both input and output levels.

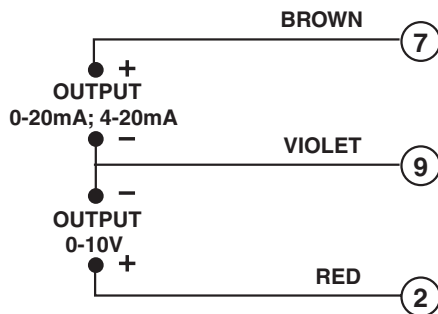
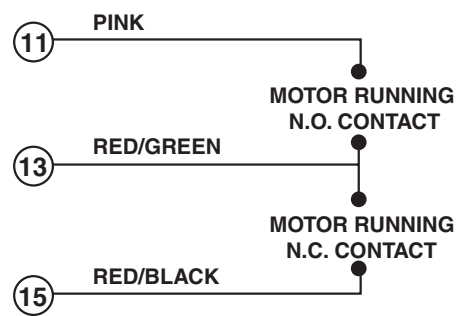
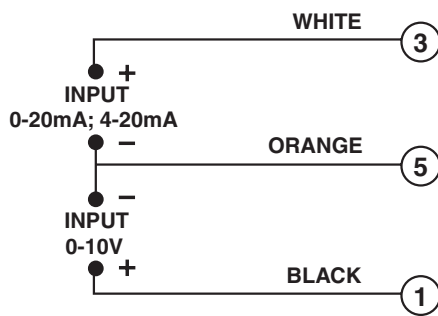
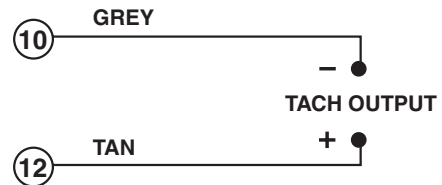
NOTE: Tubing size should be selected before adjusting the voltage or current scaling.



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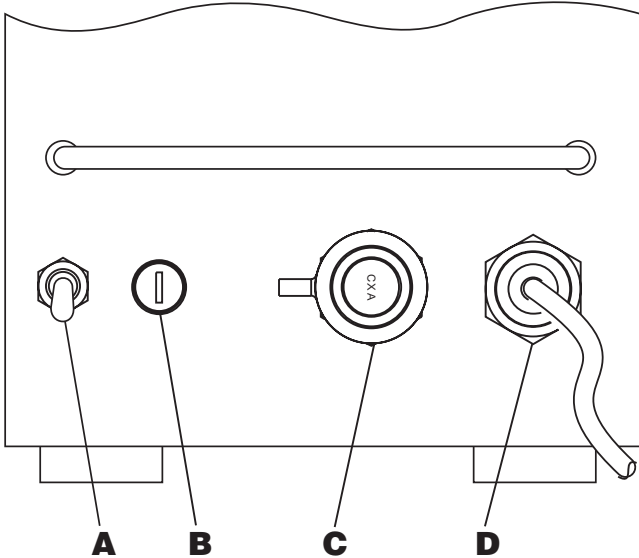
NOTE: Colors are those of Remote Cable, Catalog number 77300-32.



TROUBLESHOOTING AND MAINTENANCE

Fuse Replacement

1. Place the power switch in the off position.
2. Disconnect the AC power input line cord from the receptacle.
3. Remove and check the fuse and replace if defective.
4. Reconnect the AC power input line cord to the receptacle.



- A.** Power Switch - All settings are retained in memory.
- B.** T6.3A Fuse
- C.** External Receptacle
- D.** IEC 320 Power Cord

Troubleshooting

SYMPTOM	CAUSE	REMEDY
A. Motor does not rotate. Display does not light.	A. No power.	<ol style="list-style-type: none"> 1. Check fuse and replace if defective. 2. Check that unit is plugged into a live line. 3. Check connection of power cord. 4. Check the line cord for continuity and replace if defective. 5. Return for servicing.
B. Motor does not rotate. Display lights.	B1. Defective remote control.	<ol style="list-style-type: none"> 1. Place power switch in off position. 2. Check that remote cable connector is inserted fully into the receptacle. 3. If motor still does not rotate, select INTERNAL with the MODE control and press the START/STOP control. 4. If the motor rotates, replace the remote control with similar unit. If motor does not rotate, return drive for servicing.

Troubleshooting (cont.)

SYMPTOM	CAUSE	REMEDY
B. (cont.) Motor does not rotate. Display lights.	B2. MODE control not properly set.	<ol style="list-style-type: none"> 1. Check that the MODE control is set to INTERNAL for operation with front panel control or to mA or V for operation with remote control. 2. If motor still does not rotate, return for servicing.

If an **error message** is displayed, refer to the following list for possible corrective actions you can take. If these do not correct the problem, contact your dealer.

ERROR MESSAGE	CAUSE	REMEDY
"Err 2"	Motor over-speed	<ol style="list-style-type: none"> 1. Clear by pressing any key. 2. Check for proper tube loading and pump operation. 3. Return unit for repair if the error persists.
"Err 3" "Err 5" "Err 12"	Overload	<ol style="list-style-type: none"> 1. Clear by pressing any key. 2. Check for proper tube loading and pump operation. 3. Return unit for repair if the error persists.
"Err 7"	Bad data. Operator parameters set to default values.	<ol style="list-style-type: none"> 1. Clear by pressing any key. 2. Reprogram operator parameters. 3. Return unit for repair if the error persists.
"Err 10" "Err 11"	Voltage out of range	<ol style="list-style-type: none"> 1. Clear by pressing any key. 2. Check that AC line voltage is within specified voltage ranges. 3. Return unit for repair if AC line voltage is correct and the error persists.
"Err 13" "Err 14"	Over temperature	<ol style="list-style-type: none"> 1. Check for heat sources or obstructions to cooling. 2. Check for proper tube loading and pump operation. 3. Allow unit to cool. Clear by pressing any key. 4. Return unit for repair if no cause for overheating is found and the error persists.
All other errors	Internal error or failure.	<ol style="list-style-type: none"> 1. Clear (if possible) by turning power off and on. 2. Return unit for repair if the error persists.

Cleaning

Keep the drive enclosure clean with mild detergents. Do not immerse.

Replacement Parts and Accessories

Description	Part Number
Fuse—T6.3A	77500-24
Hand-held remote control	07592-83
Remote control cable, 25 ft (7.62 m)	77300-32
Caster Kit	77420-01
Replacement Seal	77420-03

SPECIFICATIONS

Output:

Speed:	1 to 650 r/min
Torque output, Maximum:	
Continuous	580 oz-in (41.8 kg•cm)
Start-up	1750 oz-in (126 kg•cm)
Speed regulation:	
Line	±0.25% F.S.
Load	±0.25% F.S.
Drift	±0.25% F.S.
Display:	Six-digit, seven-segment LED
Remote outputs:	Voltage speed output (0–10V DC @ 1 k Ω min) Current speed output (0–20 mA or 4–20 mA @ 0–600 Ω) Tach output (TTL, 10 to 6500 Hz, 50% duty cycle 10 Hz/rpm) Motor running output (N.O. & N.C. contact closure, 1A @ 28V AC/DC)

Input:

Supply voltage limits:	Dual voltage—Automatically selected 90 to 130 Vrms @ 50/60 Hz, or 200 to 260 Vrms @ 50/60 Hz
Current, max.:	4.5A @ 115 Vrms, or 2.5A @ 230 Vrms
Remote Inputs:	START/STOP, CW/CCW, PRIME (Contact closure) Voltage input (0–10V DC @ 10 k Ω) Current input (0–20 mA or 4–20 mA @ 250 Ω)

Construction:

Dimensions (L × W × H):	18 3/8 in × 11 in × 17 in (467 × 279 × 432 mm)
Weight:	70 lb (31.7 kg)
Enclosure Rating:	IP 55 per IEC 529

Environment:

Temperature, Operating:	0° to 40°C (32° to 104°F)
Temperature, Storage:	–25° to 65°C (–13° to 149°F)
Humidity (non-condensing):	10% to 100%
Altitude:	Less than 2000 m
Pollution Degree:	Pollution Degree 3 (Indoor use—sheltered locations)

Chemical Resistance: Enclosure is 316 stainless steel

Compliance:

UL508C, CSA C22.2, No. 14
(For CE Mark):
EN61010-1 (EU Low Voltage Directive) and
EN61326 (EU EMC Directive)

WARRANTY

Use only MASTERFLEX precision tubing with MASTERFLEX pumps to ensure optimum performance. Use of other tubing may void applicable warranties.

The Manufacturer warrants this product to be free from significant deviations from published specifications. If repair or adjustment is necessary within the warranty period, the problem will be corrected at no charge if it is not due to misuse or abuse on your part, as determined by the Manufacturer. Repair costs outside the warranty period, or those resulting from product misuse or abuse, may be invoiced to you.

The warranty period for this product is noted on the Warranty Card.

PRODUCT RETURN

To limit charges and delays, contact the seller or Manufacturer for authorization and shipping instructions before returning the product, either within or outside of the warranty period. When returning the product, please state the reason for the return. For your protection, pack the product carefully and insure it against possible damage or loss. Any damages resulting from improper packaging are your responsibility.

TECHNICAL ASSISTANCE

If you have any questions about the use of this product, contact the Manufacturer or authorized seller.

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