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VARIABLE SPEED

MASTERFLEX

PUMP DRIVES

Cole Parmer Instrument Co.
7425 N. Oak Park Avenue
Chicago, Illinois 60648
(312)-647-0272

A-1299-4
EDITION 4675

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DESCRIPTION

Masterflex variable speed drives are available in several configurations; the drive and controller alone or packaged in kits containing an assortment of pump heads. Several gear ratios are offered, and the systems can be purchased for use on either 115V AC or 230V AC, 50-60 HZ. All of the systems use the same type of solid state speed control circuit, with some differences between the 115V and 230V units.

The drives connect directly to the pump heads. The Masterflex pumps are carefully engineered peristaltic pumps that accept a continuous length of tubing for contamination free pumping. The liquid only contacts the tubing and not the other pump parts. The pump can be used for gases, liquids, and vacuum applications. They are completely self-priming. A highly efficient three roller rotor assembly is used within a uniquely designed, polycarbonate housing. As many as ten pumps can be operated with one drive, depending on the type of tubing and speeds desired.

OPERATION

Operation of the variable speed drive is simple: select and install the desired pump head and tubing, connect the drive to the controller, and connect the controller line cord to a grounded, three wire AC receptacle. Adjust the speed control knob to the desired speed. If necessary, use the reversing switch to change the direction of the pump's rotation (stop the pump before changing the direction).

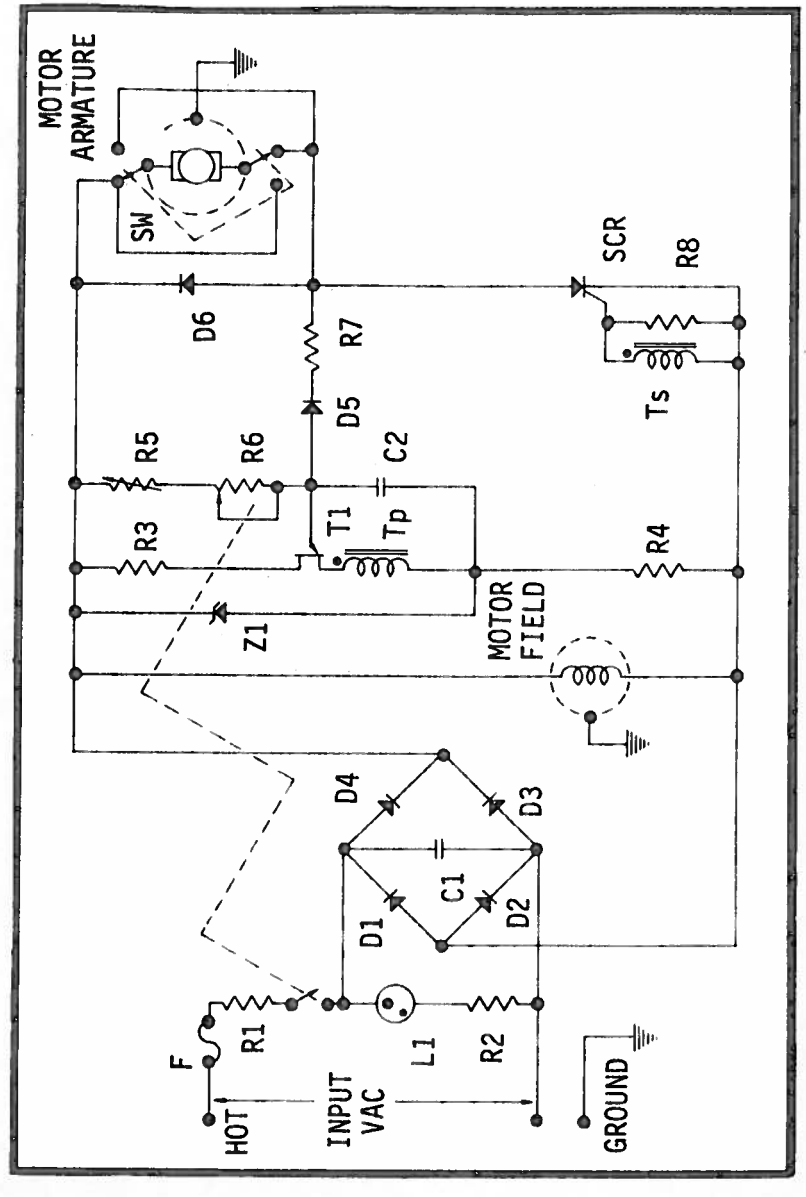
A few cautionary notes must be added. The speed control knob graduations are for reference only;

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they are not calibrated. Some drives will not start to rotate until the knob is at position '4'. This is caused by component tolerances and is a normal condition. Speeds slower than the stated minimum speed can be obtained but they are not recommended. The motor would operate at a higher temperature, and the speed regulation circuit would allow greater fluctuations in the speed and hence the pump flow. Care should be taken, when using the rotation reversing switch, to make sure that the pump is brought to a full stop before reversing rotation. Failure to bring the pump to a full stop may cause an overload condition that will result in blowing the controller fuse and perhaps other electronic components. Do not replace the fuse with one of a higher rating. That would increase the possibility of component failure.

MULTIPLE HEAD USAGE

The variable speed drives and pump heads have been designed so that the drives can operate several heads, at once; the number dependent on the drive and type of tubing used. A list is provided with the drives and the recommended maximum number of pump heads that each can operate. This assumes that standard Tygon, Silicone, or Viton tubing is used. 'Food Grade' Tygon tubing requires approximately twice the torque as the standard Tygon, and this reduces the capacity of the drives by fifty percent. Hence, 7545-10 drives, using Food Grade Tygon should be limited to five heads. Standard heads attach directly to the drive, while Add-On heads attach only to other heads, either Standard or Add-On. Use a Standard head as the first channel and Add-On heads for additional channels in multiple channel applications.



VARIABLE SPEED MASTERFLEX SCHEMATIC

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CONTROLLER PARTS LIST NO. 1

230 V AC 50-60 HZ (7546, 7546-10)

SYMBOL	PART NO.	ITEM
F	B-1115-8	0.75 A-SLO-BLOW FUSE
R1	B-1113-52	2 OHM 10W
R2	B-1113-43	56K
R3	B-1113-108	680 OHM
R4	B-1113-111	8K , 8 W
R5	B-1117-10	4.7 K TRIM
R6	B-1117-2	25K SPEED CONTROL
R7	B-1113-110	82 K, 5%
R8	B-1113-2	47 OHM
L1	A-1067	NEON LAMP
D1 to D4	B-1119-7	2.5 A, 1000V DIODE
D5 , D6	B-1119-2	1.0A, 1000V DIODE
C1	B-1114-29	0.1 MFD. 400V
C2	B-1114-19	0.47 MFD 250V
Z1	B-1126-7	12V, 1W, ZENER
T1	B-1118-2	UNIJUNCTION 2N1671
TP TS	A-1103	PULSE TRANSFORMER
SCR	B-1120-6	SCR 2A, 600V

CONTROLLER PARTS LIST NO. 2

115V AC 50-60 HZ (7545, 7545-10)

SYMBOL	PART NO.	ITEM
F	B-1115-3	1.5 A SLO-BLOW FUSE
R1	B-1113-64	4 OHM 10W
R2		0 OHM
R4	B-1113-109	4K , 5W
R7	B-1113-105	43K, 5%
C1	B-1114-13	0.1 MFD, 250V
SCR	B-1120-3	SCR 2A, 200V

The other components are the same as in 7546 all resistors 10%, ½W unless otherwise noted

PUMP SYSTEMS

CATALOG NUMBER	DESCRIPTION	SPEED RANGE RPM	MAXIMUM NUMBER OF PUMPS
7545	115V-AC-MOTOR & CONTROLLER	30 to 600	2
7545-10	115V-AC-MOTOR & CONTROLLER	5 to 100	10
7546	230V-AC-MOTOR & CONTROLLER	30 to 600	2
7546-10	230V-AC-MOTOR & CONTROLLER	5 to 100	10
7550-45	KIT: 7545 & 4 PUMP HEADS	30 to 600	2
7550-46	KIT: 7546 & 4 PUMP HEADS	30 to 600	2
7550-85	KIT: 7545 & 8 PUMP HEADS	30 to 600	2
7550-86	KIT: 7546 & 8 PUMP HEADS	30 to 600	2

All systems operate on 50 or 60 HZ

ML* PER REVOLUTION

7013	0.06	7015	1.67
7014	0.21	7017	2.80
7016	0.80	7018	3.80

*approximate flow

PUMP ROTOR REPLACEMENT

Each rotor assembly has three cylindrical rollers held between two circular discs. These rollers compress the tubing and force the liquid along the tubing as the rotor assembly rotates. The 7015 pump has a rotor which is different from the rotors in the other pump heads. The rollers of the 7015 rotor are flush with the outer edge of the circular discs. The rollers of the other pump heads extend approximately 1/16"beyond the outer edge of the discs. If the wrong rotor is used in any of the pump heads, improper tubing occlusion will occur.

MASTERFLEX PUMP HEAD MOUNTING HARDWARE (Plated Steel)

For 7013 to 7018 Series Pumps

Part No.	Description
B-1238-3	For 1 channel
B-1238-8	For 2 channels
B-1238-6	For 3 channels
B-1238-7	For 4 channels
B-1238-16-CR	For 5 channels
B-1238-17-CR	For 6 channels
B-1238-18-CR	For 7 channels
B-1238-19-CR	For 8 channels
B-1238-20-CR	For 9 channels
B-1238-21-CR	For 10 channels

MASTERFLEX PUMP HEAD MOUNTING HARDWARE (Stainless Steel)

B-1238-9	For 1 channel
B-1238-10	For 2 channels

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MASTERFLEX PUMP REPLACEMENT PARTS

(Metal parts are plated steel)

STANDARD PUMP HEAD	ADD-ON PUMP HEAD	PLASTIC PUMP HEAD SECTION	ROTOR ASSEMBLY
7013		A-1106-2	B-1061-1
	7013-20	A-1106-2	B-1289-1
7014		A-1106-3	B-1061-1
	7014-20	A-1106-3	B-1289-1
7016		A-1106-5	B-1061-1
	7016-20	A-1106-5	B-1289-1
7015		A-1106-1	B-1061
	7015-20	A-1106-1	B-1289-2
7017		A-1106-4	B-1061-1
	7017-20	A-1106-4	B-1289-1
7018		A-1106-6	B-1061-1
	7018-20	A-1106-6	B-1289-1

All rotor assemblies use teflon thrust washers, A-1184.

MASTERFLEX PUMP REPLACEMENT PARTS

(Metal parts are Stainless Steel)

STANDARD PUMP HEAD	ADD-ON PUMP HEAD	PLASTIC PUMP HEAD SECTION	ROTOR ASSEMBLY
7013-10		A-1400-1	B-1290-1
	7013-21	A-1400-1	B-1291-1
7014-10		A-1400-2	B-1290-1
	7014-21	A-1400-2	B-1291-1
7016-10		A-1400-5	B-1290-1
	7016-21	A-1400-5	B-1291-1
7015-10		A-1400-3	B-1290-2
	7015-21	A-1400-3	B-1291-2
7017-10		A-1400-4	B-1290-1
	7017-21	A-1400-4	B-1291-1
7018-10		A-1400-6	B-1290-1
	7018-21	A-1400-6	B-1291-1

All rotor assemblies use teflon thrust washers, A-1184.

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MOTOR REPAIR PARTS

ITEM	PART NO.	DRIVE
MOTOR BRUSHES (set of 2)	A-1138-CR	7545, 7545-10 7546, 7546-10
BRUSH CAP	A-1791-CR	ALL DRIVES NOTED ABOVE
GEAR CASE GASKET	B-1467	ALL DRIVES NOTED ABOVE
ARMATURE	A-1793-CR* A-1808-CR**	7545
ARMATURE	A-1808-CR	7545-10
ARMATURE	A-1792-CR* A-1809-CR**	7546
ARMATURE	A-1809-CR	7546-10
OUTPUT GEAR ASSEMBLY	7545-06	7545, 7546
OUTPUT GEAR ASSEMBLY	B-1125	7545-10, 7546-10
COMPOUND GEAR	B-1127	7545-10, 7546-10

NOTE:

* VERSION A (OVERALL LENGTH=6.453")
** VERSION B (OVERALL LENGTH=6.143")

MAINTENANCE

The speed control circuit has solid state components which do not require servicing. A tubing rupture may result in a motor overload which could cause some electrical parts to fail.

The rear motor bearing should be given two drops of #20 non detergent oil every three months. Do not over-oil. Exact motor brush and communator life will depend on the speed and the number of pump heads. Brushes should be inspected and replaced when less than 0.300" long. The communator should be periodically inspected and cleaned if necessary. If preventive maintenance is not performed, excessive communator wear or 'bridging' between communator segments will cause excessive current through the controller circuit.

WARRANTY

The Cole-Parmer Instrument Company warrants the product to be free from defects in material and workmanship for a period of six months. If repair or adjustment is necessary and has not been the result of abuse or misuse within the six month period, please return, freight prepaid, and correction of the defect will be made without charge (see note on return of items.)

For your protection, items being returned must be carefully packed to prevent damage in shipment and insured against possible damage or loss. Cole-Parmer will not be responsible for damage resulting from careless or insufficient packing.

Out of warranty products will be repaired for a nominal charge.

RETURN OF ITEMS

Authorization must be obtained from our Customer Service Department before returning items for any reason. When applying for authorization, please include data regarding the reason the items are to be returned. A 15% restocking charge will be made on all unauthorized returns.

NOTE

Technical information and advice on the use of the product in specific applications may be obtained. Modifications can be made to adapt the unit to special customer applications. Contact the Engineering Department for information.

The Cole-Parmer Instrument Company reserves the right to make improvements in design, construction and appearance of our products without notice.

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