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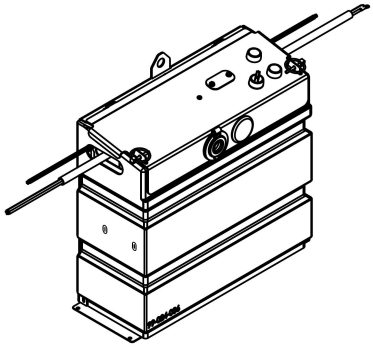
MPU-AC GEN2 AC-Powered Modular Power Unit
Instruction Manual



Receiving instructions:

After delivery, remove the packaging from the product. Inspect the product closely to determine whether it sustained damage during transport. If damage is discovered, record a complete description of it on the bill of lading. If the product is undamaged, discard the packaging.

NOTE:

The end-user is solely responsible for confirming that product design, use, and maintenance comply with laws, regulations, codes, and mandatory standards applied where the product is used.

Replacement Parts and Technical Assistance:

For answers to questions not addressed in these instructions and to order replacement parts, labels, and accessories, call our Technical Service and Parts Department at (260) 665-7586. The department can also be contacted online at http://www.vestilmfg.com/parts_info.htm.

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SIGNAL WORDS

This manual uses SIGNAL WORDS to identify hazards that could occur while using this product. DANGER, WARNING, and CAUTION draw attention to hazards likely to cause personal injuries. Each signal word implies a specific level of injury. NOTICE is used to indicate hazards likely to result in property damage. The following are definitions for each word:

DANGER	Identifies a hazardous situation which, if not avoided, WILL result in DEATH or SERIOUS INJURY. Use of this signal word is limited to the most extreme situations.
WARNING	Identifies a hazardous situation which, if not avoided, COULD result in DEATH or SERIOUS INJURY.
CAUTION	Indicates a hazardous situation which, if not avoided, COULD result in MINOR or MODERATE injury.
NOTICE	Identifies practices likely to result in product/property damage, such as operation that might damage the product.

Hazards of Improper Use:

We strive to identify all hazards that could occur while using our products, but no manual can address every risk. The most effective means for avoiding injury is to exercise sound judgment whenever using this device. Read the entire manual carefully before installing, using, or servicing the product. Vestil recommends that you contact its Technical Service Department (the "TSD") if you have any questions about instructions in the manual. You should also contact the TSD if you believe that a necessary instruction is missing or inaccurate.

WARNING Improper or careless operation might result in serious personal injuries.

- ***Read and understand the entire manual before using or servicing the power unit*.** Read the manual to refresh your understanding of proper use and maintenance procedures whenever necessary.
- All wiring to electrical power supplies must conform to the national electrical code (NEC) as adopted in your location (where the product is used). Having all necessary wiring installed only by licensed electricians is strongly recommended.
- Only authorized, qualified personnel should perform service on the electrical system.
- DO NOT service this power unit unless the product it provides power to (e.g. cart, table, lift, etc.) is unloaded. Read the "Inspections & Maintenance" section of your product owner's manual. Put the product into the recommended maintenance configuration. If repairs are necessary, ONLY install manufacturer-approved replacement parts.
- DO NOT use the power unit unless it is in normal condition (see "Inspections & Maintenance" on p. 20).
- Watch the cylinder while extending and retracting the piston. It should move smoothly. Watch for binding or jerky movement and listen for unusual noises. Tag the unit "Out of order" and do not use it if you observe anything abnormal.
- DO NOT continue to press the UP button if the piston is fully extended.
- DO NOT use the power unit UNLESS all labels are in place and readable (see "Labeling diagram" on p. 20).
- DO NOT modify this power unit in any way. Modifications automatically void the limited warranty and might make the unit unsafe to use.

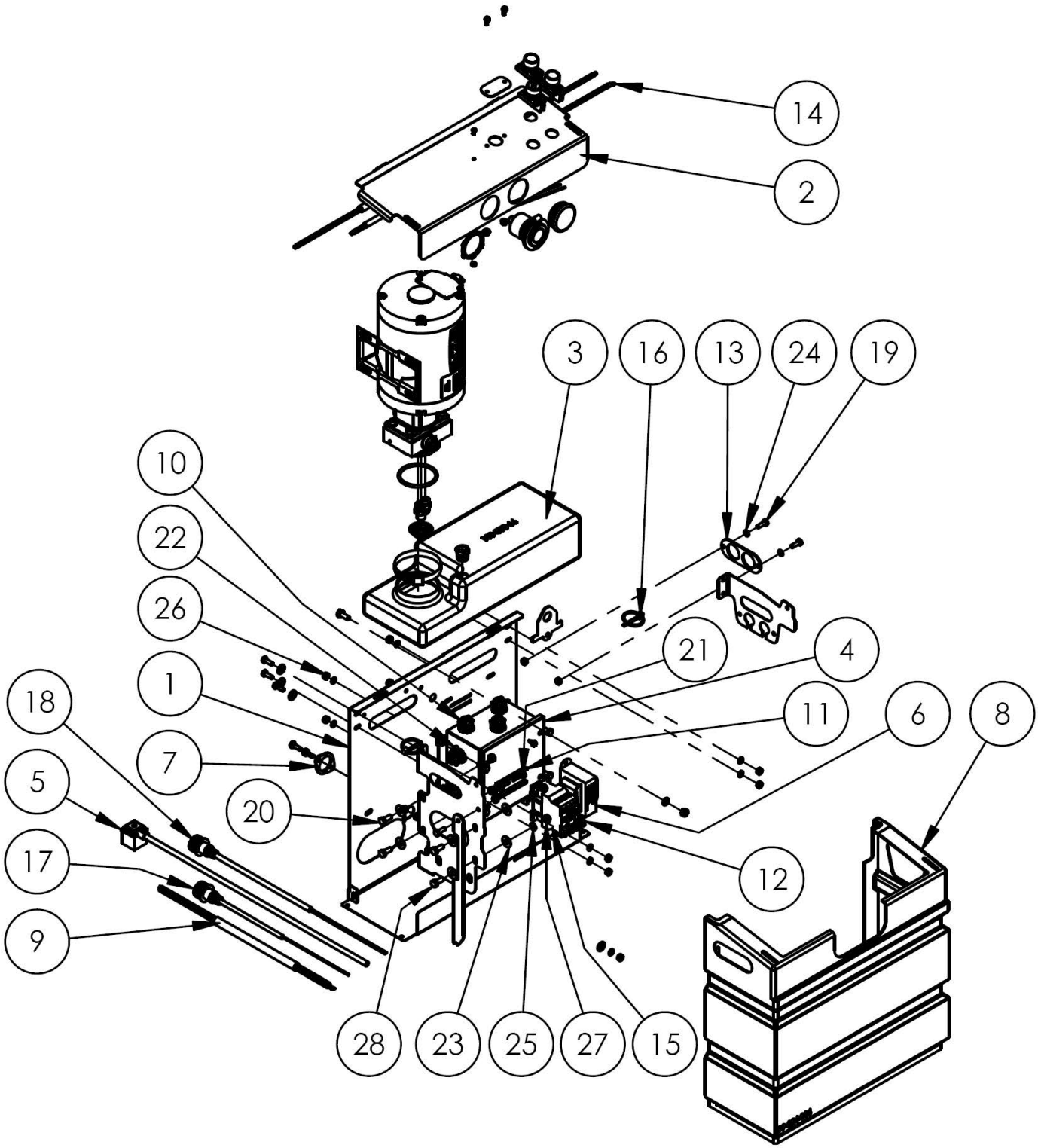
NOTICE Proper use and maintenance are essential for this product to function properly.

- Periodically lubricate moving parts.
- Keep the product clean & dry. Only use and store the product indoors.
- Only use approved replacement parts. To order replacement or spare parts for this equipment, contact the factory.

NOTES:

NOTES:

POWER UNIT ASSEMBLY: 115V AC OR 208-230V AC
99-660-(073-096)-MANUALS SINGLE PHASE, 0.75HP, 1725RPM OR 2HP, 3450RPM MOTOR,
DASHBOARD *WITH 2 PUSHBUTTONS*
USER SELECTED PUMP DISPLACEMENT AND FLOW CONTROL
L-H-L HYDRAULIC CIRCUIT

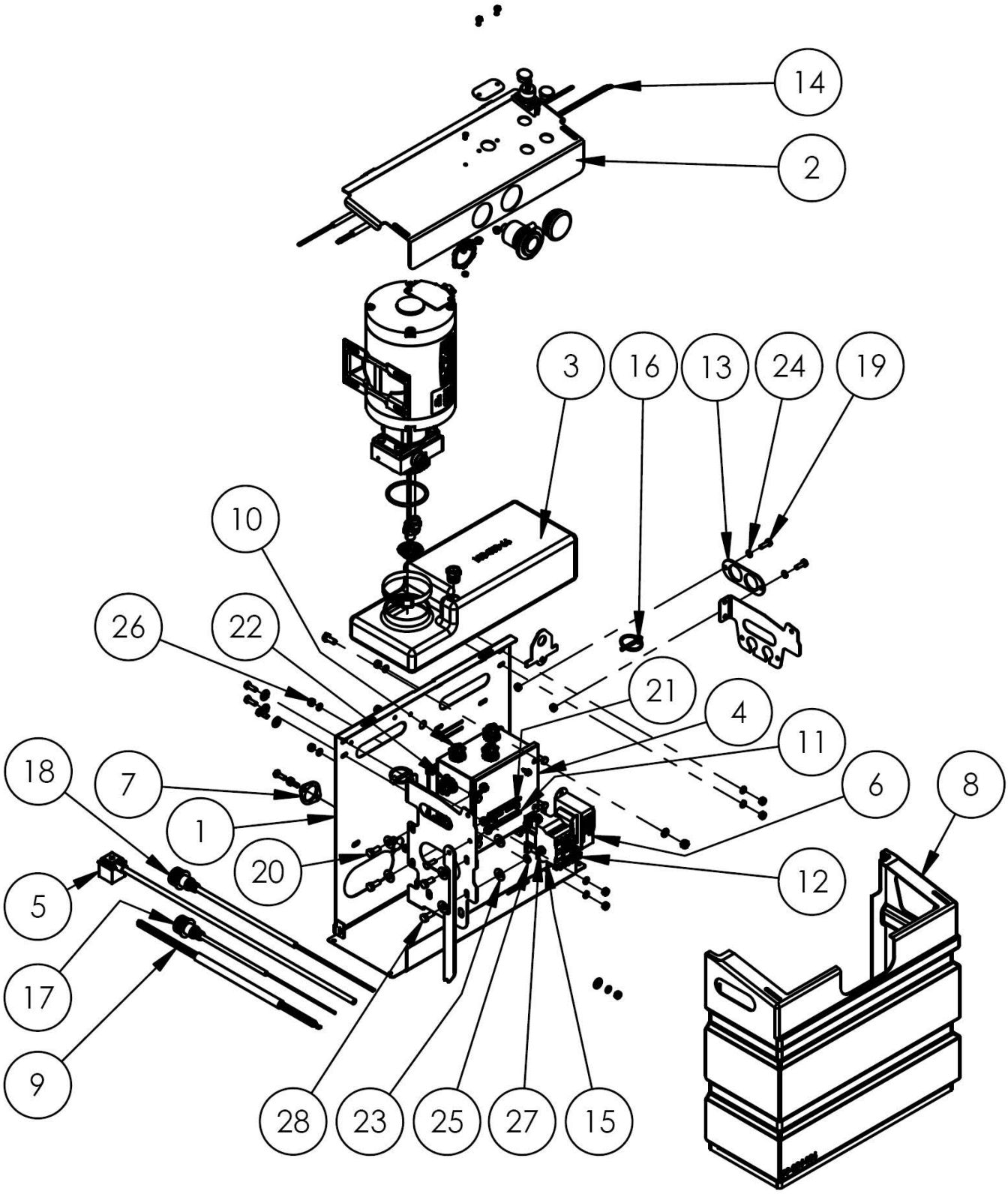


2-PUSHBUTTONS POWER UNIT ASSEMBLY BILL OF MATERIALS
SINGLE PHASE; 115V OR 208-230V AC; 0.75HP, 1725RPM OR 2HP, 3450RPM MOTOR
USER SELECTED PUMP DISPLACEMENT AND FLOW CONTROL

Item	Part no.	Description	Qty.
1	99-514-021	FRAME, MPU GEN2	1
2	99-160-173 99-160-218	2-PUSHBUTTON DASHBOARD: 115V AC, 1-PH 230V AC, 1-PH	1
3		**POWER UNIT SUBASSEMBLY: 115V OR 208-230AC, 1-PHASE, *0.75HP, 1725RPM MOTOR*; L-H-L CIRCUIT; 1.5 GAL. HORIZONTAL TANK & FITTINGS; PLUS 1 OF THE FOLLOWING PUMP + FLOW CONTROL COMBINATIONS (SEE "POWER UNIT SUBASSEMBLY" ON P. 13)**	
		0.060 DISPLACEMENT PUMP:	
	99-160-176	0.5GPM FLOW CONTROL	1
	99-160-177	1.0GPM FLOW CONTROL	1
	99-160-178	1.5GPM FLOW CONTROL	1
	99-160-179	2.0GPM FLOW CONTROL	1
		0.073 DISPLACEMENT PUMP:	
	99-160-180	0.5GPM FLOW CONTROL	1
	99-160-181	1.0GPM FLOW CONTROL	1
	99-160-182	1.5GPM FLOW CONTROL	1
	99-160-183	2.0GPM FLOW CONTROL	1
		0.122 DISPLACEMENT PUMP:	
	99-160-184	1.0GPM FLOW CONTROL	1
	99-160-185	1.5GPM FLOW CONTROL	1
	99-160-186	2.0GPM FLOW CONTROL	1
		0.153 DISPLACEMENT PUMP:	
	99-160-187	0.5GPM FLOW CONTROL	1
	99-160-188	1.0GPM FLOW CONTROL	1
	99-160-189	1.5GPM FLOW CONTROL	1
	99-160-190	2.0GPM FLOW CONTROL	1
4	01-029-006	CONTROL BOX, 6"x6"x4"	1
5	01-033-011	CONNECTOR, COIL, COMMON	1
6	01-129-001	TRANSFORMER, CONTROL, 24V, 40VA	1
7	99-016-076	BRACKET, CLAMP PLATE, BACK CONNECTION	1
8	99-024-036	COVER, POWER UNIT, DC, GEN. II	1
9	99-033-070	CORD, STRAIGHT, 14/4 & 18/2, 18" BLUNT CUT BOTH ENDS	1
10	99-034-037	ACCESSORIES, ELECTRICAL, ROMEX, 0.375"	5
11	99-034-042	RAIN, DIN, ALUMINUM	1
12	99-034-074	ACCESSORIES, ELECTRICAL, TERMINAL BLOCK	1
13	99-034-084	ELECTRICAL CORD, CLAMP PLATE	1
14	99-034-147	RING TERMINAL, BLUE, #8, 14-16GA. WIRE	3

Item	Part no.	Description	Qty.
15	99-128-005	CONTACTOR, MOTOR, 3-POLE, 24V AC	1
16	99-145-142	LOCKING PIN WITH RING, $^{3}/_{16}$"DIA. X $1^{1}/_{4}$" EFFECTIVE LENGTH	2
3		**POWER UNIT SUBASSEMBLY: 115V OR 208-230AC, 1-PHASE, *2HP, 3450RPM MOTOR*; L-H-L CIRCUIT; 1.5 GAL. HORIZONTAL TANK & FITTINGS; PLUS 1 OF THE FOLLOWING PUMP + FLOW CONTROL COMBINATIONS (SEE "POWER UNIT SUBASSEMBLY" ON P. 13)**	
		0.060 DISPLACEMENT PUMP:	
	99-160-191	0.5GPM FLOW CONTROL	1
	99-160-192	2.0GPM FLOW CONTROL	1
		0.073 DISLACEMENT PUMP:	
	99-160-193	0.5GPM FLOW CONTROL	1
	99-160-194	1.0GPM FLOW CONTROL	1
	99-160-195	1.5GPM FLOW CONTROL	1
	99-160-196	2.0GPM FLOW CONTROL	1
		0.122 DISPLACEMENT PUMP:	
	99-160-197	1.0GPM FLOW CONTROL	1
	99-160-198	2.0GPM FLOW CONTROL	1
		0.153 DISPLACEMENT PUMP:	
	99-160-199	1.5GPM FLOW CONTROL	1
17	99-533-064	ASSEMBLY, VESTIL MOD., CORD, STRAIGHT, 18/5, 15" MOLDED FEMALE RECEPTACLE, 5-PIN	1
18	99-533-066	ASSEMBLY, VESTIL MOD., CORD, STRAIGHT, 18/2, 30" MOLDED FEMALE RECEPTACLE, 2-PIN	1
19	11003	HEX BOLT, GR. A, Z-PLATED, $^{1}/_{4}$"-20X$^{3}/_{4}$"	8
20	11053	BOLT, HHCS, #2, Z-PLATED, $^{5}/_{16}$"-18X$^{3}/_{4}$"	4
21	31802	SELF-TAPPING SCREW, #8-18X$^{1}/_{2}$"	4
22	33004	FLAT WASHER, USS, Z-PLATED, $^{1}/_{4}$"	4
23	33006	FLAT WASHER, Z-PLATED, USS, $^{1}/_{4}$"	8
24	33618	MEDIUM SPLIT LOCK WASHER, $^{1}/_{4}$"	8
25	33620	MEDIUM SPLIT LOCK WASHER, $^{5}/_{16}$"	4
26	36102	HEX NUT, GR. A, Z-PLATED, $^{1}/_{4}$"-20	8
27	36104	HEX NUT GR. A, Z-PLATED, $^{5}/_{16}$"-18	4
28	H-9X450	TIE STRAP, BLACK	1

POWER UNIT ASSEMBLY: 115V AC OR 208-230V AC
99-660-(114-137)-MANUALS SINGLE PHASE, 0.75HP, 1725RPM OR 2HP, 3450RPM MOTOR
DASHBOARD *WITHOUT PUSHBUTTONS*
USER SELECTED PUMP DISPLACEMENT AND FLOW CONTROL
L-H-L HYDRAULIC CIRCUIT

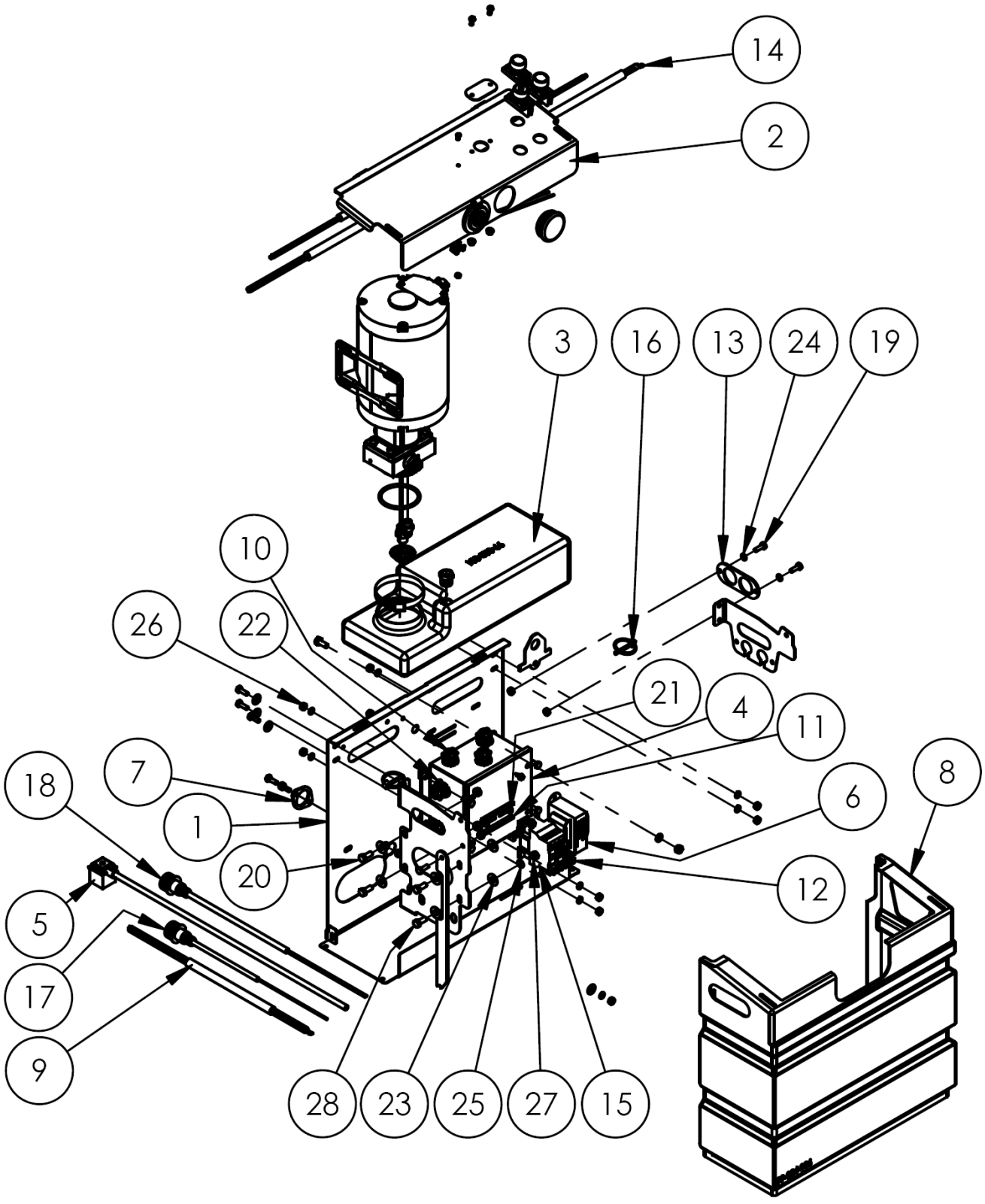


0-PUSHBUTTONS POWER UNIT ASSEMBLY BILL OF MATERIALS
SINGLE PHASE; 115V AC OR 208-230V AC; 0.75HP, 1725RPM OR 2HP, 3450RPM MOTOR; USER SELECTED PUMP DISPLACMENT AND FLOW CONTROL

Item	Part no.	Description	Qty.
1	99-514-021	FRAME, MPU GEN2	1
2	99-160-174 99-160-219	0-PUSHBUTTON DASHBOARD: 115V AC, 1-PH 230V AC, 1-PH	1
3		**POWER UNIT SUBASSEMBLY: 115V OR 208-230AC, 1-PHASE, *0.75HP, 1725RPM MOTOR*; L-H-L CIRCUIT; 1.5 GAL. HORIZONTAL TANK & FITTINGS; PLUS 1 OF THE FOLLOWING PUMP + FLOW CONTROL COMBINATIONS (SEE "POWER UNIT SUBASSEMBLY" ON P. 13)**	
	99-160-176 99-160-177 99-160-178 99-160-179	0.060 DISPLACEMENT PUMP: 0.5GPM FLOW CONTROL 1.0GPM FLOW CONTROL 1.5GPM FLOW CONTROL 2.0GPM FLOW CONTROL	1 1 1 1
	99-160-180 99-160-181 99-160-182 99-160-183	0.073 DISPLACEMENT PUMP: 0.5GPM FLOW CONTROL 1.0GPM FLOW CONTROL 1.5GPM FLOW CONTROL 2.0GPM FLOW CONTROL	1 1 1 1
	99-160-184 99-160-185 99-160-186	0.122 DISPLACEMENT PUMP: 1.0GPM FLOW CONTROL 1.5GPM FLOW CONTROL 2.0GPM FLOW CONTROL	1 1 1
	99-160-187 99-160-188 99-160-189 99-160-190	0.153 DISPLACEMENT PUMP: 0.5GPM FLOW CONTROL 1.0GPM FLOW CONTROL 1.5GPM FLOW CONTROL 2.0GPM FLOW CONTROL	1 1 1 1
4	01-029-006	CONTROL BOX, 6"x6"x4"	1
5	01-033-011	CONNECTOR, COIL, COMMON	1
6	01-129-001	TRANSFORMER, CONTROL, 24V, 40VA	1
7	99-016-076	BRACKET, CLAMP PLATE, BACK CONNECTION	1
8	99-024-036	COVER, POWER UNIT, DC, GEN. II	1
9	99-033-070	CORD, STRAIGHT, 14/4 & 18/2, 18" BLUNT CUT BOTH ENDS	1
10	99-034-037	ACCESSORIES, ELECTRICAL, ROMEX, 0.375"	5
11	99-034-042	RAIN, DIN, ALUMINUM	1
12	99-034-074	ACCESSORIES, ELECTRICAL, TERMINAL BLOCK	1
13	99-034-084	ELECTRICAL CORD, CLAMP PLATE	1
14	99-034-147	RING TERMINAL, BLUE, #8, 14-16GA. WIRE	3

Item	Part no.	Description	Qty.
15	99-128-005	CONTACTOR, MOTOR, 3-POLE, 24V AC	1
16	99-145-142	LOCKING PIN WITH RING, $^{3}/_{16}$"DIA. X $1^{1}/_{4}$" EFFECTIVE LENGTH	2
3		**POWER UNIT SUBASSEMBLY: 115V OR 208-230AC, 1-PHASE, *2HP, 3450RPM MOTOR*; L-H-L CIRCUIT; 1.5 GAL. HORIZONTAL TANK & FITTINGS; PLUS 1 OF THE FOLLOWING PUMP + FLOW CONTROL COMBINATIONS (SEE "POWER UNIT SUBASSEMBLY" ON P. 13)**	
	99-160-191 99-160-192	0.060 DISPLACEMENT PUMP: 0.5GPM FLOW CONTROL 2.0GPM FLOW CONTROL	1 1
	99-160-193 99-160-194 99-160-195 99-160-196	0.073 DISLACEMENT PUMP: 0.5GPM FLOW CONTROL 1.0GPM FLOW CONTROL 1.5GPM FLOW CONTROL 2.0GPM FLOW CONTROL	1 1 1 1
	99-160-197 99-160-198	0.122 DISPLACEMENT PUMP: 1.0GPM FLOW CONTROL 2.0GPM FLOW CONTROL	1 1
	99-160-199	0.153 DISPLACEMENT PUMP: 1.5GPM FLOW CONTROL	1
17	99-533-064	ASSEMBLY, VESTIL MOD., CORD, STRAIGHT, 18/5, 15" MOLDED FEMALE RECEPTACLE, 5-PIN	1
18	99-533-066	ASSEMBLY, VESTIL MOD., CORD, STRAIGHT, 18/2, 30" MOLDED FEMALE RECEPTACLE, 2-PIN	1
19	11003	HEX BOLT, GR. A, Z-PLATED, $^{1}/_{4}$"-20X$^{3}/_{4}$"	8
20	11053	BOLT, HHCS, #2, Z-PLATED, $^{5}/_{16}$"-18X$^{3}/_{4}$"	4
21	31802	SELF-TAPPING SCREW, #8-18X$^{1}/_{2}$"	4
22	33004	FLAT WASHER, USS, Z-PLATED, $^{1}/_{4}$"	4
23	33006	FLAT WASHER, Z-PLATED, USS, $^{1}/_{4}$"	8
24	33618	MEDIUM SPLIT LOCK WASHER, $^{1}/_{4}$"	8
25	33620	MEDIUM SPLIT LOCK WASHER, $^{5}/_{16}$"	4
26	36102	HEX NUT, GR. A, Z-PLATED, $^{1}/_{4}$"-20	8
27	36104	HEX NUT GR. A, Z-PLATED, $^{5}/_{16}$"-18	4
28	H-9X450	TIE STRAP, BLACK	1

POWER UNIT ASSEMBLY: 208-230VAC & 460V AC
99-660-(097-104)-MANUALS 3-PHASE, 2HP, 1725RMP MOTOR
DASHBOARD *WITH 2-PUSHBUTTONS*
USER SELECTED PUMP DISPLACEMENT & FLOW CONTROL
L-H-L HYDRAULIC CIRCUIT

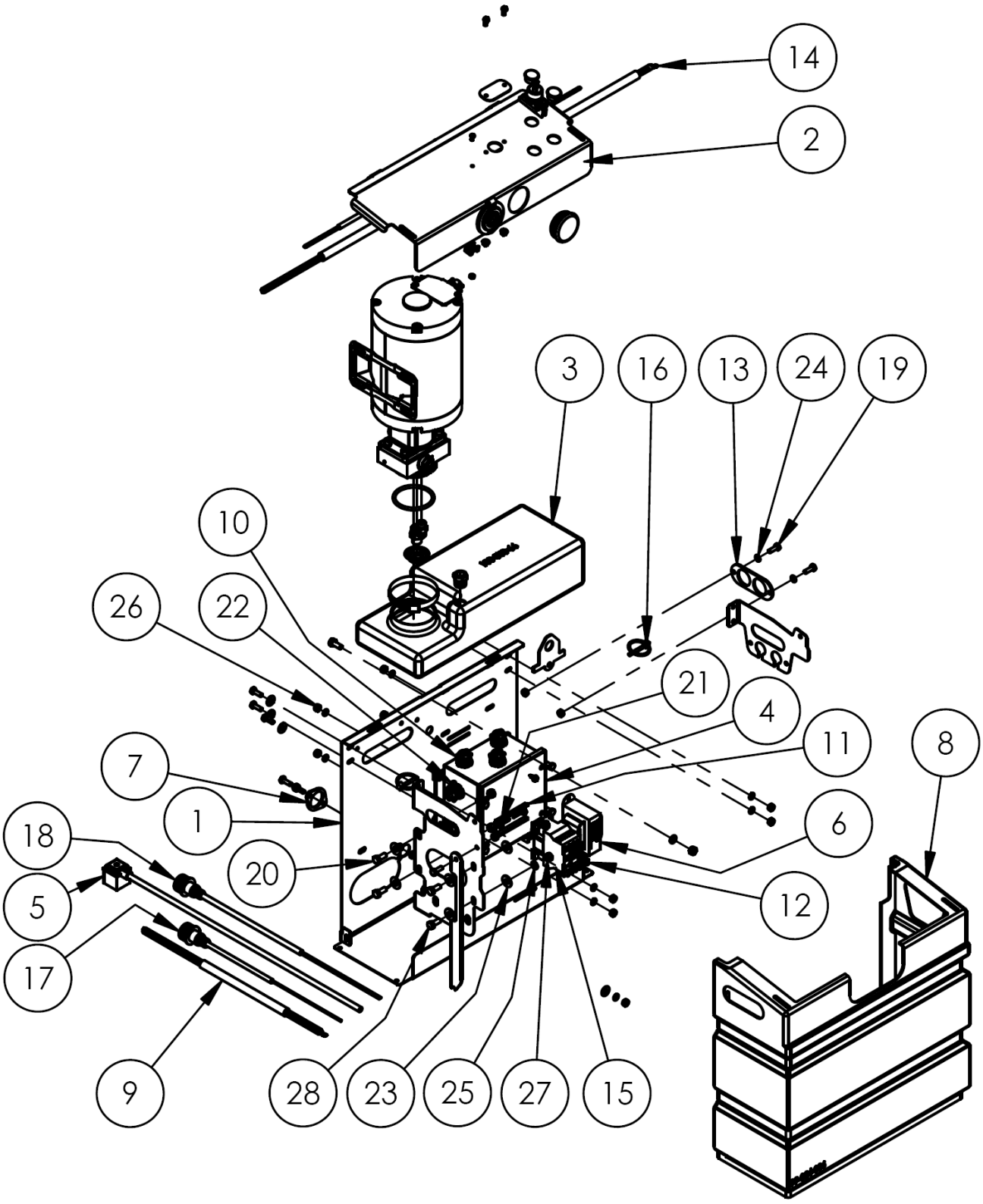


2-PUSHBUTTONS POWER UNIT ASSEMBLY BILL OF MATERIALS
3-PHASE; 208-230V AC & 460V AC; 2HP, 1725RPM OR 3450RPM MOTOR;
USER SELECTED PUMP DISPLACMENT AND FLOW CONTROL

Item	Part no.	Description	Qty.
1	99-514-021	FRAME, MPU GEN2	1
2	99-160-220	2-PUSHBUTTON DASHBOARD	1
3		**POWER UNIT SUBASSEMBLY: 115V OR 208-230AC, 3-PHASE, *0.75HP, 1725RPM MOTOR*; L-H-L CIRCUIT; 1.5 GAL. HORIZONTAL TANK & FITTINGS; PLUS 1 OF THE FOLLOWING PUMP + FLOW CONTROL COMBINATIONS (SEE "POWER UNIT SUBASSEMBLY" ON P. 14)**	
		0.060 DISPLACEMENT PUMP:	
	99-160-200	0.5GPM FLOW CONTROL	1
		0.122 DISPLACEMENT PUMP:	
	99-160-201	1.0GPM FLOW CONTROL	1
	99-160-202	1.5GPM FLOW CONTROL	1
	99-160-203	2.0GPM FLOW CONTROL	1
		0.153 DISPLACEMENT PUMP:	
	99-160-204	0.5GPM FLOW CONTROL	1
	99-160-205	1.0GPM FLOW CONTROL	1
	99-160-206	1.5GPM FLOW CONTROL	1
	99-160-207	2.0GPM FLOW CONTROL	1
4	01-029-006	CONTROL BOX, 6"x6"x4"	1
5	01-033-011	CONNECTOR, COIL, COMMON	1
6	01-129-001	TRANSFORMER, CONTROL, 24V, 40VA	1
7	99-016-076	BRACKET, CLAMP PLATE, BACK CONNECTION	1
8	99-024-036	COVER, MPU, AC, GEN. II	1
9	99-033-070	CORD, STRAIGHT, 14/4 & 18/2, 18" BLUNT CUT BOTH ENDS	1
10	99-034-037	ACCESSORIES, ELECTRICAL, ROMEX, 0.375"	5
11	99-034-042	RAIN, DIN, ALUMINUM	1
12	99-034-074	ACCESSORIES, ELECTRICAL, TERMINAL BLOCK	1
13	99-034-084	ELECTRICAL CORD, CLAMP PLATE	1
14	99-034-147	RING TERMINAL, BLUE, #8, 14-16GA. WIRE	3

Item	Part no.	Description	Qty.
15	99-128-005	CONTACTOR, MOTOR, 3-POLE, 24V AC	1
16	99-145-142	LOCKING PIN WITH RING, $^{3}/_{16}$"DIA. X $1^{1}/_{4}$" EFFECTIVE LENGTH	2
3		**POWER UNIT SUBASSEMBLY: 115V OR 208-230AC, 3-PHASE, *2HP, 3450RPM MOTOR*; L-H-L CIRCUIT; 1.5 GAL. HORIZONTAL TANK & FITTINGS; PLUS 1 OF THE FOLLOWING PUMP + FLOW CONTROL COMBINATIONS (SEE "POWER UNIT SUBASSEMBLY" ON P. 14)**	
		0.060 DISPLACEMENT PUMP:	
	99-160-208	0.5GPM FLOW CONTROL	1
		0.073 DISLACEMENT PUMP:	
	99-160-209	0.5GPM FLOW CONTROL	1
	99-160-210	1.0GPM FLOW CONTROL	1
	99-160-211	1.5GPM FLOW CONTROL	1
	99-160-212	2.0GPM FLOW CONTROL	1
		0.122 DISPLACEMENT PUMP:	
	99-160-213	1.0GPM FLOW CONTROL	1
	99-160-214	2.0GPM FLOW CONTROL	1
		0.153 DISPLACEMENT PUMP:	
	99-160-215	1.5GPM FLOW CONTROL	1
	99-160-216	2.0GPM FLOW CONTROL	1
17	99-533-064	ASSEMBLY, VESTIL MOD., CORD, STRAIGHT, 18/5, 15" MOLDED FEMALE RECEPTACLE, 5-PIN	1
18	99-533-066	ASSEMBLY, VESTIL MOD., CORD, STRAIGHT, 18/2, 30" MOLDED FEMALE RECEPTACLE, 2-PIN	1
19	11003	HEX BOLT, GR. A, Z-PLATED, $^{1}/_{4}$"-20X$^{3}/_{4}$"	8
20	11053	BOLT, HHCS, #2, Z-PLATED, $^{5}/_{16}$"-18X$^{3}/_{4}$"	4
21	31802	SELF-TAPPING SCREW, #8-18X$^{1}/_{2}$"	4
22	33004	FLAT WASHER, USS, Z-PLATED, $^{1}/_{4}$"	4
23	33006	FLAT WASHER, Z-PLATED, USS, $^{1}/_{4}$"	8
24	33618	MEDIUM SPLIT LOCK WASHER, $^{1}/_{4}$"	8
25	33620	MEDIUM SPLIT LOCK WASHER, $^{5}/_{16}$"	4
26	36102	HEX NUT, GR. A, Z-PLATED, $^{1}/_{4}$"-20	8
27	36104	HEX NUT GR. A, Z-PLATED, $^{5}/_{16}$"-18	4
28	H-9X450	TIE STRAP, BLACK	1

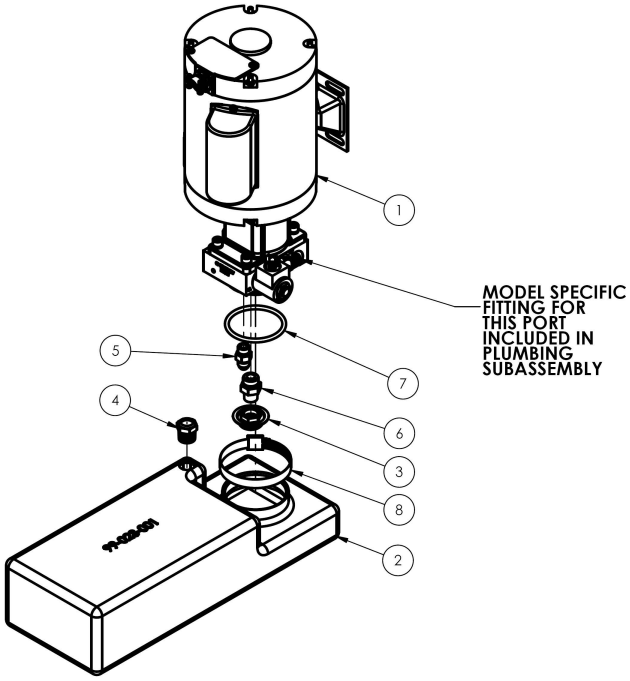
POWER UNIT ASSEMBLY: 208-230VAC & 460V AC
99-660-(138-154)-MANUALS 3-PHASE, 2HP, 1725RMP OR 3450RPM MOTOR
DASHBOARD *WITHOUT PUSHBUTTONS*
USER SELECTED PUMP DISPLACEMENT FLOW CONTROL
L-H-L HYDRAULIC CIRCUIT



0-PUSHBUTTONS POWER UNIT ASSEMBLY BILL OF MATERIALS
3-PHASE; 208-230V AC & 460V AC; 3HP, 1725RPM OR 3450RPM MOTOR; USER SELECTED PUMP DISPLACEMENT AND FLOW CONTROL

Item	Part no.	Description	Qty.
1	99-514-021	FRAME, MPU GEN2	1
2	99-160-221	0-PUSHBUTTON DASHBOARD	1
3		**POWER UNIT SUBASSEMBLY: 115V OR 208-230AC, 3-PHASE, *2HP, 1725RPM MOTOR*; L-H-L CIRCUIT; 1.5 GAL. HORIZONTAL TANK & FITTINGS; PLUS 1 OF THE FOLLOWING PUMP + FLOW CONTROL COMBINATIONS (SEE "POWER UNIT SUBASSEMBLY" ON P. 14)**	
		0.060 DISPLACEMENT PUMP:	
	99-160-200	0.5GPM FLOW CONTROL	1
		0.122 DISPLACEMENT PUMP:	
	99-160-201	1.0GPM FLOW CONTROL	1
	99-160-202	1.5GPM FLOW CONTROL	1
	99-160-203	2.0GPM FLOW CONTROL	1
		0.153 DISPLACEMENT PUMP:	
	99-160-204	0.5GPM FLOW CONTROL	1
	99-160-205	1.0GPM FLOW CONTROL	1
	99-160-206	1.5GPM FLOW CONTROL	1
	99-160-207	2.0GPM FLOW CONTROL	1
4	01-029-006	CONTROL BOX, 6"x6"x4"	1
5	01-033-011	CONNECTOR, COIL, COMMON	1
6	01-129-001	TRANSFORMER, CONTROL, 24V, 40VA	1
7	99-016-076	BRACKET, CLAMP PLATE, BACK CONNECTION	1
8	99-024-036	COVER, MPU, DC, GEN. II	1
9	99-033-070	CORD, STRAIGHT, 14/4 & 18/2, 18" BLUNT CUT BOTH ENDS	1
10	99-034-037	ACCESSORIES, ELECTRICAL, ROMEX, 0.375"	5
11	99-034-042	RAIN, DIN, ALUMINUM	1
12	99-034-074	ACCESSORIES, ELECTRICAL, TERMINAL BLOCK	1
13	99-034-084	ELECTRICAL CORD, CLAMP PLATE	1
14	99-034-147	RING TERMINAL, BLUE, #8, 14-16GA. WIRE	3
15	99-128-005	CONTACTOR, MOTOR, 3-POLE, 24V AC	1
16	99-145-142	LOCKING PIN WITH RING, $^{3}/_{16}$"DIA. X $1^{1}/_{4}$" EFFECTIVE LENGTH	2
3		**POWER UNIT SUBASSEMBLY: 115V OR 208-230AC, 3-PHASE, *2HP, 3450RPM MOTOR*; L-H-L CIRCUIT; 1.5 GAL. HORIZONTAL TANK & FITTINGS; PLUS 1 OF THE FOLLOWING PUMP + FLOW CONTROL COMBINATIONS (SEE "POWER UNIT SUBASSEMBLY" ON P. 14)**	
		0.060 DISPLACEMENT PUMP:	
	99-160-208	0.5GPM FLOW CONTROL	1
		0.073 DISLACEMENT PUMP:	
	99-160-209	0.5GPM FLOW CONTROL	1
	99-160-210	1.0GPM FLOW CONTROL	1
	99-160-211	1.5GPM FLOW CONTROL	1
	99-160-212	2.0GPM FLOW CONTROL	1
		0.122 DISPLACEMENT PUMP:	
	99-160-213	1.0GPM FLOW CONTROL	1
	99-160-214	2.0GPM FLOW CONTROL	1
		0.153 DISPLACEMENT PUMP:	
	99-160-215	1.5GPM FLOW CONTROL	1
	99-160-216	2.0GPM FLOW CONTROL	1
17	99-533-064	ASSEMBLY, VESTIL MOD., CORD, STRAIGHT, 18/5, 15" MOLDED FEMALE RECEPTACLE, 5-PIN	1
18	99-533-066	ASSEMBLY, VESTIL MOD., CORD, STRAIGHT, 18/2, 30" MOLDED FEMALE RECEPTACLE, 2-PIN	1
19	11003	HEX BOLT, GR. A, Z-PLATED, $^{1}/_{4}$"-20X$^{3}/_{4}$"	8
20	11053	BOLT, HHCS, #2, Z-PLATED, $^{5}/_{16}$"-18X$^{3}/_{4}$"	4
21	31802	SELF-TAPPING SCREW, #8-18X$^{1}/_{2}$"	4
22	33004	FLAT WASHER, USS, Z-PLATED, $^{1}/_{4}$"	4
23	33006	FLAT WASHER, Z-PLATED, USS, $^{1}/_{4}$"	8
24	33618	MEDIUM SPLIT LOCK WASHER, $^{1}/_{4}$"	8
25	33620	MEDIUM SPLIT LOCK WASHER, $^{5}/_{16}$"	4
26	36102	HEX NUT, GR. A, Z-PLATED, $^{1}/_{4}$"-20	8
27	36104	HEX NUT GR. A, Z-PLATED, $^{5}/_{16}$"-18	4
28	H-9X450	TIE STRAP, BLACK	1

POWER UNIT SUBASSEMBLY: 115V AC or 208-230V AC, 1-PHASE, 0.75HP OR 2HP MOTOR
ITEM 3 ON P. 6 & P. 8 USER-SELECTED PUMP DISPLACEMENT AND FLOW CONTROL
99-160-(176-199)-MANUALS L-H-L HYDRAULIC CIRCUIT
1.5 GALLON HORIZONTAL TANK

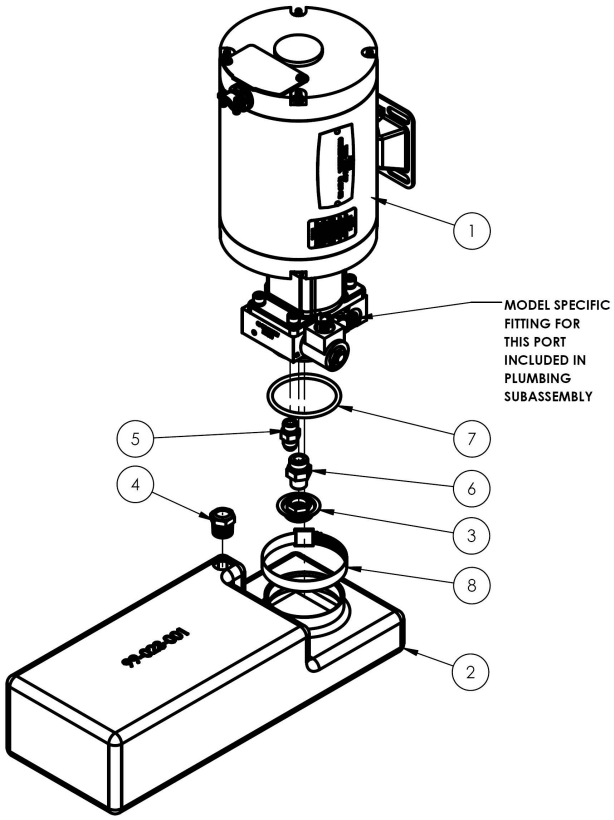


NOTE: ITEM 1 CONSISTS OF 2 SUBASSEMBLIES:
- MOTOR + PUMP (DETAIL VIEWS A-D ON **P. 15** & **16**)
- MANIFOLD (DETAIL VIEW E ON **P. 17**)

Item	Part no.	Description	Qty.
1		**MOTOR-PUMP-MANIFOLD SUBASSEMBLY: 115V & 208-230V AC, 1-PHASE, *0.75HP, 1725RPM MOTOR*, L-H-L, 1.5 GAL. HORIZONTAL TANK & FITTINGS, PLUS 1 OF THE FOLLOWING PUMP + FLOW CONTROL COMBINATIONS (SEE DETAIL A ON P. 15 & DETAIL E ON P. 17)**	
		0.060 DISPLACEMENT PUMP:	
	99-160-044	0.5GPM FLOW CONTROL	1
	99-160-045	1.0GPM FLOW CONTROL	1
	99-160-046	1.5GPM FLOW CONTROL	1
	99-160-047	2.0GPM FLOW CONTROL	1
		0.073 DISPLACEMENT PUMP:	
	99-160-048	0.5GPM FLOW CONTROL	1
	99-160-049	1.0GPM FLOW CONTROL	1
	99-160-050	1.5GPM FLOW CONTROL	1
	99-160-051	2.0GPM FLOW CONTROL	1
		0.122 DISPLACEMENT PUMP:	
	99-160-052	1.0GPM FLOW CONTROL	1
	99-160-053	1.5GPM FLOW CONTROL	1
	99-160-054	2.0GPM FLOW CONTROL	1
		0.153 DISPLACEMENT PUMP:	
	99-160-055	0.5GPM FLOW CONTROL	1
	99-160-056	1.0GPM FLOW CONTROL	1
	99-160-057	1.5GPM FLOW CONTROL	1
	99-160-058	2.0GPM FLOW CONTROL	1
2	99-023-001	RESERVOIR, HYDRAULIC, 1.5GAL., HORIZONTAL	
3	99-031-029	SCREEN, INLET, 1.75" DIA.	
4	01-116-003	BREATHER, $^1/_2$" NPT	
5	99-116-030	FITTING, HYDRAULIC, 06MJ-06MORB, STRAIGHT	

Item	Part no.	Description	Qty.
1		**MOTOR-PUMP-MANIFOLD SUBASSEMBLY: 115V & 208-230V AC, 1-PHASE, *2HP, 3450RPM MOTOR*, L-H-L, 1.5 GAL. HORIZONTAL TANK & FITTINGS, PLUS 1 OF THE FOLLOWING PUMP + FLOW CONTROL COMBINATIONS (SEE DETAIL B ON P. 15 & DETAIL E ON P. 17)**	
		0.060 DISPLACEMENT PUMP:	
	99-160-059	0.5GPM FLOW CONTROL	1
	99-160-060	2.0GPM FLOW CONTROL	1
		0.073 DISPLACEMENT PUMP:	
	99-160-061	0.5GPM FLOW CONTROL	1
	99-160-062	1.0GPM FLOW CONTROL	1
	99-160-063	1.5GPM FLOW CONTROL	1
	99-160-064	2.0GPM FLOW CONTROL	1
		0.122 DISPLACEMENT PUMP:	
	99-160-065	1.0GPM FLOW CONTROL	1
	99-160-066	2.0GPM FLOW CONTROL	1
		0.153 DISPLACEMENT PUMP:	
	99-160-067	1.5GPM FLOW CONTROL	1
6	99-116-150	FITTING, HYDRAULIC, 08MORB-06MP, STRAIGHT	
7	99-144-007	O-RING, MANIFOLD, 3" O.D.	
8	99-145-061	CLAMP, WORM GEAR HOSE, $2^{13}/_{16}$" – $3^3/_4$"	

POWER UNIT SUBASSEMBLY: 208-230V or 460V AC, 3-PHASE, 2HP MOTOR
ITEM 3 ON P. 10 & P. 12 USER-SELECTED PUMP DISPLACEMENT AND FLOW CONTROL
99-160-(200-216)-MANUALS L-H-L HYDRAULIC CIRCUIT
1.5 GALLON HORIZONTAL TANK



NOTE: ITEM 1 CONSISTS OF 2 SUBASSEMBLIES:
- MOTOR + PUMP (DETAIL VIEWS A-D ON **P. 15** & **16**)
- MANIFOLD (DETAIL VIEW E ON **P. 17**).

Item	Part no.	Description	Qty.
1		**POWER UNIT SUBASSEMBLY: 208-230V or 460V AC, 3-PHASE, 2HP, *1725RPM* MOTOR, L-H-L, 1.5 GAL. HORIZONTAL TANK & FITTINGS, PLUS 1 OF THE FOLLOWING PUMP + FLOW CONTROL COMBINATIONS.** **SEE DETAIL VIEW C ON P. 16.**	
		0.060 DISPLACEMENT PUMP:	
	99-160-068	0.5GPM FLOW CONTROL	1
		0.122 DISPLACEMENT PUMP:	
	99-160-069	1.0GPM FLOW CONTROL	1
	99-160-070	1.5GPM FLOW CONTROL	1
	99-160-071	2.0GPM FLOW CONTROL	1
		0.153 DISPLACEMENT PUMP:	
	99-160-072	0.5GPM FLOW CONTROL	1
	99-160-073	1.0GPM FLOW CONTROL	1
	99-160-074	1.5GPM FLOW CONTROL	1
	99-160-075	2.0GPM FLOW CONTROL	1
2	99-023-001	RESERVOIR, HYDRAULIC, 1.5 GAL, HORIZONTAL TANK	1
3	99-031-029	ACCESSORIES, HYDRAULIC	1
4	01-116-003	BREATHER, $^1/_2$" NPT	1
5	99-116-030	FITTING, HYDRAULIC, 06MJ-06MORB STRAIGHT	1

Item	Part no.	Description	Qty.
1		**POWER UNIT SUBASSEMBLY: 208-230V or 460V AC, 3-PHASE, 2HP, *3450RPM* MOTOR, L-H-L, 1.5 GAL. HORIZONTAL TANK & FITTINGS, PLUS 1 OF THE FOLLOWING PUMP + FLOW CONTROL COMBINATIONS.** **SEE DETAIL VIEW D ON P. 16.**	
		0.060 DISPLACEMENT PUMP:	
	99-160-076	0.5GPM FLOW CONTROL	1
		0.073 DISPLACEMENT PUMP:	
	99-160-077	0.5GPM FLOW CONTROL	1
	99-160-078	1.0GPM FLOW CONTROL	1
	99-160-079	1.5GPM FLOW CONTROL	1
	99-160-080	2.0GPM FLOW CONTROL	1
		0.122 DISPLACEMENT PUMP:	
	99-160-081	1.0GPM FLOW CONTROL	1
	99-160-082	2.0GPM FLOW CONTROL	1
		0.153 DISPLACEMENT PUMP:	
	99-160-083	1.5GPM FLOW CONTROL	1
	99-160-084	2.0GPM FLOW CONTROL	1
6	99-116-150	FITTING, HYDRAULIC, 08MORB-06MP STRAIGHT	1
7	99-144-007	O-RING, MANIFOLD, 3" OD	1
8	99-145-061	CLAMP, $2^{13}/_{16}$" – $3^3/_4$"	1

DETAIL VIEW A: SINGLE PHASE, 115V OR 208-230V, 0.75HP, 1725RPM MOTOR + PUMP SUBASSEMBLY COMBINES WITH MANIFOLD SUBASSEMBLY (DETAIL VIEW E ON P. 17)

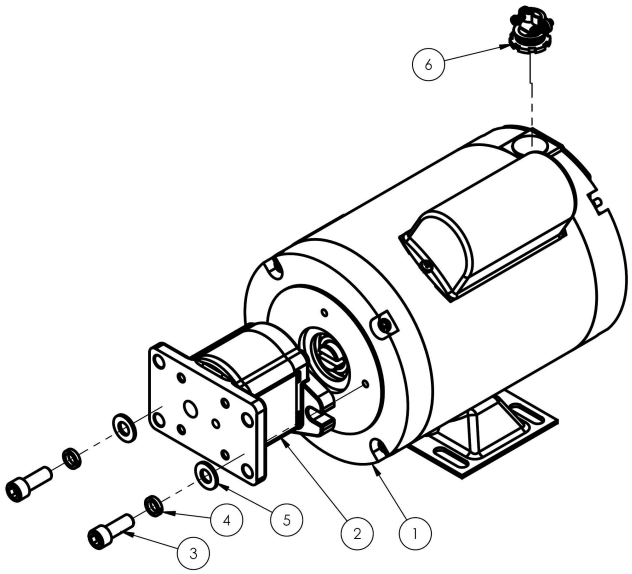


*Diagram from 99-137-(007-010)-(001 & 002)
Suffix -001 = 115V AC
Suffix -002 = 208-230V AC

Item	Part no.	Description	Qty.
1	99-135-003	MOTOR, AC, 0.75HP, 1PH, 1725RPM, 56F, 115V OR 208-230V, 60HZ, 2.0SF	1
2	01-143-905-002 01-143-906-002 01-143-907-002 01-143-908-002	PUMP, HYDRAULIC GEAR, TANG SHAFT, MANIFOLD MOUNT 0.06DISP. 1.0CC/R 0.073DISP. 1.3CC/R 0.122DISP., 2.0CC/R 0.153DISP., 2.7CC/R	 1 1 1 1
3	23305	BOLT, SHCS, UTILITY GRADE, 3/8" – 16 X 1"	2
4	33688	LOCK WASHER, HIGH COLLAR, 3/8"	2
5	96056	WASHER, FLAT, 3/8" NOMINAL, 0.406"I.D., YELLOW ZINC SAE	2
6	99-034-037	ACCESSORIES, ELECTRICAL, ROMEX 0.375"	1

DETAIL VIEW B: SINGLE PHASE, 115V OR 208-230V, 2.0HP, 3450RPM MOTOR + PUMP SUBASSEMBLY COMBINES WITH MANIFOLD SUBASSEMBLY (DETAIL VIEW E ON P. 17)

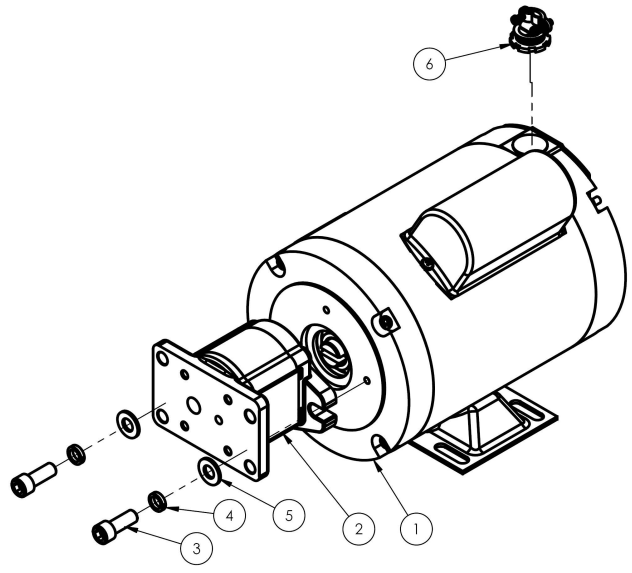


*Diagram from 99-137-(011-014)-(001 & 002)
Suffix -001 = 115V AC
Suffix -002 = 208-230V AC

Item	Part no.	Description	Qty.
1	99-135-004	MOTOR, AC, 2.0HP, 1PH, 3450RPM, 56F, 115V OR 208-230V, 60HZ, 2.0SF	1
2	01-143-905-002 01-143-906-002 01-143-907-002 01-143-908-002	PUMP, HYDRAULIC GEAR, TANG SHAFT, MANIFOLD MOUNT 0.06DISP. 1.0CC/R 0.073DISP. 1.3CC/R 0.122DISP., 2.0CC/R 0.153DISP., 2.7CC/R	1
3	23305	BOLT, SHCS, UTILITY GRADE, 3/8" – 16 X 1"	2
4	33688	LOCK WASHER, HIGH COLLAR, 3/8"	2
5	96056	WASHER, FLAT, 3/8" NOMINAL, 0.406"I.D., YELLOW ZINC SAE	2
6	99-034-037	ACCESSORIES, ELECTRICAL, ROMEX 0.375"	1

DETAIL VIEW C: 3-PHASE, 208-230V OR 460V AC, 1725RPM MOTOR + PUMP SUBASSEMBLY PAIRS WITH MANIFOLD SUBASSEMBLY (DETAIL VIEW E ON P. 17)

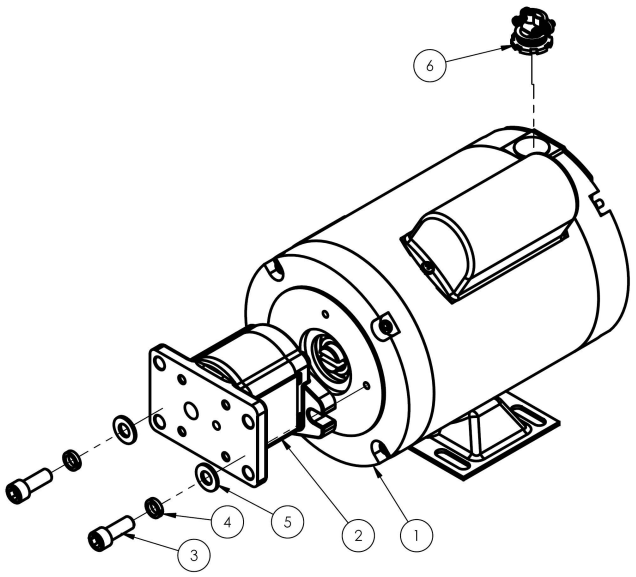


*Diagram from 99-137-(015-018)-(003-& 004)
Suffix -003 = 208-230V AC
Suffix -004 = 460V AC

Item	Part no.	Description	Qty.
1	99-135-005	MOTOR, AC, 2.0HP, 1PH, 1725RPM, 56F, 115V OR 208-230V, 60HZ, 2.0SF	1
2	01-143-905-002 01-143-906-002 01-143-907-002 01-143-908-002	PUMP, HYDRAULIC GEAR, TANG SHAFT, MANIFOLD MOUNT 0.06DISP. 1.0CC/R 0.073DISP. 1.3CC/R 0.122DISP., 2.0CC/R 0.153DISP., 2.7CC/R	1
3	23305	BOLT, SHCS, UTILITY GRADE, 3/8" – 16 X 1"	2
4	33688	LOCK WASHER, HIGH COLLAR, 3/8"	2
5	96056	WASHER, FLAT, 3/8" NOMINAL, 0.406"I.D., YELLOW ZINC SAE	2
6	99-034-037	ACCESSORIES, ELECTRICAL, ROMEX 0.375"	1

DETAIL VIEW D: 3-PHASE, 208-230V OR 460V AC, 3450RPM MOTOR + PUMP SUBASSEMBLY PAIRS WITH MANIFOLD SUBASSEMBLY (DETAIL VIEW E ON P. 17)

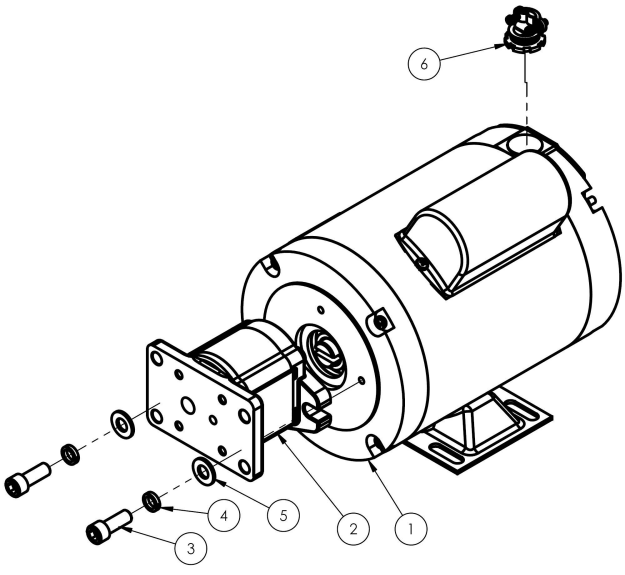
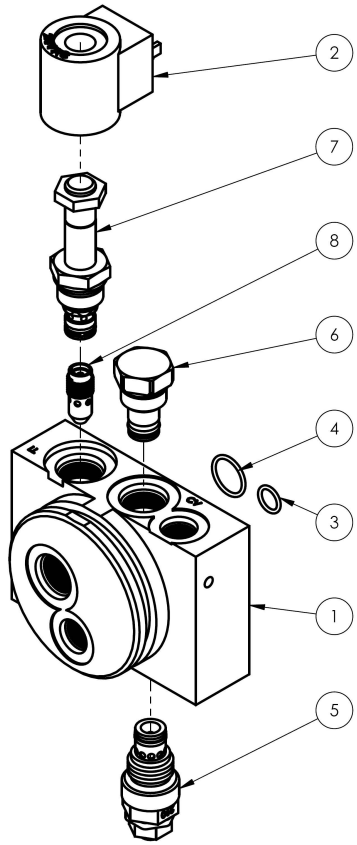


*Diagram from 99-137-(019-022)-(003-& 004)
Suffix -003 = 208-230V AC
Suffix -004 = 460V AC

Item	Part no.	Description	Qty.
1	99-135-005	MOTOR, AC, 2.0HP, 1PH, 1725RPM, 56F, 115V OR 208-230V, 60HZ, 2.0SF	1
2	01-143-905-002 01-143-906-002 01-143-907-002 01-143-908-002	PUMP, HYDRAULIC GEAR, TANG SHAFT, MANIFOLD MOUNT 0.06DISP. 1.0CC/R 0.073DISP. 1.3CC/R 0.122DISP., 2.0CC/R 0.153DISP., 2.7CC/R	1
3	23305	BOLT, SHCS, UTILITY GRADE, 3/8" – 16 X 1"	2
4	33688	LOCK WASHER, HIGH COLLAR, 3/8"	2
5	96056	WASHER, FLAT, 3/8" NOMINAL, 0.406"I.D., YELLOW ZINC SAE	2
6	99-034-037	ACCESSORIES, ELECTRICAL, ROMEX 0.375"	1

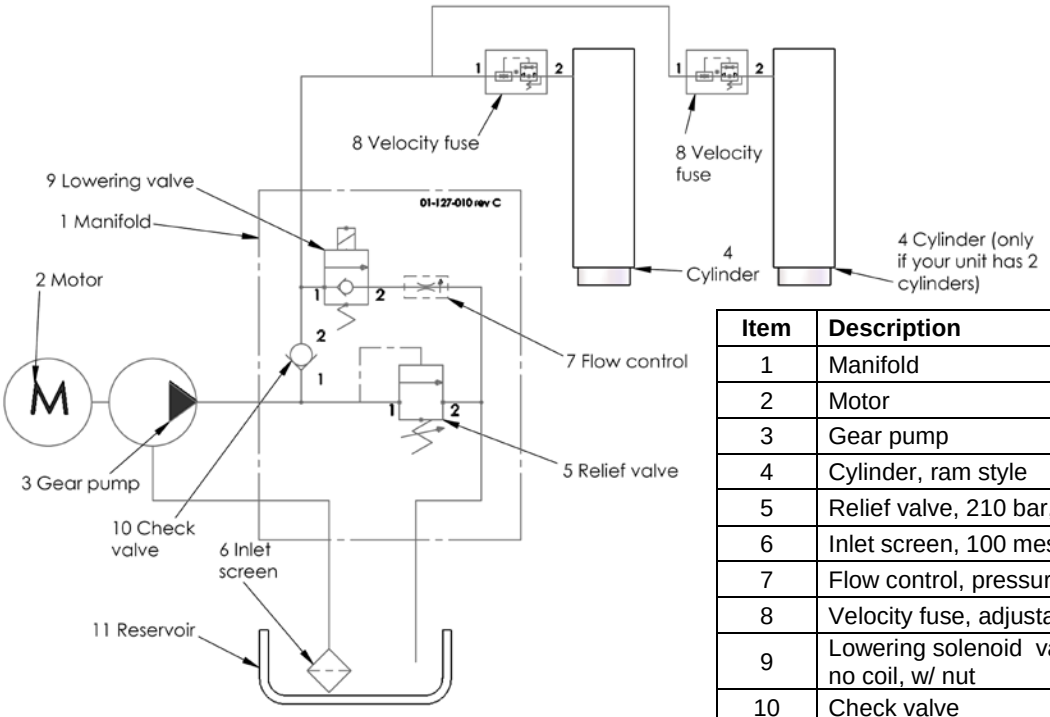
DETAIL VIEW E: MANIFOLD SUBASSEMBLY COMBINES WITH PARTICULAR MOTOR + PUMP SUBASSEMBLY (DETAIL VIEWS A-D)



Item	Part no.	Description	Qty.
1	01-127-010	MANIFOLD, L-H-L	1
2	99-034-008	ACCESSORIES, COIL WITH DIN CONNECTOR	1
3	99-144-008	O-RING, MANIFOLD, 1/2" OD	1
4	99-144-009	O-RING, MANIFOLD, 3/4" OD	1
5	99-153-006	VALVE, PRESSURE RELIEF, 210 BAR	1
6	99-153-011	CHECK VALVE, SIZE 08, NOSE-INSIDE-OUT	1
7	99-153-058	VALVE, SOLENOID, ZERO LEAK, WITH NUT	1
8		FLOW CONTROL, PRESSURE COMPENSATED:	
	99-153-049	0.5GPM	1
	99-153-038	1.0GPM	1
	99-153-039	1.5GPM	1
	99-153-040	2.0GPM	1

*Diagram from 01-627-(012-015)
Suffix -012 = 0.5gpm flow control
Suffix -013 = 1.0gpm flow control
Suffix -014 = 1.5gpm flow control
Suffix -015 = 2.0gpm flow control

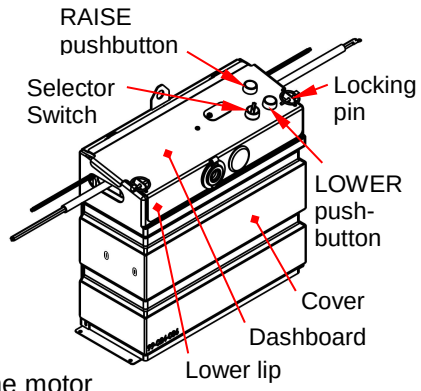
Hydraulic Circuit Diagram:



Item	Description	Qty.
1	Manifold	1
2	Motor	1
3	Gear pump	1
4	Cylinder, ram style	2
5	Relief valve, 210 bar, size 08	1
6	Inlet screen, 100 mesh 2" pancake	1
7	Flow control, pressure compensated	1
8	Velocity fuse, adjustable, brass	2
9	Lowering solenoid valve, cartridge, NC, no coil, w/ nut	1
10	Check valve	1
11	Reservoir	1

Power Unit Operation:

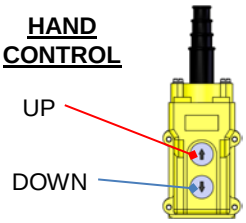
MPU ASSEMBLY



This modular power unit provides electric-hydraulic power to extend and retract the piston of one or more cylinders. Piston motion is utilized in various ways, such as raising and lowering a tabletop, rotating a drum or garbage chute, and moving a carriage (e.g. forks or platform). Piston motion is driven by a gear-type pump directly coupled to an electric motor. Many components of the hydraulic system are housed inside a manifold which is bolted to the gear pump. All components are rated for 3,000psi working pressure.

1. Selector switch: ***for the hand control and dashboard pushbuttons to operate, the selector switch must be turned to the ON position***.
2. Hand control: connects to the power unit via a pigtail cord. The control has 2 buttons: UP and DOWN. The UP button causes the piston to extend. The DOWN button allows the piston to retract.
   - Extending the piston: Pressing the UP button activates the electric motor. The motor turns the pump. As the pump rotates, oil is drawn from the reservoir, passes through the suction filter, and enters the pump. The pump pushes oil through the check valve and to the cylinder. As the cylinder fills with oil, the piston extends.
     - Releasing the button turns off the motor. The piston maintains its position until a control button is pressed.
     - Limit switches (if included in the electrical circuit of your product) also shut off the motor. See "Electric Circuit Diagram[s]" in the product owner's manual.

HAND CONTROL



   - Retracting the piston: Pressing the DOWN button activates the lowering solenoid valve. When the valve opens, oil can bypass the check valve and flow to the reservoir (through return hoses). Oil flow to the reservoir is regulated by the pressure compensated flow control valve. Regulating the volume of oil that can flow through the spool, the piston retraction speed is kept constant.
     - Releasing the button closes the lowering solenoid valve. The piston maintains its position until a control button is pressed.
     - Limit switches, if included in the electrical circuit of your product, also shut off the motor. (See Electric Circuit Diagram(s) in your owner's manual).
3. Dashboard pushbuttons (2-Pushbuttons models only): the buttons are labeled "RAISE" and "LOWER". Pressing the RAISE button causes the piston to extend. Pressing the LOWER button retracts the piston.
4. Electric motor: the motor (AC powered, i.e. plugs into a wall socket) is activated whenever the user presses a button (up or down) on the hand control.
   - AC-powered motors can be wired for either single-phase or three-phase operation. Regardless of phase configuration, every motor is dual-voltage capable.
5. Pump: the pump shaft is directly coupled to the shaft of the electric motor. Several displacements are available to match the horsepower of the motor.
6. Check valve: restricts oil flow to one direction through the circuit by preventing oil backflow through the pump to the reservoir. Without a check valve, oil would return to the reservoir after the motor (and pump) stops. Oil can only flow in response to an electrical signal from the hand control. This allows the piston to maintain any degree of extension.
7. (Pressure) Relief valve: prevents system pressure from exceeding 3000psi. The valve opens a path for oil to follow to the reservoir without traveling to the cylinder if pressure in the system exceeds 3,000psi.
8. Lowering solenoid valve: electrically-operated cartridge valve that activates when the DOWN button is pressed. The valve has an integral screen to prevent contaminants from entering it.
9. Pressure compensated flow control spool: regulates the flow of oil to the reservoir when the lowering valve opens. The spool is located beneath the lowering valve. It allows the piston to retract at a set, constant rate regardless of the load applied (e.g. on the forks, platform, chute, tabletop, etc.). Several sizes are available.
10. Cylinder (not part of the modular power unit): the modular power unit controls movement of one or more displacement style cylinders. As oil fills the cylinder, it pushes the piston out of the cylinder. Each cylinder includes a bleeder valve at the top end. The valve allows air to be removed from the cylinder.
11. Velocity fuse: a safety device installed in the hose port of each cylinder. If a failure occurs that results in a sudden loss of hydraulic pressure (e.g. punctured hose, leaking fitting or coupling), the velocity fuse automatically closes. By closing, the fuse traps oil in the cylinder and prevents the piston from retracting. The piston remains stationary until pressure is reapplied to the system.

    NOTE: Air in the hydraulic system can also cause the velocity fuse to close even though no failure occurred. To reset (open) the fuse, unload the work surface (forks, tabletop, chute, platform, etc.). Press and release the UP button several times. Then, extend and retract the piston completely to purge air from the system.
12. Hydraulic fluid: HO150 hydraulic fluid. To replenish the fluid, add anti-wear hydraulic fluid with a viscosity grade of 150 SUS at 100°F (ISO 32 @ 40°C) like AW-32 or Dexron transmission fluid.

Removing the Cover: [Refer to MPU Assembly diagram at the top of p. 18]

To access the internal components of the power unit, the plastic cover must be removed. First, remove the locking pins to disconnect the dashboard from the metal frame. Open the dashboard by lifting the front lip and rotating it up to a vertical position. Grasp the rear edges of the cover and pull them away from each other. The cover will disengage the frame. Reinstall the cover by reversing these steps.

Cleaning the Lowering Solenoid Valve: [Detail View E, item 7; manifold port RV]

If the piston slowly retracts without pressing the DOWN/LOWER button, then the lowering solenoid valve might not be closing properly. The valve should be removed and cleaned.

- Unload the work surface of your unit (e.g. forks, tabletop, chute, or platform).
- Completely retract the piston.
- Lock out electrical power. Tag the unit “Out of Service”. Turn the selector switch to the OFF position and unplug the electrical cord from the wall socket.
- Remove the cover to access the internal components. Then, remove the nut that fastens the solenoid coil to the valve stem.
- Remove the coil and unscrew the valve from the manifold.
- Inspect the valve for blockage.
- Inspect O-rings and back-up washers for damage such as cuts and tears.
- Submerge the valve in mineral spirits or kerosene.
- Use a thin tool, such as a small screwdriver or a hex wrench, to push the poppet in and out several times from the bottom end of the valve. The valve should move freely, about 1/16” between the closed and open positions. If the poppet sticks, examine the valve stem to determine if it is bent. Replace the valve if the poppet doesn’t move freely after cleaning.
- Remove mineral oil/kerosene from the valve with compressed air.
- Confirm that the poppet freely moves in and out.
- Inspect the bottom of the valve cavity in the manifold for foreign matter.
- With the thin tool, press the middle of the flow control spool, which is located in the bottom of the cavity. It should move up-and-down smoothly.
- Reinstall the valve in the manifold. Tighten it with a torque wrench to 20 lb·ft.

Bleeding Air from Hydraulic System

If the piston retracts very slowly or does not retract at all when the DOWN/LOWER button is pressed, air might be caught in the cylinder. Air can cause the velocity fuse to close. When the velocity fuse is closed, the piston will not retract. To correct this issue, bleed air from the system. A bleeder screw is located at the top of each cylinder. Study the appropriate “Exploded view” in the owner’s manual for your product to locate the bleeder screw. The bleeder screw includes a hose fitting for a small diameter hose. By attaching a hose to the screw, any oil that escapes during the bleeding process can be directed into a container for proper disposal.

- Unload your unit.
- If your product includes a maintenance stop, move it into maintenance position. Push the DOWN/LOWER button until the work surface is entirely supported by the stop.
- Locate the bleeder valve located at the top of the cylinder (it looks like a grease zerk; see the corresponding “Exploded View” in the owner’s manual for your product). Hold a rag over the valve. Open it about a half turn with a wrench (turn the hex until air begins to escape). Oil and air will sputter from the valve.
- Jog the motor a few times by briefly pressing and releasing the UP/RAISE button. If air continues to escape from the bleeder valve, jog the motor several more times. Wait at least a few seconds between jogs.
- Close the valve once air no longer is heard or seen bubbling out of the valve. Just a clear stream of oil should be seen flowing from the bleeder valve.
- Remove the cover from the modular power unit. Check the oil level in the reservoir. If the surface of the oil is lower than 1 to 1½ in. below the fill port, then add oil. Use anti-wear hydraulic fluid with a viscosity grade of 150 SUS at 100°F (ISO 32 @ 40°C) like AW-32 or Dexron transmission fluid.

Written Record:

Before putting your product into regular service, make a written record that describes the appearance and function of the modular power unit. Remove the cover and photograph the internal components. Describe their appearance in writing. Record the oil level in the reservoir by marking it in a few places with a permanent marker. Describe the electrical connections. Replace the cover and turn on the power unit. Use the hand control to extend and retract the piston (raise and lower the tabletop/forks). Describe the sound of the power unit as the piston extends and retracts. Indicate whether the piston extends/retracts smoothly.

Inspections and Maintenance:

Review the "Inspections & Maintenance" section of the owner's manual for your product. Put the product into recommended inspection configuration (e.g. apply maintenance props) before performing the following inspections and maintenance.

DO NOT inspect the power unit or perform any repairs or maintenance on it unless the selector switch is OFF and the unit is unplugged from the power source (wall socket).

(A) Before each use, check the cart for any of the following conditions. Restore the unit to normal condition before returning it to service.
- Oil leaks
- Pinched or chafed hoses
- Damaged electrical cords/hand control

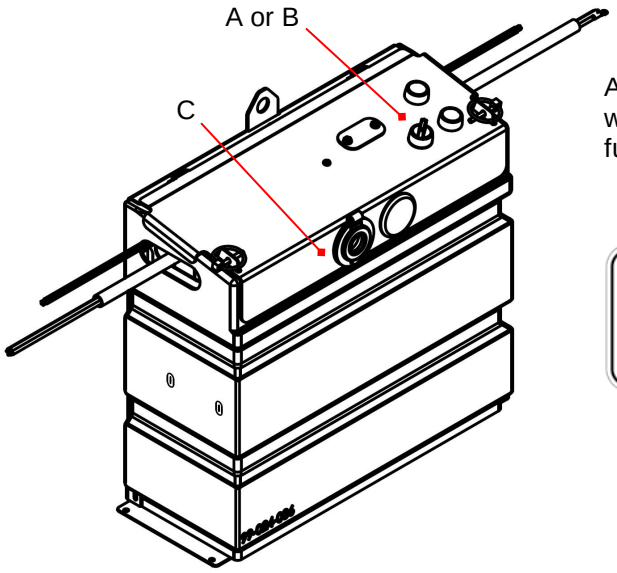
(B) At least once per month, remove the cover and:
- Check the oil level. Oil should be 1in. to $1^1/_2$in. below the top of the reservoir/tank (item no. 2 on pages 13 & 14) when the piston is completely retracted. Add oil, if necessary. Only use AW-32 hydraulic fluid or its equivalent. If the oil looks milky, water is present and must be replaced.
- Check for oil leaks. Resolve the issue as described in *Troubleshooting* on p. 21-22.
- Check hand control and pigtail cord for severe wear.
- Cycle the piston. Watch for binding. Listen for unusual noises. See *Troubleshooting*.
- Make sure all labels are in place & in readable condition. See *Labeling diagram* (below).

(C) Yearly:

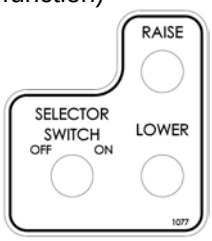
Change the oil at least once a year. The oil should be changed as soon as it darkens, becomes gritty, or appears milky. Milky appearance indicates the presence of water. Only use AW-32 hydraulic fluid or its equivalent.

Labeling diagram:

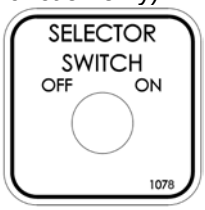
The unit should be labeled as shown in the diagrams. However, label content and location are subject to change so your product might not be labeled exactly as shown. Thoroughly photograph the unit when you first receive it as discussed in the *Written Record* portion of the Inspections and Maintenance section on p. 5. Make sure that your record includes a photograph of each label. Replace all labels that are damaged, missing, or not easily readable (e.g. faded). To order replacement labels, contact the technical service and parts department online at http://www.vestilmfg.com/parts_info.htm. Alternatively, you may request replacement parts and/or service by calling (260) 665-7586 and asking the operator to connect you to the Parts Department.



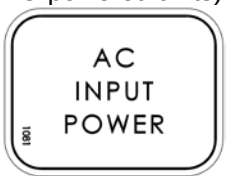
A: Label 1077 (units with powered lift function)



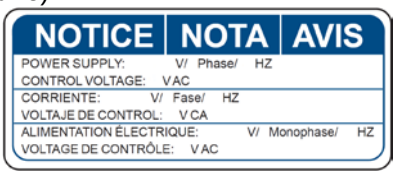
B: Label 1078 (units with powered tilt function only)



C: Label 1081 (all AC-powered units)

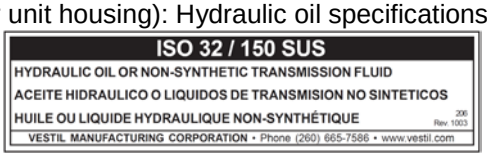


Label 248-251 (all units; applied to front and back of metal frame):



248: 115V AC, Single-Phase, 60Hz
249: 208-230V AC, 3-Phase, 60Hz
250:460V AC, 3-Phase, 60Hz
251: 208-230V AC, Single-Phase, 60Hz

Label 206 (all units; applied to oil reservoir inside power unit housing): Hydraulic oil specifications



Troubleshooting:

Contact Vestil for assistance with issues not listed below.

Issue	Explanation	Remedy
1. Cylinder/piston does not extend when UP button pressed, but pump is running.	a. Voltage at motor terminals too low to run pump;	a. Measure voltage at motor terminals (or as close to terminals as possible) while pump runs under load. If voltage is adequate, check wiring. Compare wiring to applicable diagram. Contact Technical Support.
	b. Hydraulic hose leaking;	b. Correct as appropriate.
	c. Fluid level in hydraulic reservoir too low;	c. Add fluid. The system uses HO150 hydraulic fluid. Replace the hydraulic fluid with an anti-wear hydraulic fluid of viscosity grade of 150 SUS at 100°F (ISO 32 @ 40°C) such as AW-32 or Dexron transmission fluid.
	d. Load exceeds capacity/max. rated load limit, i.e. relief valve opening;	d. Reduce weight of load. DO NOT change relief valve setting!!
	e. Clogged suction filter;	e. Remove filter and clean it.
	f. Suction line leaking or loose fittings;	f. Inspect all fittings for proper fit.
	g. Clogged filler/breather cap on tank;	g. Remove and clean.
	h. Lowering valve energized by faulty wiring or stuck open;	h. Remove lowering valve and clean (see instructions on p. 19).
	i. Hydraulic pump malfunctioning;	i. Disconnect hydraulic line from cylinder. Put free end of hose in large container and cycle the pump. If no oil output, check pump-motor coupling. Contact factory to order replacement pump, if necessary.
	j. Power source interruption.	j. Check electrical utility at socket.
2. Piston extends slowly	k. Debris stuck in lowering solenoid valve causing portion of fluid to flow to reservoir;	k. Remove solenoid valve and clean (see instructions on p. 19).
	l. Debris clogging suction filter or breather cap;	l. Correct as appropriate (see also remedies f and h).
	m. Pinched hose;	m. Repair the hose.
	n. Low motor voltage;	n. Measure voltage at motor terminals (or as close to terminals as possible) while pump runs under load. If voltage is adequate, check wiring. Compare wiring to applicable diagram. Contact Technical Support.
	o. Load exceeds capacity;	o. Reduce load. DO NOT change relief valve setting!!
	p. Pump malfunctioning;	p. Disconnect hydraulic line from cylinder. Put free end of hose in large container and cycle the pump. If no oil output, check pump-motor coupling. Contact factory to order replacement pump, if necessary.
3. Motor labors or is really hot	q. Low voltage;	q. See remedy a.
	r. Incorrect wiring;	r. Confirm that neither motor line is connected to ground.
	s. Oil starvation causing pump to bind. High heat produced. Pump might be permanently damaged;	s. See d, f, g, h, and i.
	t. Binding cylinder(s);	t. Align cylinder(s).
	u. Insufficient battery charge.	u. Recharge battery.
4. Piston extends in jerks or feels spongy.	v. Fluid starvation	v. See remedies d, f, g, l.
	w. Air trapped in cylinder(s)	w. See “Bleeding air from hydraulic

		system" on p. 19.
5. Piston retracts slowly when loaded.	x. Filter of lowering solenoid valve clogged; y. Pinched hydraulic hose; z. Debris in flow control valve; aa. Binding cylinder(s); bb. Debris in velocity fuse.	y. Remove lowering solenoid and clean filter. z. Repair hose. aa. Remove and clean flow control valve. bb. Align cylinder(s) properly. cc. Remove and clean fuse.
6. Piston retracts rapidly.	cc. Leaking hoses and/or fittings; dd. Check valve stuck open; ee. Debris in flow control valve.	dd. Repair as appropriate. ee. Remove and clean check valve. ff. Remove flow control valve from manifold and clean.
7. Piston extends but does not maintain extension and slowly retracts on its own.	gg. Lowering solenoid valve incorrectly wired or stuck open by debris in valve; hh. Check valve stuck open; ii. Leaking hoses or fittings; jj. Cylinder packing worn or damaged.	ff. See remedy k. gg. Remove and clean check valve. hh. Repair as appropriate. ii. Replacing packing.
8. Piston extends but does not retract.	kk. Lowering solenoid wired incorrectly; ll. Lowering solenoid valve stuck open; mm. Faulty lowering solenoid coil; nn. Object in frame blocking leg rollers; oo. Binding cylinders; pp. Velocity fuse is open.	jj. Correct wiring. Contact Technical Support. kk. *Lightly* tap the solenoid coil body to seat it properly. Striking the coil hard might damage the stem. DO NOT remove the solenoid from the manifold because the tabletop will descend dangerously quickly. ll. Refer to electrical system diagram. Contact Technical Support. mm. Raise tabletop a clean debris affecting rollers from frame. nn. Align cylinders properly. oo. Jog the motor to pressurize hydraulic system.
9. Erratic operation	qq. Insufficient power	pp. The squirrel is tired of running on its wheel.

LIMITED WARRANTY

Vestil Manufacturing Corporation ("Vestil") warrants this product to be free of defects in material and workmanship during the warranty period. *Our warranty obligation is to provide a replacement for a defective original part **if** the part is covered by the warranty, after we receive a proper request from the warrantee (you) for warranty service*.

Who may request service?
Only a warrantee may request service. *You are a warrantee **if*** you purchased the product from Vestil or from an authorized distributor AND Vestil has been fully paid.

What is an "original part"?
An original part is a part *used to make the product as shipped* to the warrantee.

What is a "proper request"?
A request for warranty service is proper if Vestil receives: 1) a photocopy of the Customer Invoice that displays the shipping date; AND 2) a written request for warranty service including your name and phone number. Send requests by any of the following methods:

Mail	Fax	Email
Vestil Manufacturing Corporation	(260) 665-1339	sales@vestil.com
2999 North Wayne Street, PO Box 507	Phone	
Angola, IN 46703	(260) 665-7586	

In the written request, list the parts believed to be defective and include the address where replacements should be delivered.

What is covered under the warranty?
After Vestil receives your request for warranty service, an authorized representative will contact you to determine whether your claim is covered by the warranty. Before providing warranty service, Vestil may require you to send the entire product, or just the defective part or parts, to its facility in Angola, IN. The warranty covers defects in the following *original* dynamic components: motors, hydraulic pumps, electronic controllers, switches and cylinders. It also covers defects in *original* parts that wear under normal usage conditions ("wearing parts"), such as bearings, hoses, wheels, seals, brushes, and batteries.

How long is the warranty period?
The warranty period for original dynamic components is the same as the period applied to your product. For wearing parts, the warranty period is also the same as the period applied to your product. Read the Limited Warranty included with the product owner's manual to determine the length of these periods. The warranty periods begin on the date when Vestil ships the product to the warrantee. If the product was purchased from an authorized distributor, the periods begin when the distributor ships the product. Vestil may, at its sole discretion, extend the warranty periods for products shipped from authorized distributors by *up to* 30 days to account for shipping time.

If a defective part is covered by the warranty, what will Vestil do to correct the problem?
Vestil will provide an appropriate replacement for any *covered* part. An authorized representative of Vestil will contact you to discuss your claim.

What is not covered by the warranty?
1. Labor;
2. Freight;
3. Occurrence of any of the following, which automatically voids the warranty:
    - Product misuse;
    - Negligent operation or repair;
    - Corrosion or use in corrosive environments;
    - Inadequate or improper maintenance;
    - Damage sustained during shipping;
    - Collisions or other incidental contacts causing damage to the product;
    - Unauthorized modifications: DO NOT modify the product IN ANY WAY without first receiving written authorization from Vestil. Modification(s) might make the product unsafe to use or might cause excessive and/or abnormal wear.

Do any other warranties apply to the product?
Vestil Manufacturing Corp. makes no other express warranties. All implied warranties are disclaimed to the extent allowed by law. Any implied warranty not disclaimed is limited in scope to the terms of this Limited Warranty.