



Series 2100 Plunger Pumps

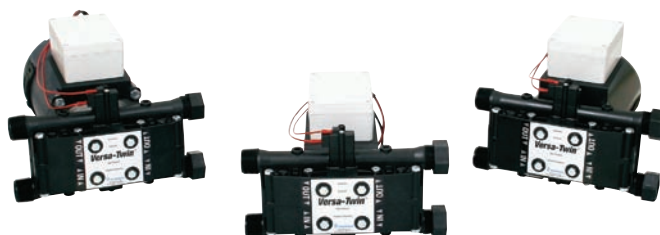
Form L-1539
Rev. B

Original Instruction Manual

Series 2130P, 2132P, and 2133P Plunger Pumps



**Series 2130P
AC and DC Motor-Driven**



**Series 2132P & 2133P
DC Motor-Driven with
Integrated Pressure Switch**

Pentair

375 5th Ave., New Brighton, MN 55112

Phone: (651)766-6300 -OR- 800-424-9776 Fax: 800-323-6496

www.hypropumps.com

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Introduction

Description

Hypro plunger pumps are positive displacement pumps designed for creating and boosting pressure in fluid circuits. The pump operates with an electric motor, which drives a rotating crankshaft, and causes plungers to reciprocate back and forth, drawing fluid in as the plungers retract, and expelling fluid as they extend. The fluid is directed by a series of check valves in the head manifold, which limits the fluid to one directional flow. Construction features include ceramic plungers, stainless steel wetted components, and a Noryl® GTX plastic housing.

Purpose of Manual

Hypro has provided this manual to provide instructions and requirements that must be met when installing, using and maintaining the product(s) identified on the cover.

If the product is sold, the seller must pass this manual on to the new owner.

The following special attention notices are used to notify and advise the user of this product of procedures that may be dangerous to the user or result in damage to the product.

ATTENTION

Attention is used to notify of installation, operation, or maintenance information that is important but not safety related.



This symbol is used to denote the presence of an electrical hazard that will result in personal injury, death, or property damage.



This symbol is used to denote the presence of a hazard that will result in personal injury, death, or property damage.



California Proposition 65 Warning -- This product and related accessories contain chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

Intended Use(s)

Hypro plunger pumps are intended for creating or boosting dynamic pressure and will work with a variety of fluids. Hypro plunger pumps will work in a variety of environments, but they should never be used to pump liquids above 60°C (140°F), or below 1°C (34°F). Any uses outside of those specified in this manual are considered misuses and are prohibited. Contact Hypro Technical Services about any questions regarding specific acceptable uses.

Misuses

Hypro plunger pumps are designed to operate effectively within the specified speed, pressure and environmental ranges. Going outside of these ranges will void the warranty and could cause damage to property, serious injury or death. Some common misuses of Hypro plunger pumps are:

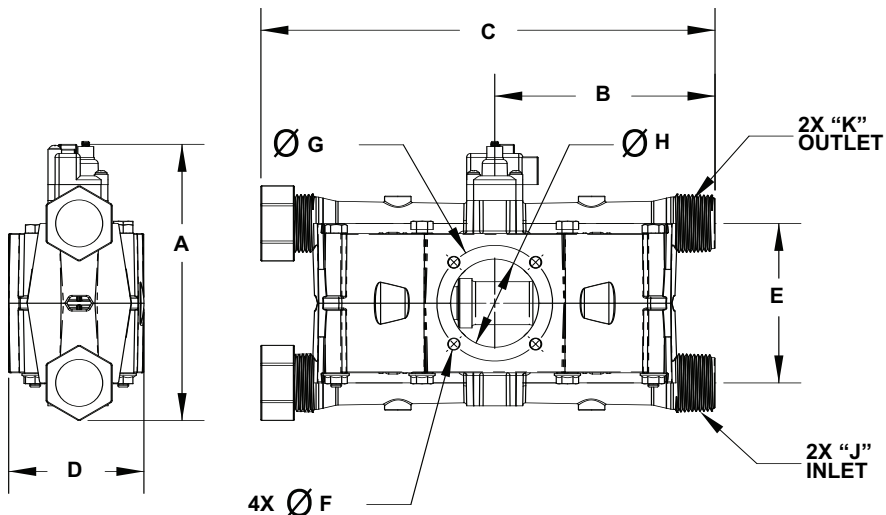
- DO NOT run the pump faster than the maximum recommended speed.
- DO NOT run the pump motor with a higher than recommended voltage.
- DO NOT exceed the rated duty cycle for electric motors.
- DO NOT run the pump higher than the maximum recommended pressure.
- DO NOT run pumps when the liquid has exceeded the maximum or minimum temperature limit.
(See Intended Uses)
- DO NOT pump non-approved liquids.
- DO NOT pump water or other liquids for human consumption.
- DO NOT operate any Hypro pump under the influence of drugs or alcohol.
- DO NOT run the pump dry.

Pump Technical Data

(All specifications and performance data are based on water as a carrier fluid.)

Pump Only

Pump Dimensions				
Dim.	2130PX		2132PX, 2133PX	
	Inch	mm	Inch	mm
A	6.27	159	5.33	135
B	5.00	127	5.00	127
C	10.31	262	10.31	262
D	3.07	78	3.07	78
E	3.62	92	3.62	92
Φ F	0.25	6.5	0.25	6.5
Φ G	2.63	66.7	2.63	66.7
Φ H	2.00	50.8	2.00	50.8
J	1" NPT	1" NPT	1" NPT	1" NPT
K	1" NPT	1" NPT	1" NPT	1" NPT



2130PX, 2132PX, and 2133PX Pump Specifications									
Plungers:	Max. Flow Rate (GPM):	Max. Pressure (PSI):	Max RPM	Ports:	Shaft:	Continuous Operation (PSI):	Intermittent Operation (PSI):	Dry Weight	Minimum Horsepower Requirement
2	See performance table	300	2200	4X 1" NPT Outlet & Inlet	N/A	300	300	3.6 lb [1.6 kg]	See performance table

2130PX, 2132PX, and 2133PX Pump Specifications	
Model	Pressure Switch Operating Range (PSI)
2130PX	None
2132PX	150 - 250
2133PX	250 - 350

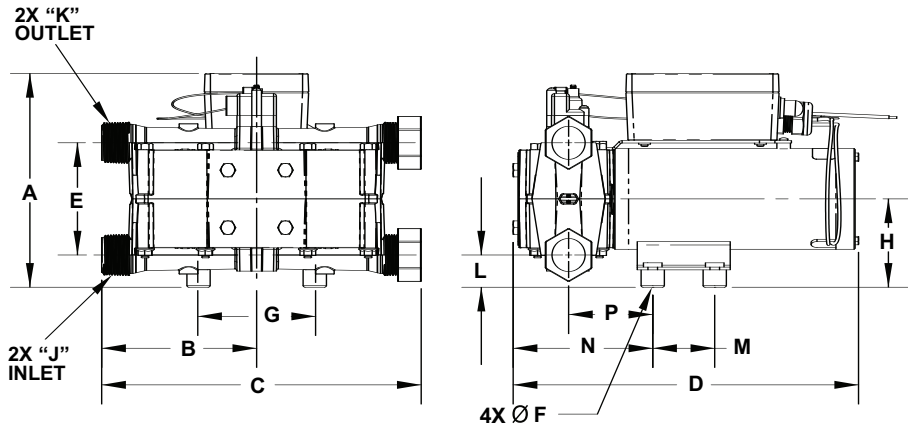
Performance Data 2130PX, 2132PX, and 2133PX (Imperial)						
1750 RPM						
Pressure	GPM	HP	GPM	HP	GPM	HP
	.145" Ecc		.175" Ecc		.235" Ecc	
0 PSI	2.0	0.06	2.4	0.07	3.9	0.11
50 PSI	1.8	0.13	2.2	0.15	3.4	0.21
100 PSI	1.8	0.20	2.1	0.22	3.3	0.33
150 PSI	1.7	0.25	2.1	0.30	3.2	0.43
200 PSI	1.7	0.3	2.0	0.37	3.1	0.53
250 PSI	1.6	0.34	1.9	0.43	3.0	0.62
300 PSI	1.6	0.39	1.9	0.49	2.9	0.70

Performance Data 2130PX, 2132PX, and 2133PX (Metric)						
1750 RPM						
Pressure	LPM	HP	LPM	HP	LPM	HP
	3.7mm Ecc		4.4mm Ecc		6.0mm Ecc	
0 BAR	7.6	0.06	9.1	0.07	14.8	0.11
3.4 BAR	6.8	0.13	8.3	0.15	12.9	0.21
6.9 BAR	6.8	0.20	7.9	0.22	12.5	0.33
10.3 BAR	6.4	0.25	7.9	0.30	12.1	0.43
13.8 BAR	6.4	0.30	7.6	0.37	11.7	0.53
17.2 BAR	6.1	0.34	7.2	0.43	11.4	0.62
20.7 BAR	6.1	0.39	7.2	0.49	11	0.70

Pump Technical Data

Motorized

Pump Dimensions				
	2130P-D183		2132P-D183	
Dim.	Inch	mm	Inch	mm
A	5.52	140	6.90	175
B	5.00	127	5.00	127
C	10.31	262	10.31	262
D	11.14	283	11.14	283
E	3.62	92	3.62	92
Φ F	0.25	6.4	0.25	6.4
G	3.80	97	3.80	97
H	2.85	72	2.85	72
J	1" NPT	1" NPT	1" NPT	1" NPT
K	1" NPT	1" NPT	1" NPT	1" NPT
L	1.04	26	1.04	26
M	2.00	51	2.00	51
N	4.50	114	4.50	114
P	2.72	69	2.72	69



2130P-D183 and 2132P-D183 Pump Specifications										
Plungers:	Max. Flow Rate (GPM):	Max. Pressure (PSI):	Max RPM	Voltage	Ports:	Shaft:	Continuous Operation (PSI):	Intermittent Operation (PSI):	Dry Weight	Minimum Horsepower Requirement
2	2.5	150	2200	12-13.5 VDC	4x1" NPT Outlet & Inlet	1/2"	75	150	16.3 lb [7.4 kg]	N/A

2130P-D183 and 2132P-D183 Pump Specifications				
Model	Pressure Switch Operating Range (PSI)	Motor Maximum Amps (continuous @ 25° C)	Motor Maximum Amps (intermittent @ 25° C)	Motor Duty Cycle
2130P-D183	None	12	20	50% (30 min on / 30 min off)
2132P-D183	150 - 250	12	20	50% (30 min on / 30 min off)

Performance Data 2130P-D183, 2132P-D183 (Imperial)		
13.5 VDC		
Pressure	GPM	AMPS
0 PSI	2.5	5.2
50 PSI	2.2	9.8
100 PSI	2.0	14.6 **
150 PSI	1.8	19.3 **

Tested at 13.5 VDC

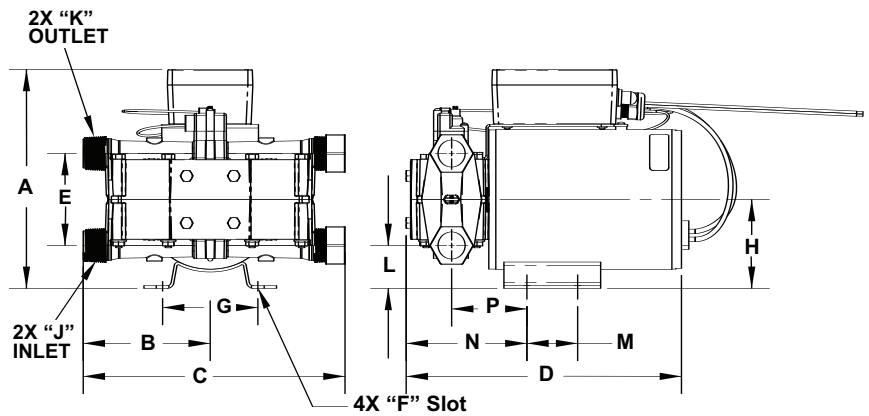
** Indicates intermittent duty only. Observe recommended duty cycle.

Performance Data 2130P-D183, 2132P-D183 (Metric)		
13.5 VDC		
Pressure	LPM	AMPS
0 BAR	9.5	5.2
3.4 BAR	8.3	9.8
6.9 BAR	7.6	14.6 **
10.3 BAR	6.8	19.3 **

Pump Technical Data

Motorized

Pump Dimensions				
Dim.	2130P-D355		2132P-D355 2133P-D355	
	Inch	mm	Inch	mm
A	6.25	159	8.62	219
B	5.00	127	5.00	127
C	10.31	262	10.31	262
D	10.84	275	10.84	275
E	3.62	92	3.62	92
F	.27 x .50	6.9 x 12.7	.27 x .50	6.9 x 12.7
G	3.75	95	3.75	95
H	3.50	89	3.50	89
J	1" NPT	1" NPT	1" NPT	1" NPT
K	1" NPT	1" NPT	1" NPT	1" NPT
L	1.69	43	1.69	43
M	2.00	51	2.00	51
N	4.75	121	4.75	121
P	2.97	75	2.97	75



2130P-D355, 2132P-D355, 2133P-D355 Pump Specifications										
Plungers:	Max. Flow Rate (GPM):	Max. Pressure (PSI):	Max RPM	Voltage	Ports:	Shaft:	Continuous Operation (PSI):	Intermittent Operation (PSI):	Dry Weight	Minimum Horsepower Requirement
2	2.8	300	2000	12-13.5VDC	4X 1" NPT Outlet & Inlet	5/8"	175	300	27.5 lb [12.5 kg]	N/A

2130P-D355, 2132P-D355, 2133P-D355 Pump Specifications				
Model	Pressure Switch Operating Range (PSI)	Motor Maximum Amps (continuous @ 25° C)	Motor Maximum Amps (intermittent @ 25° C)	Motor Duty Cycle
2130P-D355	None	25	35	75% (45 min on / 15 min off)
2132P-D355	150 - 250	25	35	75% (45 min on / 15 min off)
2133P-D355	250 - 350	25	35	75% (45 min on / 15 min off)

Performance Data 2130P-D355, 2132P-D355, and 2133P-D355 (Imperial) 13.5 VDC		
Pressure	GPM	AMPS
0 PSI	2.8	9.1
50 PSI	2.5	13.4
100 PSI	2.4	18.9
150 PSI	2.3	23.5
200 PSI	2.2	27.5 **
250 PSI	2.1	30.9 **
300 PSI	2.0	34.8 **

Performance Data 2130P-D355, 2132P-D355, and 2133P-D355 (Metric) 13.5 VDC		
Pressure	LPM	AMPS
0 BAR	10.6	9.1
3.4 BAR	9.5	13.4
6.9 BAR	9.1	18.9
10.3 BAR	8.7	23.5
13.8 BAR	8.3	27.5 **
17.2 BAR	7.9	30.9 **
20.7 BAR	7.6	34.8 **

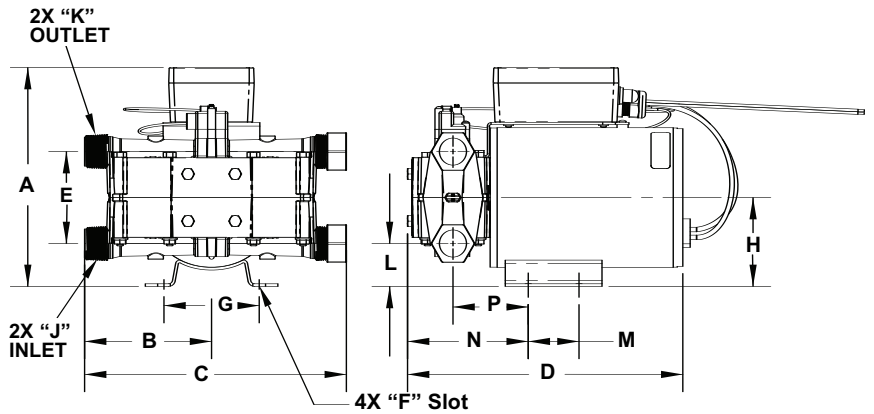
Tested at 13.5 VDC

** Indicates intermittent duty only. Observe recommended duty cycle.

Pump Technical Data

Motorized

Pump Dimensions				
	2130P-D359		2132P-D359	
Dim.	Inch	mm	Inch	mm
A	6.25	159	8.62	219
B	5.00	127	5.00	127
C	10.31	262	10.31	262
D	10.84	275	10.84	275
E	3.62	92	3.62	92
F	.27 x .50	6.9 x 12.7	.27 x .50	6.9 x 12.7
G	3.75	95	3.75	95
H	3.50	89	3.50	89
J	1" NPT	1" NPT	1" NPT	1" NPT
K	1" NPT	1" NPT	1" NPT	1" NPT
L	1.69	43	1.69	43
M	2.00	51	2.00	51
N	4.75	121	4.75	121
P	2.97	75	2.97	75



2130P-D359, 2132P-D359 Pump Specifications										
Plungers:	Max. Flow Rate (GPM):	Max. Pressure (PSI):	Max RPM	Voltage	Ports:	Shaft:	Continuous Operation (PSI):	Intermittent Operation (PSI):	Dry Weight	Minimum Horsepower Requirement
2	See performance table	200	2000	12-13.5 VDC	4X 1" NPT Outlet & Inlet	5/8"	125	200	27.5 lb [12.5 kg]	N/A

2130P-D359, 2132P-D359 Pump Specifications				
Model	Pressure Switch Operating Range (PSI)	Motor Maximum Amps (continuous @ 25° C)	Motor Maximum Amps (intermittent @ 25° C)	Motor Duty Cycle
2130P-D359	None	25	35	75% (45 min on / 15 min off)
2132P-D359	150 - 250	25	35	75% (45 min on / 15 min off)

Performance Data 2130P-D359, 2132P-D359 (Imperial) 13.5 VDC		
Pressure	GPM	AMPS
0 PSI	3.9	11.6
50 PSI	3.2	17.2
100 PSI	3.1	21.5
150 PSI	3.0	26.2**
200 PSI	2.8	31.8**

Performance Data 2130P-D359, 2132P-D359 (Metric) 13.5 VDC		
Pressure	LPM	AMPS
0 BAR	14.8	11.6
3.4 BAR	12.1	17.2
6.9 BAR	11.7	21.5
10.3 BAR	11.4	26.2**
13.8 BAR	10.6	31.8**

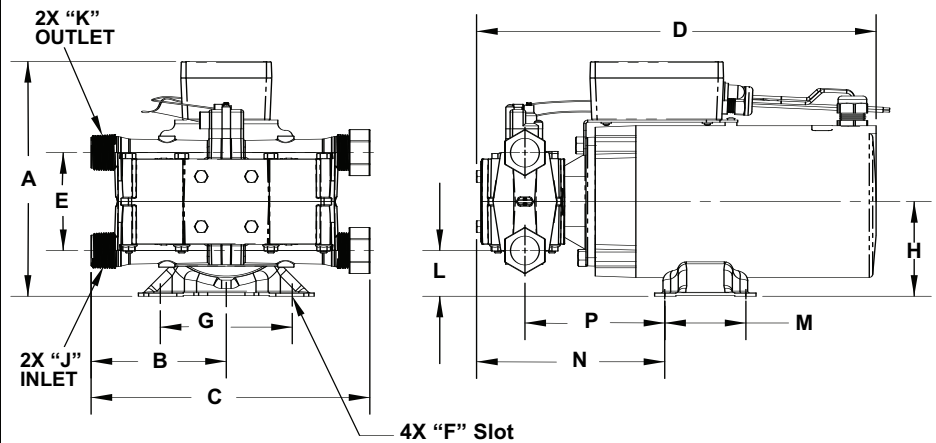
Tested at 13.5 VDC

** Indicates intermittent duty only. Observe recommended duty cycle.

Pump Technical Data

Motorized

Pump Dimensions				
	2130P-D395		2132P-D395 2133P-D395	
Dim.	Inch	mm	Inch	mm
A	6.31	159	8.68	220
B	5.00	127	5.00	127
C	10.31	262	10.31	262
D	14.77	275	14.77	275
E	3.62	92	3.62	92
F	.34 x 1.22	6.9 x 12.7	.34 x 1.22	6.9 x 12.7
G	4.88	95	4.88	95
H	3.50	89	3.50	89
J	1" NPT	1" NPT	1" NPT	1" NPT
K	1" NPT	1" NPT	1" NPT	1" NPT
L	1.69	43	1.69	43
M	3.00	76.2	3.00	76.2
N	6.96	177	6.96	177
P	5.17	131	5.17	131



2130P-D395, 2132P-D395, and 2133P-D395 Pump Specifications										
Plungers:	Max. Flow Rate (GPM):	Max. Pressure (PSI):	Max RPM	Voltage	Ports:	Shaft:	Continuous Operation (PSI):	Intermittent Operation (PSI):	Dry Weight	Minimum Horsepower Requirement
2	2.8	300	2000	12-13.5 VDC	4x 1" NPT Outlet & Inlet	5/8"	300	N/A	32 lb [14.5 kg]	N/A

2130P-D395, 2132P-D395, 2133P-D395 Pump Specifications				
Model	Pressure Switch Operating Range (PSI)	Motor Maximum Amps (continuous @ 25° C)	Motor Maximum Amps (intermittent @ 25° C)	Motor Duty Cycle
2130P-D395	None	39	N/A	Continuous Duty
2132P-D395	150 - 250	39	N/A	Continuous Duty
2133P-D395	250 - 350	39	N/A	Continuous Duty

Performance Data 2130P-D395, 2132P-D395, and 2133P-D395 (Imperial) 13.5 VDC		
Pressure	GPM	AMPS
0 PSI	2.9	8.3
50 PSI	2.5	13.0
100 PSI	2.4	19.0
150 PSI	2.3	23.5
200 PSI	2.2	27.2
250 PSI	2.1	30.7
300 PSI	2.0	33.9

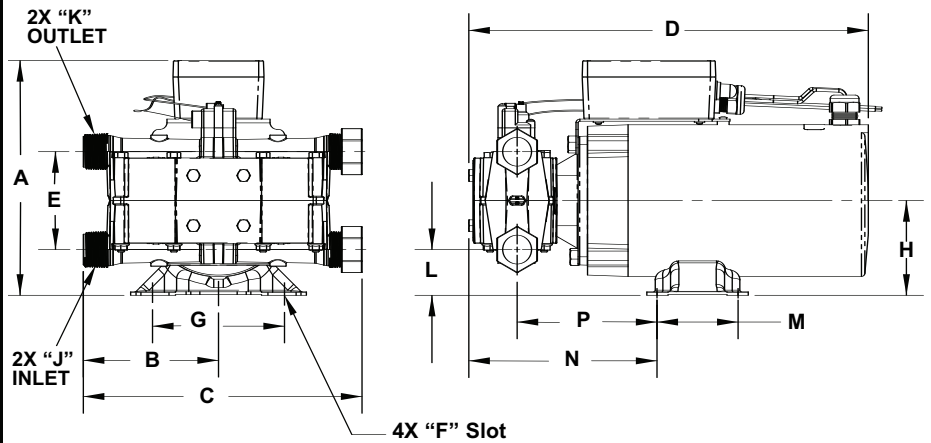
Tested at 13.5 VDC

Performance Data 2130P-D395, 2132P-D395, and 2133P-D395 (Metric) 13.5 VDC		
Pressure	LPM	AMPS
0 BAR	11.0	8.3
3.4 BAR	9.5	13.0
6.9 BAR	9.1	19.0
10.3 BAR	8.7	23.5
13.8 BAR	8.3	27.2
17.2 BAR	7.9	30.7
20.7 BAR	7.6	33.9

Pump Technical Data

Motorized

Pump Dimensions				
	2130P-D399		2132P-D399	
Dim.	Inch	mm	Inch	mm
A	6.31	159	8.68	220
B	5.00	127	5.00	127
C	10.31	262	10.31	262
D	14.77	275	14.77	275
E	3.62	92	3.62	92
F	.34 x 1.22	6.9 x 12.7	.34 x 1.22	6.9 x 12.7
G	4.88	95	4.88	95
H	3.50	89	3.50	89
J	1" NPT	1" NPT	1" NPT	1" NPT
K	1" NPT	1" NPT	1" NPT	1" NPT
L	1.69	43	1.69	43
M	3.00	76.2	3.00	76.2
N	6.96	177	6.96	177
P	5.17	131	5.17	131



2130P-D399, 2132P-D399 Pump Specifications										
Plungers:	Max. Flow Rate (GPM):	Max. Pressure (PSI):	Max RPM	Voltage	Ports:	Shaft:	Continuous Operation (PSI):	Intermittent Operation (PSI):	Dry Weight	Minimum Horsepower Requirement
2	See performance table	200	2000	12-13.5 VDC	4x 1" NPT Outlet & Inlet	5/8"	200	N/A	32 lb [14.5 kg]	N/A

2130P-D399, 2132P-D399 Pump Specifications				
Model	Pressure Switch Operating Range (PSI)	Motor Maximum Amps (continuous @ 25° C)	Motor Maximum Amps (intermittent @ 25° C)	Motor Duty Cycle
2130P-D399	None	39	N/A	Continuous Duty
2132P-D399	150 - 250	39	N/A	Continuous Duty

Performance Data 2130P-D399, 2132P-D399 (Imperial) 13.5 VDC		
Pressure	GPM	AMPS
0 PSI	4.0	11.0
50 PSI	3.5	17.2
100 PSI	3.3	24.0
150 PSI	3.1	29.3
200 PSI	3.0	34.2

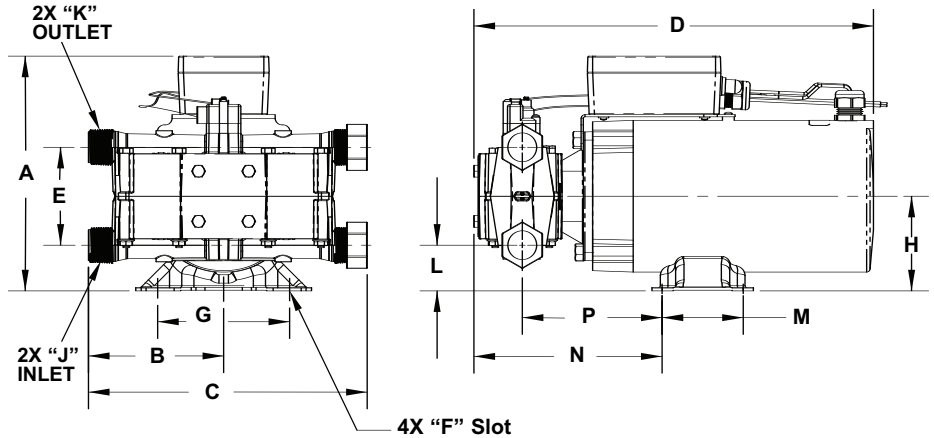
Tested at 13.5 VDC

Performance Data 2130P-D399, 2132P-D399 (Metric) 13.5 VDC		
Pressure	LPM	AMPS
0 BAR	15.1	11.0
3.4 BAR	13.2	17.2
6.9 BAR	12.5	24.0
10.3 BAR	11.7	29.3
13.8 BAR	11.4	34.2

Pump Technical Data

Motorized

Pump Dimensions				
	2130P-A055		2130P-A079	
Dim.	Inch	mm	Inch	mm
A	8.37	213	8.7	221
B	5.00	127	5.00	127
C	10.31	262	10.31	262
D	12.7	323	13.8	349
E	3.62	92	3.62	92
F	.34 x 1.22	6.9 x 12.7	.34 x 1.22	6.9 x 12.7
G	4.88	124	4.88	124
H	3.50	89	3.50	89
J	1" NPT	1" NPT	1" NPT	1" NPT
K	1" NPT	1" NPT	1" NPT	1" NPT
L	1.69	43	1.69	43
M	3.00	76.2	3.00	76.2
N	7.00	178	7.00	178
P	5.22	133	5.22	133



2130P-A055, 2130P-A079 Pump Specifications												
Plungers:	Max. Flow Rate (GPM):	Max. Pressure (PSI):	Max RPM	Voltage	Hz:	Phase	Ports:	Shaft:	Continuous Operation (PSI):	Intermittent Operation (PSI):	Dry Weight	Motor Frame:
2	See performance table	300	1750	115/208-230 VAC	50/60	1	4x 1" NPT Outlet & Inlet	5/8"	300	N/A	33 lb [15.0 kg]	56C

2130P-A055, 2130P-A079 Pump Specifications						
Model	Pressure Switch Operating Range (PSI)	Motor Full Load Amps	Motor Service Factor	Minimum Horsepower Requirement	Enclosure	Motor Duty Cycle
2130P-A055	None	7.2 / 3.5-3.6	1.25	½	ODP	Continuous Duty
2130P-A079	None	10.6 / 5.2-5.3	1.25	¾	ODP	Continuous Duty

Performance Data 2130P-A055, 2130P-A079 (Imperial)				
Pressure	GPM	AMPS	GPM	AMPS
	2130P-A055		2130P-A079	
0 PSI	2.4	6.5	3.9	8.9
50 PSI	2.2	6.6	3.4	9
100 PSI	2.1	6.7	3.3	9.1
150 PSI	2.1	6.8	3.2	9.5
200 PSI	2	7	3.1	9.8
250 PSI	1.9	7.2	3	10.1
300 PSI	1.9	7.3	2.9	10.6

Performance Data 2130P-A055, 2130P-A079 (Metric)				
Pressure	LPM	AMPS	LPM	AMPS
	2130P-A055		2130P-A079	
0 BAR	9.1	6.5	14.8	8.9
3.4 BAR	8.3	6.6	12.9	9
6.9 BAR	7.9	6.7	12.5	9.1
10.3 BAR	7.9	6.8	12.1	9.5
13.8 BAR	7.6	7	11.7	9.8
17.2 BAR	7.2	7.2	11.4	10.1
20.7 BAR	7.2	7.3	11	10.6

Tested at 110 VAC, 60 Hz

Fluid Pumping Applications

Application	Pump Materials Compatibility		Comments
	YES	NO	
WEED CONTROL CHEMICALS	X		
INSECT CONTROL	X		
BRUSH CONTROL	X		
PEST CONTROL CHEMICALS AND FUMIGANTS	X		
LIQUID FERTILIZERS	X		
POWDERED FERTILIZERS	X		
FLUID TRANSFER	X		
BLEACH	X		
MILD ACIDS	X		
STRONG ACIDS		X	NOT FOR ACIDS WITH pH < 3

The following chemicals should never be put through any Hypro pump:

- Gasoline (Petrol)
- Kerosene/Kerosine (paraffin)
- Diesel fuel
- Ceramic slurries
- Sewage
- Potable water
- Abrasive fluids

Tools

The Hypro plunger pumps and mounting assemblies are designed with Imperial (inch) bolts, however, there are many metric (mm) sizes which will work with these bolts. In all cases, an adjustable spanner (crescent) wrench can also be used.

Lifting, Transport and Intermediate Storage

Lifting Instructions

- Before attempting to lift a Hypro pump, ensure that the surrounding working area is free of hazards which could cause injury or damage to property.
- During lifting operations, any personnel not involved in the lift should not enter the working area.
- If lifting hooks, rope or chains are being used for a lift, they must be free of damage and be rated to carry 150% of the weight of the load to be lifted.
- Always wear steel-toed shoes and cut-resistant gloves when attempting to lift.
- When lifting and carrying, always keep the pump close to your body. (See Figure 1.)
- When starting the lift, bend your knees and keep your back straight. (See Figure 1.) Tightening the stomach muscles will help hold one's back straight.
- During the lift, use one's legs to do the work. Never use your back and make sure your legs are at least shoulder-width apart. (See Figure 1.)



Figure 1

Lifting, Transport and Intermediate Storage - cont'd.

Packaging Descriptions and Unpacking Instructions

- Hypro plunger pumps are shipped in cardboard boxes for safe transporting.
- When pumps are shipped in large quantities, they may be put on a pallet to allow for easy storage, lifting and handling.
- Before lifting any pump or pallet, determine the weight via the attached packing slips to establish what lifting equipment or method should be used.
- Once the pump is unpacked, dispose of all the packaging in a manner which follows local and national regulations.

Transport

- All Hypro pumps are capable of being transported by air, sea, rail or motor vehicle. When the pump is shipped, ensure that the pump is moved in accordance with local and national laws, and ensure the pump is secured to the vehicle to prevent unwanted movement which could cause damage to person or property. Prior to shipping, all fluids should be removed from the pump.

Storage

- New pumps in their boxes can be stored years as long as the port plugs are not removed. Once the plugs have been removed, if the pump is not to be used for an extended period of time (i.e. more than 30 days), the pump must be winterized as described in the Cleaning section of this manual.

Assembly and Installation

Assembly

This pump comes completely assembled.

Installation

Before attempting to install your Hypro plunger pump, it is imperative to read and understand the following:

- Installation of a Hypro pump should only be performed by a technician having the knowledge and skills necessary to install the pump without the risk of property damage or personal injury.
- Pumping systems must be installed in accordance with Hypro installation instructions. Failure to do so will void your warranty and could cause damage to property, serious personal injury, or death.
- Electrical power cables and pump hoses must be routed where there is no risk of personnel tripping, walking into, or falling because they have been routed in areas where personnel are expected to move. Electrical power cables and pump hoses should be routed according to local and national standards.
- It is the installer's responsibility that AC electric drive motors, Hypro pumps, and metalwork of support structures are bonded to earth (ground), per local and national standards, to prevent a buildup of static electricity.
- It is the installer's responsibility to conduct earth continuity tests between AC electric drive motors, Hypro pumps, and metalwork of support structures and earth according to EN60204-1:2006/A1:2009 to confirm that all components that need to be connected to earth are satisfactorily bonded.
- It is the installer's responsibility to conduct electrical tests in accordance with EN60204-1:2006/A1:2009 on finished pump assemblies.
- All connections to electrical components must be number, symbol, or color coded generally as recommended by EN60204-1:2006/A1:2009.
- Installers must provide hydraulic components that are capable of withstanding maximum source pressure.

Assembly and Installation - cont'd.

System Installation

⚠ ATTENTION Use only pipe, fittings, accessories, hose, etc. rated for the maximum pressure rating of the pump.

- Select adequate size drive unit to avoid overloading. Avoid unnecessary restrictions in the line such as elbows, check valves, and all extraneous curves and bends.
- Avoid using looped sections of tubing or pipe which might permit air to become trapped.
- For threaded pipe fittings, use proper sealant to ensure leak-free joints.
- Flynut fittings with o-ring seals are available to connect to the pump inlet and outlet ports.
- Piping connected to the pump must have vibration isolation in the form of flexible tubing or some other method.
- For systems with pressure switch, a pressure relief valve with an elastomeric seat (Hypro #3301-0001) must be used, to prevent pressure from bleeding off. In addition, the system plumbing should be as follows:
 - a. For systems with rigid pipe, rigid or semi-rigid hose (working pressure greater than 600 psi), or any hose less than 150 feet in length, a properly-sized system accumulator, or a custom-sized pulse hose (Hypro #3375-0025) must be installed.
 - i. Hypro pulse hose 3375-0025 may be installed either branched off the discharge line (as shown in the system diagram) or as a delivery hose between the pump outlet and the rigid plumbing.
 - b. Systems with 3/8" I.D. flexible hose, of 600 psi working pressure or lower, and 150 feet or more in length, do not require an accumulator or pulse hose, as the hose itself dampens out pressure spikes.
- Do not hang excessive weight or plumbing fittings on the pump, and avoid bending loads on the pump ports.
- If the liquid is below the level of the pump, some means should be provided in installation to prime the pump, such as a foot valve or check valve to hold prime. Keep suction lift to a minimum and avoid unnecessary bends in the suction line.
- Selection of the right size and type of hose is vital for good performance. Be sure to hook up to the proper ports on the pump (note markings "IN" and "OUT" on pump label).
 - a. Always use a suction hose compatible with the fluids being pumped and at least the same inside diameter as pump ports. If the suction hose is over 5 feet long, use one size larger hose. Keep the suction hose as short as possible and restrictions such as elbows, check valves, etc. at a minimum. Both inlet ports may be used, but is not necessary for operation. **Suction lift not to exceed 3 feet.**
 - b. High pressure pumps require the use of special high pressure discharge hose. Use a hose rated at least 50% greater than the highest operating pressure of pump. Example: If required pump pressure is 300 psi, use hose rated at minimum of 450 psi working pressure.
- Use a suction line strainer with at least 3 to 5 times the suction port area in open screen area. Be sure the screen is suitable for the liquid being pumped. To avoid clogging, the mesh should be appropriate for the nozzle tip to be used. The pump will pass solids up to 1/32" in diameter.
- A system relief, unloader, or regulator is required in any system to prevent over-pressurization. Bypass relief valves incorporate an adjustable spring-loaded poppet that opens to protect the pump from over-pressurizing when the pump outlet is shut off. The overflow is diverted back to the tank. Bypass valves must be rated for the max. flow of the pump because they return the full amount of flow when the outlet is shut off.

⚠ Never attach an agitator or any restriction to a bypass line of a pressure relief device because system damage may occur.

- Every system requires a means to regulate pressure when the gun is shut off, or discharge is otherwise restricted or blocked. This can be accomplished with an unloader, pressure regulator, or pressure switch.
- An unloader or regulator valve protects the pump by unloading pressure when the gun is shut off or discharge is otherwise blocked. This saves the pump and power because the liquid is bypassed at a low pressure. The device must be set to a pressure no higher than the working pressure of the pump and a minimum of 10% below the system relief pressure.
- A pressure switch (optional, included with 2132P and 2133P series) is used to turn the motor and pump off when the pressure at the discharge of the pump reaches the pressure switch setting.
 - a. It is important that the nozzle being used by the spray gun or system must be large enough to pass sufficient flow, so that the pump operating or spraying pressure does not exceed the setting of the pressure switch. If the nozzle on the spray gun is too small, the pump will cycle on and off, producing an undesirable effect to the user and harming the motor.
 - b. **⚠ ATTENTION** A system relief valve is still required in systems that utilize a demand switch for safe operation. The relief valve should be set at least 10% above the setting for the pressure switch to prevent rapid cycling. The relief must also be set no higher than 10% above the working pressure of the pump.

Assembly and Installation - cont'd.

- A pressure accumulator or pulse hose absorbs the shock and smooths out the pump discharge pulsations, providing smoother operation. The pressure accumulator, or pulse hose, should be installed between the pump and the unloader valve. The pressure accumulator should be charged to 30-50% of the operating pressure of the pump. If a pulse hose is being used, it should be coiled or pointed upward for best operation.
- Use gauges capable of reading 1.5 to 2 times the pump working pressure. Use silicone-filled gauges or a gauge dampener to protect the gauge from damaging pressure surges.

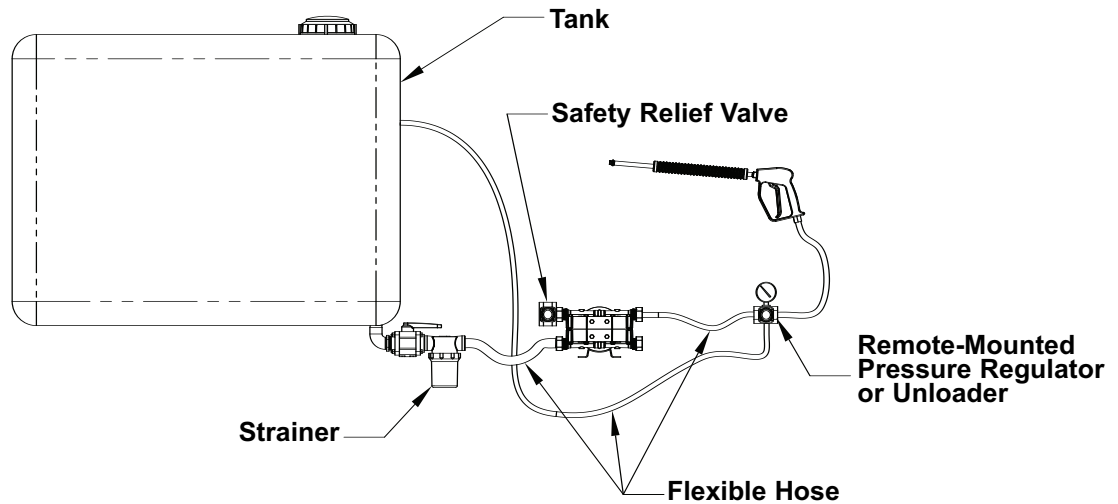


Figure 2 - System Diagram with Regulator or Unloader

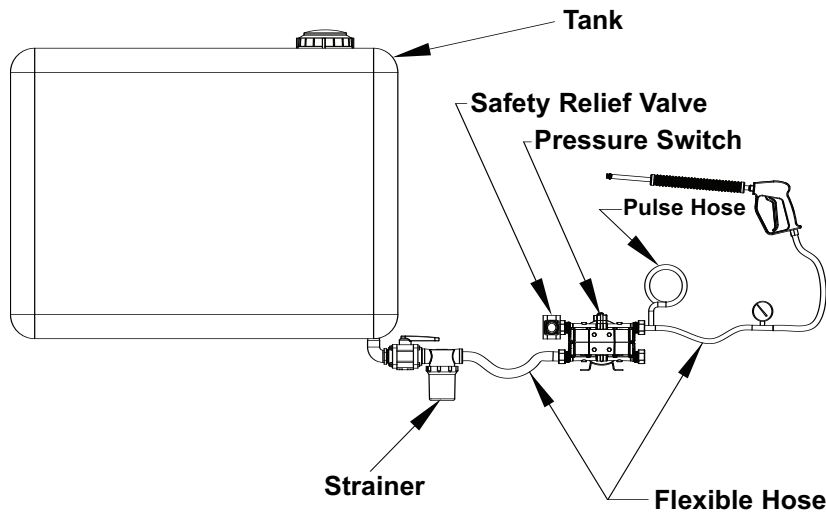


Figure 3 - System Diagram with Pressure Switch

12VDC System

The motor must be fused to protect the electrical system. The following models come already equipped with a circuit breaker in the system:

2132P-D183 2132P-D355 2133P-D355 2132P-D395 2133P-D395

All other models should use a slow-blow, inline, Maxi (time delay), automotive fuse or circuit breaker with amp rating as follows:

2130P-D183 - 20 amp
2130P-D355, 2130P-D359 - 40 amp
2130P-D395, 2130P-D399 - 40 amp

The motor lead wires are identified by color on each corresponding lead wire. For proper pump rotation, the connections should be made as follows:

- Positive Motor Lead (+) to Positive Power Lead (**Red, +**).
- Negative Motor Lead (-) to Negative Power Lead (**Black, -**).

Assembly and Installation - cont'd.

Wiring for all 12-volt Systems

For 40 amp applications, 8 gauge wire or larger should be used. If lengths over 25 feet are needed, use 4 gauge wire. For 20 amp applications, 10 gauge or larger should be used. Minimize wire length where possible to achieve the best possible performance from the pump.

Battery isolators are recommended to protect both the alternator and battery of your vehicle. Not all vehicles have high amp alternators. An alternator may be damaged if it is overloaded. Be sure to check the output rating of the vehicle or implement, and use battery isolators with a deep cycle battery, or bank of batteries, to protect system from overloading or draining vehicle battery.

Plunger Pumps with Pressure Switch (Series 2132P and 2133P)

Hypro plunger pumps with built-in pressure switches come equipped with a circuit breaker suitable to the amperage of the DC electric motor. The switch, mounted to the pump head, carries low current that is directed to a high current automotive relay that turns the motor off and on. The electrical enclosure houses these components in a drip-proof environment.

Figure 4 is an example of a typical application of a Hypro plunger pump equipped with a pressure switch.

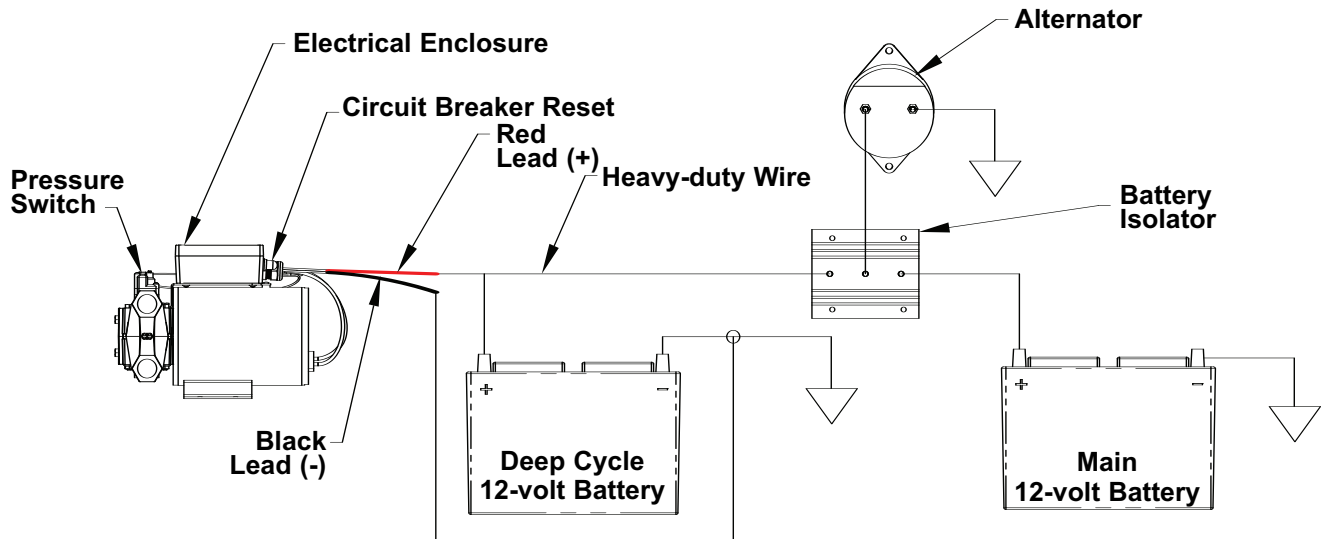


Figure 4

Plunger Pumps without Pressure Switch (Series 2130P)

Figure 5 is an example of a typical application of a Series 2130P plunger pump. It is recommended that a solenoid contact switch, the same type that is used in the automotive industry for starters, be used. The switch should be rated for 12 VDC applications with a minimum of 50 amps continuous duty.

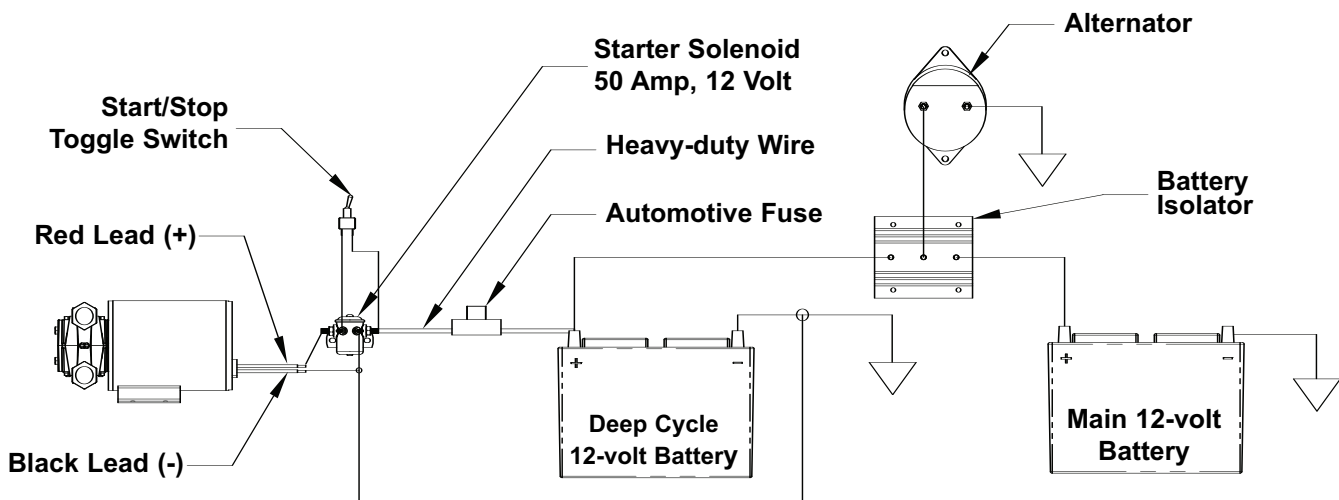


Figure 5

Assembly and Installation - cont'd.

AC Electrical Connections

- Make sure the power source conforms to the requirements of the equipment being installed.
- When wiring an electrically-driven pump, installation must follow all local and national electrical and safety codes.
- To reduce the risk of electric shock, all motors must be adequately grounded. Follow all local and national codes when wiring your pump.
- When wiring the motor to its power source, ensure that the wiring instructions for the motor terminal connections are met.


Control System(s)

- Hypro 2100 Series pumps are required to have a control system to ensure proper function and performance.
- Overload and short-circuit protection devices should open at a current that is 10% higher than the normal load current.
- For more detail on a typical control system installation, see the preceding subsections of the “Assembly and Installation” section of this manual.

Commissioning Start-Up, Operation, Shutdown

Before attempting to start your pump, the following must be understood and followed to ensure safe operation.

Information

- When running Hypro plunger pumps, it is essential that operators use hearing protection as the sound levels can reach levels of 80 decibels. When lifting pumps, one should wear steel-toed shoes in order to protect the feet in the event the pump is dropped and cut-resistant gloves to protect the hands from any sharp burrs on the pump.
- Only authorized operators having the knowledge and skill necessary to safely use a Hypro pump, or any equipment the pump is connected to, may run the pump.
- When spraying manually, it is recommended that chemical-resistant face masks and clothing be worn to prevent any chemicals from coming into contact with the skin or being inhaled.
- When spraying manually, always spray upwind of yourself as long as the sprayed chemical will not be blown into the vicinity of other people.
- When installing, adjusting or removing a Hypro plunger pump, ensure that there are no objects which can fall on the installer and make certain that all machinery to which the pump is to be attached is turned off.
- Hypro plunger pumps should only be used on tractors or tow-behind spray platforms which have electrically conductive tires in order to reduce the risk of electrocution.
- Never operate a Hypro plunger pump from outside while there is a chance of getting struck by lightning.
- Never leave electrical wires or plumbing components where they can be a tripping hazard or become entangled in a moving component. Ideally, electrical cables, hoses, pipes and fittings should be routed overhead. In the event electrical wiring must be routed over the ground, operators are required to use rubber ramps if they cross a gangway.
- Hypro plunger pumps should not be used if the ambient light is below 200lux.
- Reference “Fluid Pumping Applications” chart for a list of chemical types and their compatibility with pump materials.  **Failure to follow this warning will void your warranty and could lead to property damage, serious injury or death.** Contact Hypro with any questions about chemicals which can be put through the pump.
- Always read chemical labels and follow recommendations.

Start-Up, Operation, Shutdown

Before Starting the Pump

- For initial setup and test of your system, it is recommended to start with clean water instead of chemical, and confirm the system and plumbing connections are leak free.
- Check water or chemical supply in the tank. Do not run dry.
- Check line strainer for debris or clogs.
- Check all plumbing connections to make sure they are tight.
- Check power source and connections.
- Check all valves and regulators are set to the desired setting and are functioning properly.
- Ensure all hoses are properly positioned and are not damaged in any way.

Priming the Pump

Before starting pump, make sure air bleeder valve or spray gun is open, or unloader valve is adjusted to its lowest pressure. After starting pump, open and close gun several times, if necessary, to aid priming the pump. If pump does not prime within a few seconds, stop motor and inspect installation for suction line leaks or obstructions. Make sure that strainer is not clogged. Be sure that suction line is not obstructed, kinked or blocked.

If the pump is to operate hours at a time, check frequently for:


1. adequate liquid supply. Plunger pumps must not run dry.
2. temperature rise. Overheating is harmful to bearings, cups and ceramic plungers.

Pressure Switch (if equipped)


The pressure switch is used to turn the motor and pump off when the pressure at the discharge of the pump reaches maximum operating pressure. The pressure switch must only be adjusted for the shut-off pressure setting. The pressure switch differential, or turn-on pressure, is a predetermined internal function of the pressure switch and is not adjustable. The spraying or operating pressure should be at least 10% below the setting of the pressure switch in order to prevent rapid cycling in operation.

To adjust the pressure switch:

1. Connect an appropriate gauge and follow system installation guidelines. A pressure control device is needed to adjust discharge line pressure.
2. Per instructions above, with the discharge line open to atmosphere, run the pump until fully primed.
3. Adjust the output pressure control device to the desired switch pressure setting (switch pressure setting should be 10% higher than the desired operating pressure). If the desired switch pressure is reached, and the pump does not cycle on/off (within 2 sec.), proceed to step 5. If the pump begins to cycle on/off, proceed to step 4 to increase the pressure setting.

  **Do not exceed the pressure rating of the given model or the amperage rating of the motor.**

4. To increase the pressure switch setting, turn the 5/64" set screw clockwise until pump runs continuously. Continue to make small adjustments in the output pressure control device and pressure switch setting until your pump runs continuously at the desired switch pressure. Then proceed to step 5 to complete the pressure switch setting process.

 **Do not crank the adjustment screw more than 6 turns from being flush, or the pressure switch will not function.**

5. Once desired switch pressure is reached, slowly adjust the pressure switch 5/64" set screw by turning it counterclockwise to decrease the pressure setting until the pump begins to cycle on/off.
6. Readjust the output pressure control device to the desired operating pressure (10% below switch off pressure).
7. Verify pump runs continuously at desired system pressure. If necessary, repeat the adjustment setting procedure.

⚠ ATTENTION A system relief valve is still required in systems that utilize a demand switch for safe operation. The relief valve should be set at least 10% above the setting for the pressure switch. The relief valve pressure must never be set higher than 10% above the maximum working pressure of the pump.

Operation

Prior to operation, make sure all discharge lines and hoses are secure, and not frayed, and there are no personnel close to the pump. Make sure the tank valve / inlet line to the pump is open, and the gun or wand is open to atmosphere.

Start-Up, Operation, Shutdown - cont'd.

To start the pump, turn on main power switch to start the motor. Make sure pump is primed before proceeding. Adjust spraying nozzle to reach desired spray output.

⚠ ATTENTION Higher pressure requires more amperage. Use only the pressure you need, and do not unnecessarily overload the system.

Duty Cycle

Duty cycle is the ratio of motor-on time to total cycle time in one hour. It is used to determine the acceptable level of running time so that the thermal limits of the motor are not exceeded. Use the following equation and example to determine Duty Cycle: $\text{Duty Cycle} = \text{ON TIME} / [\text{Cycle ON TIME} + (60 \text{ Minutes} - \text{Cycle ON TIME})] * 100$. (ON TIME cannot exceed 60 minutes.)

An example of a 75% Duty Cycle Motor is $= 45 / [45 + (60 - 45)] * 100 = 75\%$ or 45 minutes on time per hour of operation at maximum rated pressure and flow. ON TIME can be extended by reducing the maximum pressure the pump operates at.

Duty cycle is affected by ambient temperature. If operating in extremely hot environments, duty cycles will decrease. Do not run DC electric motors to an external operating temperature over 175°F, or the motor life will be compromised.

Shutting Down

To shut down the unit, first turn the switch or power supply off. Actuate the spray gun trigger to relieve system pressure. Disconnect the pressure hose.

⚠ ATTENTION Always flush and rinse system after every use. Attempt to use the entirety of tank mix each day to avoid settlement or separation of product overnight. A sludge or residue could cause valves to stick or pump to temporarily run dry and permanently damage the pump. Never change chemicals without completely rinsing the tank and whole pumping system. Follow the recommendations on the chemical labels for system flushing and neutralization.

Maintenance and Servicing

Information

- All maintenance should be done when machinery is stationary and has been isolated from its energy sources. It is dangerous to perform maintenance while machinery is still connected to its power source. Machinery should be isolated from its electrical power source by turning the supply disconnect device to its OFF position and locking it in OFF position.
- Be sure to release all pressure from the system before performing any sort of maintenance on a Hypro pump. An easy way to do this is to loosen the end cap on the pump body. Be sure to remember to re-tighten before operating the pump again.
- The lubrication of this pump unit has been done at the factory prior to shipping. If the pump unit is to be repaired or reworked, see work instructions on initial lubrication.
- Protective gloves, clothing, and eye protection should be worn if pumps need to be worked on while in service.
- Any hazardous liquids should be disposed of in a manner which complies with local and national regulations. Never dump fluids onto the ground.

Maintenance, Routine Servicing, and Inspection

Preventative Maintenance Checklist

Check	Daily	Weekly	100 hrs.	500 hrs.	1000 hrs.
Clean Filters	X				
Water Leaks	X				
Plumbing		X			
Pressure Switch			X		
Cam & Bearing				X	
Motor				X	
Pump Seals					X
Pump Valves					X
Pump Body					X

Maintenance, Routine Servicing, and Inspection - cont'd.

- If system performance decreases, check immediately.
- Duty cycle, temperature, quality of fluid being pumped, and inlet feed conditions all affect the life of pump, motor components, and service cycle.
- Remember to service the regulator / unloader and pressure switch setting at each seal servicing, along with all other system accessories and connections prior to resuming operation.

Cleaning

Care of Pump

Your pump will last longer and give best performance when properly taken care of. Proper pump care depends on the liquid being pumped and when the pump will be used again. After each use, flush pump with a neutralizing solution for the liquid just pumped. Follow with a clean water rinse. This is especially important for corrosive chemicals. It is good practice to clean the pump after each use to prevent deposits from forming and damaging the pump. Using an antifreeze/rust inhibitor not only coats the interior of the pump, but acts as a lubricant as well, keeping valves from sticking and protecting against any remaining moisture freezing in cold weather. For infrequent use and before long periods of storage, drain pump thoroughly. Open any drain plugs, remove suction hose from liquid, and blow out pump with air. An antifreeze/rust inhibitor should be injected into the pump before both ports are plugged and the pump is stored. Plug all ports to keep out air until pump is used again.

Disposal

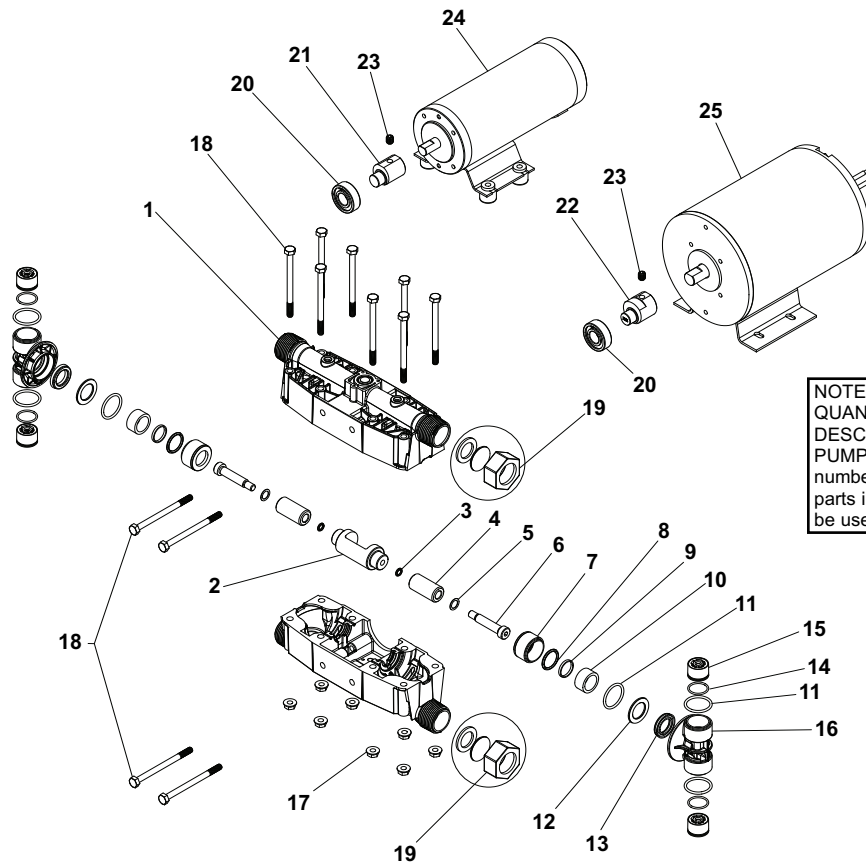
When disposing of a Hypro pump, be sure to remove all fluids from the pump before scrapping. These fluids should be disposed of in a manner which complies with local and national regulations. Never dump fluids onto the ground. Once the pump is free of all fluids, it must be scrapped in accordance with local and national laws.

Replacement Parts

The parts illustrations on the following pages show the pumps and their replacement parts. Only genuine Hypro replacement parts should be used. Failure to follow this warning can result in damage to property, serious injury or death, and will void your warranty. If the pump malfunctions or is defective, it should be sent back to Hypro for service.

Parts Illustration

Models 2130P-D183, 2130P-D355, and 2130P-D359



NOTE: When ordering parts, give QUANTITY, PART NUMBER, DESCRIPTION, and COMPLETE PUMP MODEL NUMBER. Reference numbers are used ONLY to identify parts in the drawing and are NOT to be used as order numbers.

Plunger Packing Kit No. 3430-0631

Contains: Two Ref. 3 o-rings, two Ref. 5 washers, two Ref. 8 o-rings, two Ref. 9 seal rings, two Ref. 10 plunger guides, six Ref. 11 o-rings, and two Ref. 13 u-cup seals.

Plunger Kit No. 3430-0819

Contains one each: Ref. 3 o-ring, Ref. 4 plunger, and Ref. 5 washer.

Valve Kit No. 3430-0632

Contains four each: Ref. 11 o-rings, Ref. 14 o-rings, and Ref. 15 poppet valves.

Pump Head Kit 2130PX

Contains: Items 1 through 19

Eccentric Kit (.145") No. 3430-0651

Contains one each:

Ref. 20 Bearing, Ref. 21 Eccentric, and Ref. 23 Set Screw

Eccentric Kit (.175") No. 3430-0654

Contains one each:

Ref. 20 Bearing, Ref. 22A Eccentric, and Ref. 23 Set Screw

Eccentric Kit (.235") No. 3430-0820

Contains one each:

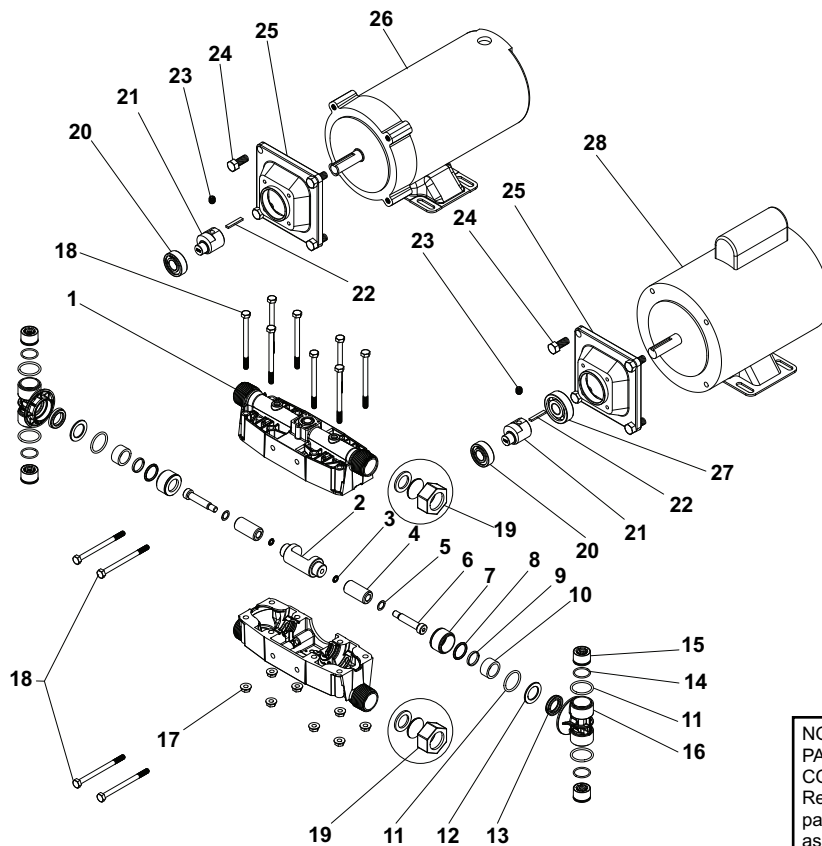
Ref. 20 Bearing, Ref. 22B Eccentric, and Ref. 23 Set Screw

Ref. No.	Qty. Req'd.	Part No.	Description
1	2	0102-2100P	Pump Body (Noryl GTX)
2	1	0500-2130	Connecting Rod
3	2	1720-0033	O-ring
4	2	3500-0070	Plunger
5	2	2270-0015	Washer
6	2	2220-0104	Shoulder Screw
7	2	1830-0171S	Guide Retainer
8	2	1720-0202	O-ring
9	2	1440-0010	Seal Ring
10	2	1440-0086	Plunger Guide
11	6	1721-0227	O-ring
12	2	2270-0095	Washer
13	2	2150-0091	U-Cup Seal

Ref. No.	Qty. Req'd.	Part No.	Description
14	4	1721-0007	O-ring
15	4	3400-0172	Poppet Valve
16	2	0717-2130P	Tee
17	8	2250-0077	Nut
18	12	2210-0137	Bolt
19	2	FNCAP-100N	End Cap Assembly
20	1	2000-0015	Bearing
21	1	0550-2145	Eccentric (.145") 2130P-D183
22A	1	0551-2175	Eccentric (.175") 2130P-D355
22B	1	0551-2235	Eccentric (.235") 2130P-D359
23	1	2230-0003	Set Screw
24	1	2570-0025	Electric Motor: 2130P-D183
25	1	2570-0026	Electric Motor: 2130P-D355, 2130P-D359

Parts Illustration

Models 2130P-A055, 2130P-A079, 2130P-D395, and 2130P-D399



NOTE: When ordering parts, give QUANTITY, PART NUMBER, DESCRIPTION, and COMPLETE PUMP MODEL NUMBER. Reference numbers are used ONLY to identify parts in the drawing and are NOT to be used as order numbers.

Plunger Packing Kit No. 3430-0631

Contains: Two Ref. 3 o-rings, two Ref. 5 washers, two Ref. 8 o-rings, two Ref. 9 seal rings, two Ref. 10 plunger guides, six Ref. 11 o-rings, and two Ref. 13 u-cup seals.

Plunger Kit No. 3430-0819

Contains one each: Ref. 3 o-ring, Ref. 4 plunger, and Ref. 5 washer.

Valve Kit No. 3430-0632

Contains four each: Ref. 11 o-rings, Ref. 14 o-rings, and Ref. 15 poppet valves.

Pump Head Kit 2130PX

Contains: Items 1 through 19

Eccentric Kit (.175") No. 3430-0654

Contains one each:

Ref. 20 Bearing, Ref. 21A Eccentric, Ref. 22 Key, and Ref. 23 Set Screw

Eccentric Kit (.235") No. 3430-0820

Contains one each:

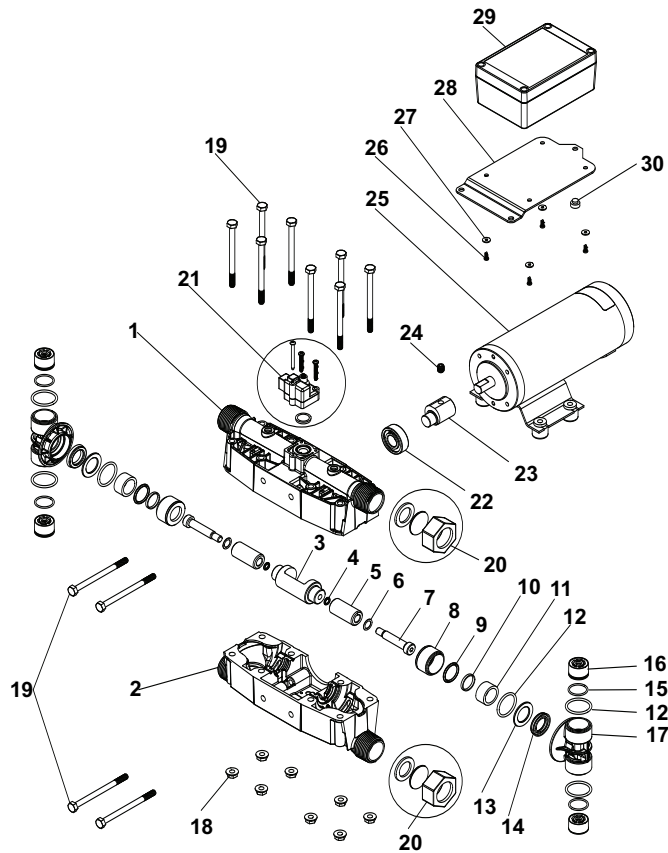
Ref. 20 Bearing, Ref. 21B Eccentric, Ref. 22 Key, and Ref. 23 Set Screw

Ref. No.	Qty. Req'd.	Part No.	Description
1	2	0102-2100P	Pump Body (Noryl GTX)
2	1	0500-2130	Connecting Rod
3	2	1720-0033	O-ring
4	2	3500-0070	Plunger
5	2	2270-0015	Washer
6	2	2220-0104	Shoulder Screw
7	2	1830-0171S	Guide Retainer
8	2	1720-0202	O-ring
9	2	1440-0010	Seal Ring
10	2	1440-0086	Plunger Guide
11	6	1721-0227	O-ring
12	2	2270-0095	Washer
13	2	2150-0091	U-Cup Seal
14	4	1721-0007	O-ring
15	4	3400-0172	Poppet Valve

Ref. No.	Qty. Req'd.	Part No.	Description
16	2	0717-2130P	Tee
17	8	2250-0077	Nut
18	12	2210-0137	Bolt
19	2	FNCAP-100N	End Cap Assembly
20	1	2000-0015	Bearing
21A	1	0551-2175	Eccentric (.175") for 2130P-D395, 2130P-A055
21B	1	0551-2235	Eccentric (.235") for 2130P-D399, 2130P-A079
22	1	1610-0061	Key
23	1	2230-0003	Set Screw
24	4	2210-0020	Bolt
25	1	0706-2100A	Flange Adapter
26	1	2570-0027	Electric Motor (DC): 2130P-D395, 2130P-D399
27	1	2000-0021	Ball Bearing: 2130P-A055, 2130P-A079
28	1	24878-SHU	Electric Motor (AC) 1/2 HP: 2130P-A055
	1	24876-SHU	Electric Motor (AC) 3/4 HP: 2130P-A079

Parts Illustration

Model 2132P-D183



NOTE: When ordering parts, give QUANTITY, PART NUMBER, DESCRIPTION, and COMPLETE PUMP MODEL NUMBER. Reference numbers are used ONLY to identify parts in the drawing and are NOT to be used as order numbers.

Plunger Packing Kit No. 3430-0631

Contains: Two Ref. 4 o-rings, two Ref. 6 washers, two Ref. 9 o-rings, two Ref. 10 seal rings, two Ref. 11 plunger guides, six Ref. 12 o-rings, and two Ref. 14 u-cup seals.

Plunger Kit No. 3430-0819

Contains one each: Ref. 4 o-ring, Ref. 5 plunger, and Ref. 6 washer.

Valve Kit No. 3430-0632

Contains four each: Ref. 12 o-rings, Ref. 15 o-rings, and Ref. 16 poppet valves.

Pump Head Kit 2132PX: 150-250 PSI Pressure Switch

Contains: Items 1 through 21

Eccentric Kit (.145") No. 3430-0651

Contains one each:

Ref. 22 Bearing, Ref. 23 Eccentric, and Ref. 24 Set Screw.

Enclosure Repair Kit No. 3430-0815 (20 amp)

Contains: Four Ref. 26 screws, four Ref. 27 washers, one Ref. 29 enclosure replacement kit 20A, two splice connectors, one shrink tubing, one relay, one circuit breaker, and one wire lead.

Relay Repair Kit No. 3430-0814

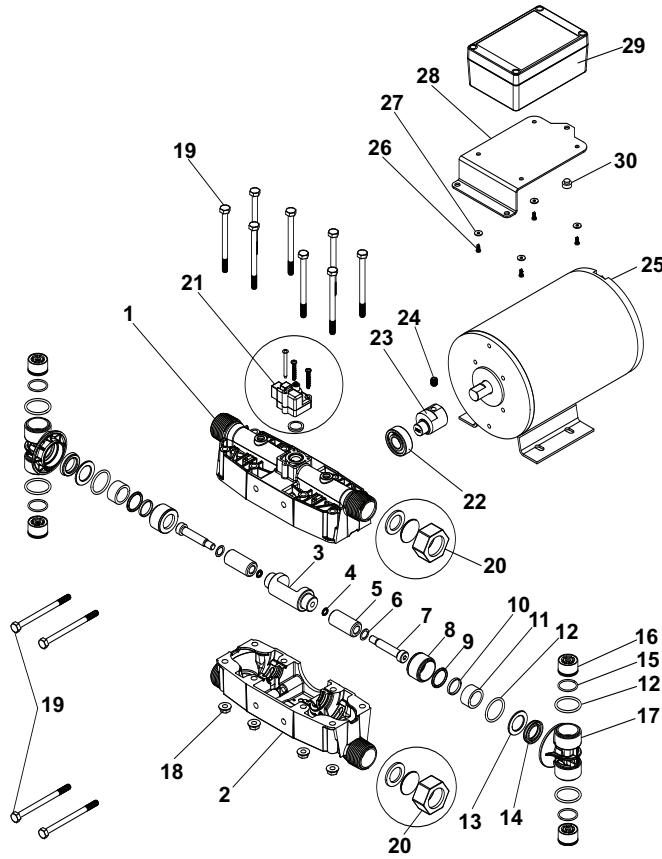
Contains one: Relay Assembly.

Ref. No.	Qty. Req'd.	Part No.	Description
1	1	0102-2101P	Upper Pump Body
2	1	0102-2100P	Lower Pump Body
3	1	0500-2130	Connecting Rod
4	2	1720-0033	O-ring
5	2	3500-0070	Plunger
6	2	2270-0015	Washer
7	2	2220-0104	Shoulder Screw
8	2	1830-0171S	Guide Retainer
9	2	1720-0202	O-ring
10	2	1440-0010	Seal Ring
11	2	1440-0086	Plunger Guide
12	6	1721-0227	O-ring
13	2	2270-0095	Washer
14	2	2150-0091	U-Cup Seal
15	4	1721-0007	O-ring

Ref. No.	Qty. Req'd.	Part No.	Description
16	4	3400-0172	Poppet Valve
17	2	0717-2130P	Tee
18	8	2250-0077	Nut
19	12	2210-0137	Bolt
20	2	FNCAP-100N	End Cap Assembly
21	1	3430-0817	Pressure Switch Kit 150-250 psi, -incl. diaphragm & screws
22	1	2000-0015	Bearing
23	1	0550-2145	Eccentric
24	1	2230-0003	Set Screw
25	1	2570-0025	Electric Motor
26	4	2200-0086	Screw
27	4	2270-0082	Washer
28	1	1520-0125	Bracket
29	1	3430-0815	Enclosure Replacement Kit 20A
30	1	2530-0182	Grommet

Parts Illustration

Models 2132P-D355, 2132P-D359, and 2133P-D355



NOTE: When ordering parts, give QUANTITY, PART NUMBER, DESCRIPTION, and COMPLETE PUMP MODEL NUMBER. Reference numbers are used ONLY to identify parts in the drawing and are NOT to be used as order numbers.

Plunger Packing Kit No. 3430-0631

Contains: Two Ref. 4 o-rings, two Ref. 6 washers, two Ref. 9 o-rings, two Ref. 10 seal rings, two Ref. 11 plunger guides, six Ref. 12 o-rings, and two Ref. 14 u-cup seals.

Plunger Kit No. 3430-0819

Contains one each: Ref. 4 o-ring, Ref. 5 plunger, and Ref. 6 washer.

Valve Kit No. 3430-0632

Contains four each: Ref. 12 o-rings, Ref. 15 o-rings, and Ref. 16 poppet valves.

Pump Head Kit 2132PX: 150-250 PSI Pressure Switch

Contains: Items 1 through 21A

Pump Head Kit 2133PX: 250-350 PSI Pressure Switch

Contains: Items 1 through 21B

Eccentric Kit (.175") No. 3430-0654

Contains one each:

Ref. 22 Bearing, Ref. 23A Eccentric, and Ref. 24 Set Screw.

Eccentric Kit (.235") No. 3430-0820

Contains one each:

Ref. 22 Bearing, Ref. 23B Eccentric, and Ref. 24 Set Screw.

Enclosure Repair Kit No. 3430-0816 (40 amp)

Contains: Four Ref. 26 screws, four Ref. 27 washers, one Ref. 29 enclosure replacement kit 40A, two splice connectors, one shrink tubing, one relay, one circuit breaker, and one wire lead.

Relay Repair Kit No. 3430-0814

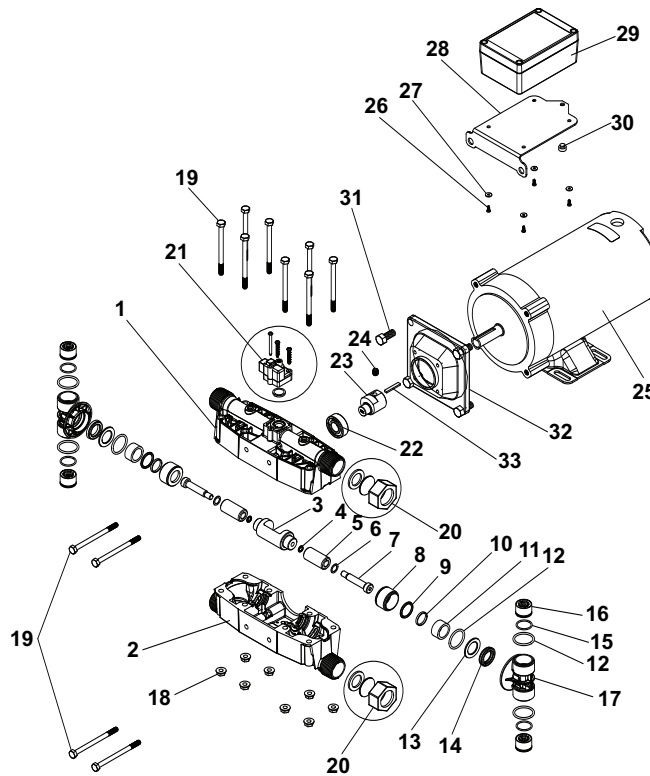
Contains one: Relay Assembly.

Ref. No.	Qty. Req'd.	Part No.	Description
1	1	0102-2101P	Upper Pump Body
2	1	0102-2100P	Lower Pump Body
3	1	0500-2130	Connecting Rod
4	2	1720-0033	O-ring
5	2	3500-0070	Plunger
6	2	2270-0015	Washer
7	2	2220-0104	Shoulder Screw
8	2	1830-0171S	Guide Retainer
9	2	1720-0202	O-ring
10	2	1440-0010	Seal Ring
11	2	1440-0086	Plunger Guide
12	6	1721-0227	O-ring
13	2	2270-0095	Washer
14	2	2150-0091	U-Cup Seal
15	4	1721-0007	O-ring
16	4	3400-0172	Poppet Valve
17	2	0717-2130P	Tee

Ref. No.	Qty. Req'd.	Part No.	Description
18	8	2250-0077	Nut
19	12	2210-0137	Bolt
20	2	FNCAP-100N	End Cap Assembly
21A	1	3430-0817	Pressure Switch Kit: 150-250 psi -incl. diaphragm & screws
21B	1	3430-0818	Pressure Switch Kit: 250-350 psi -incl. diaphragm & screws
22	1	2000-0015	Bearing
23A	1	0551-2175	Eccentric (.175") for 2132P-D355, 2133P-D355
23B	1	0551-2235	Eccentric (.235") for 2132P-D359
24	1	2230-0003	Set Screw
25	1	2570-0026	Electric Motor (DC)
26	4	2200-0086	Screw
27	4	2270-0082	Washer
28	1	1520-0126	Bracket
29	1	3430-0816	Enclosure replacement kit 40A
30	1	2530-0182	Grommet

Parts Illustration

Models 2132P-D395, 2132P-D399, and 2133P-D395



NOTE: When ordering parts, give QUANTITY, PART NUMBER, DESCRIPTION, and COMPLETE PUMP MODEL NUMBER. Reference numbers are used ONLY to identify parts in the drawing and are NOT to be used as order numbers.

Plunger Packing Kit No. 3430-0631

Contains: Two Ref. 4 o-rings, two Ref. 6 washers, two Ref. 9 o-rings, two Ref. 10 seal rings, two Ref. 11 plunger guides, six Ref. 12 o-rings, and two Ref. 14 u-cup seals.

Plunger Kit No. 3430-0819

Contains one each: Ref. 4 o-ring, Ref. 5 plunger, and Ref. 6 washer.

Valve Kit No. 3430-0632

Contains four each: Ref. 12 o-rings, Ref. 15 o-rings, and Ref. 16 poppet valves.

Pump Head Kit 2132PX: 150-250 PSI Pressure Switch

Contains: Items 1 through 21A

Pump Head Kit 2133PX: 250-350 PSI Pressure Switch

Contains: Items 1 through 21B

Eccentric Kit (.175") No. 3430-0654

Contains one each:

Ref. 22 Bearing, Ref. 23A Eccentric, Ref. 24 Set Screw, and Ref. 33 Key.

Eccentric Kit (.235") No. 3430-0820

Contains one each:

Ref. 22 Bearing, Ref. 23B Eccentric, Ref. 24 Set Screw, and Ref. 33 Key.

Enclosure Repair Kit No. 3430-0816 (40 amp)

Contains: Four Ref. 26 screws, four Ref. 27 washers, one Ref. 29 enclosure replacement kit 40A, two splice connectors, one shrink tubing, one relay, one circuit breaker, and one wire lead.

Relay Repair Kit No. 3430-0814

Contains one: Relay Assembly.

Ref. No.	Qty. Req'd.	Part No.	Description
1	1	0102-2101P	Upper Pump Body
2	1	0102-2100P	Lower Pump Body
3	1	0500-2130	Connecting Rod
4	2	1720-0033	O-ring
5	2	3500-0070	Plunger
6	2	2270-0015	Washer
7	2	2220-0104	Shoulder Screw
8	2	1830-0171S	Guide Retainer
9	2	1720-0202	O-ring
10	2	1440-0010	Seal Ring
11	2	1440-0086	Plunger Guide
12	6	1721-0227	O-ring
13	2	2270-0095	Washer
14	2	2150-0091	Seal
15	4	1721-0007	O-ring
16	4	3400-0172	Poppet Valve
17	2	0717-2130P	Tee
18	8	2250-0077	Nut

Ref. No.	Qty. Req'd.	Part No.	Description
19	12	2210-0137	Bolt
20	2	FNCAP-100N	End Cap Assembly
21A	1	3430-0817	Pressure Switch Kit: 150-250 psi -incl. diaphragm & screws
21B	1	3430-0818	Pressure Switch Kit: 250-350 psi -incl. diaphragm & screws
22	1	2000-0015	Bearing
23A	1	0551-2175	Eccentric (.175") for 2132P-D395, 2133P-D395
23B	1	0551-2235	Eccentric (.235") for 2132P-D399
24	1	2230-0003	Set Screw
25	1	2570-0027	Electric Motor (DC)
26	4	2200-0086	Screw
27	4	2270-0082	Washer
28	1	1520-0127	Bracket
29	1	3430-0816	Enclosure replacement kit 40A
30	1	2530-0182	Grommet
31	4	2210-0020	Bolt
32	1	0706-2100A	Flange Adapter
33	1	1610-0061	Key

Troubleshooting

Troubleshooting Guide

Symptom	Probable Cause(s)	Corrective Action(s)
No flow or low flow	Pump not primed	Refer to Priming in the Operation section.
	Air leak in suction line	Check and reseal inlet fittings.
	Blocked or clogged line strainer	Inspect strainer and clear any debris from screen.
	Undersize suction line or collapsed hose	Suction line should be the same diameter as inlet port of pump or larger.
	Nozzle clogged	Clear nozzle or replace.
	Low voltage at motor	Increase wire size.
	Unloader or relief valve not functioning properly	Repair or replace relief valve.
Loss of pressure	Pump incorrectly rebuilt	Disassemble and rebuild per Repair Instructions section.
	Debris in valves	Remove debris. See Repair section.
	Valves worn	Replace valves. See Repair section.
	Unloader or relief valve not functioning properly	Repair or replace relief valve.
	Worn nozzle	Replace nozzle of proper size.
	Pump not primed	Refer to Priming in the Operation section.
Pulsation, pump runs extremely rough	Faulty pressure accumulator or pulse hose	Check pre-charge for accumulator (30-50% of system pressure) or replace as needed.
	Stuck inlet or discharge check valve	Clean or replace valve. See Repair section.
	Air leak in suction line	Check and reseal inlet fittings.
Pump leaking	Seals worn	Replace seals. See Repair section.
	Body cracked	Replace body. See Repair section.
	Tee fitting cracked	Replace component. See Repair section.
Motor does not turn on	Circuit breaker tripped	Reset circuit breaker.
	Fuse blown	Replace fuse.
	Pressure switch worn	Replace pressure switch. See Repair section.
	Relay worn	Replace relay. See Repair section.
	Motor worn	Replace motor. See Repair section.
	Pump seized / frozen	Repair or replace pump. See Repair section.
Motor turns on and off rapidly	Outlet restricted / Nozzle clogged	Clear nozzle or replace.
	Improperly sized nozzle	Refer to Operating instructions.
	Pressure switch setting incorrect	Refer to Operating instructions.
	System relief improperly set, or bleeding off pressure	Adjust relief valve per Operating Instructions, or replace relief valve.
Pressure switch does not turn motor off	Pressure switch setting incorrect	Refer to Operating instructions.
	Relay worn, contacts fused together	Replace relay. See Repair section.
	Switch worn or stuck	Replace switch. See Repair section.

Table 2

Repair Instructions

⚠ Before disassembly, be sure to follow all precautions to relieve pressure from the pump, and properly flush the pump of all chemicals.

1. Remove pump head from motor. With a 7/16" socket, remove the four bolts on the front of the pump connected to the motor. Remove pump head.
2. Disassemble pump head. With a 7/16" socket, loosen the eight flanged nuts that hold the two body halves together. Remove bolts and gently pry the pump body halves apart. With a flat screwdriver, pry the internal connecting rod and valve casings from the body.

3. Inspection of Pump Parts

When disassembling pump, thoroughly inspect all parts and replace if necessary, with special consideration given to the following areas:

- a. Cam Bearing: Rotate bearing. It should turn smooth without a rough or loose feeling to it. Replace if necessary. If bearing has been flooded with solution due to failure of the seal, it should be replaced.
- b. Connecting Rod: Check clearance on the wear surface with feeler gauge between bearing and flat surface. It should be less than 0.010". Excessive noise and loss of performance will occur if clearance is too great.
- c. Elastomers: O-rings and U-cup should always be replaced when pump is serviced. Elastomers take a set with age and do not energize in a dynamic condition as new parts will. Reusing these parts may cause leaks or premature failure to occur. Running a plunger pump dry will cause the U-cup to fail due to the high heat generated by friction on non-lubricated surfaces.
- d. Valves: Inspect for pitting and general wear in the valve assembly. Poppets wear against the valve seat. Valves will leak if worn unevenly or pitted, resulting in loss of performance and increased vibration accompanied by reduced flow.
- e. Carbon Plunger Guide: Inspect guides for wear and replace if necessary. Worn guides and spacers put stress on the U-cups and will cause early failure of these parts.
- f. Plunger: Plungers may show discoloration due to the solutions being pumped. Inspect for pits, fissures & cracks. Replace if any are found. Ceramic material cracks from thermal shock are usually caused by running the pump dry followed by a sudden shock of cold solution.
- g. Body and Valve Casing: Inspect parts for cracks, worn surfaces or chemical attack.

1. Plunger / Connecting Rod Assembly: (Figure 6)

Skip this step if assembly was left untouched, otherwise assemble stainless steel washer onto shoulder screw and slide ceramic plunger over bolt. Lubricate o-ring, and roll it over the end of the bolt threads until tight against the plunger. Spray Loctite activator on threads and then apply blue Loctite to threads. (Stainless steel requires activator for Loctite to adhere.) Thread bolt into connecting rod and tighten with 3/16" Allen wrench, while holding connecting rod with a crescent wrench or in a vise (Figure 7). Shoulder bolt should be tightened to approximately 100 to 115 in-lbs.

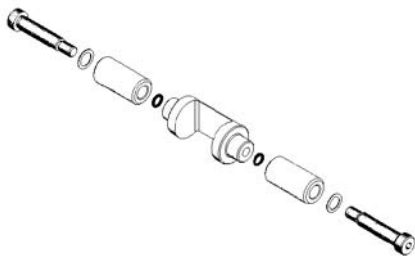


Figure 6



Figure 7

Repair Instructions

2. Guide Retainer Assembly: (Fig. 8)

Assemble vacuum seal by lubricating o-ring with oil, then slipping Teflon® seal ring inside o-ring. Carefully insert vacuum seal assembly into guide retainer at an angle and part way in (Fig. 9). Align carbon plunger guide with the guide retainer, cup and start pushing it in. With a constant force, push carbon guide all the way down. This will align and locate the vacuum seal correctly against the bottom. Carbon guide should be nearly even with the top of the metal plunger guide retainer when fully assembled.

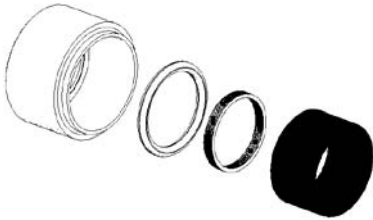


Figure 8



Figure 9

3. Tee Fitting Assembly: (Fig. 10)

Lubricate o-ring on valve with oil and push valve in casing as shown in Figure 10. Note: The cage should always be on the upper side of the assembly. Solution enters the valve through the stainless steel metal seat of the valve and exits through the plastic cage. On the plunger side of the casing, insert the U-cup with the open side facing in. This allows the pressure of the liquid to spread the lips of the U-cup and energize it to seal against the ceramic plunger. Insert metal backup ring and then the o-ring to finish assembly.



Figure 10

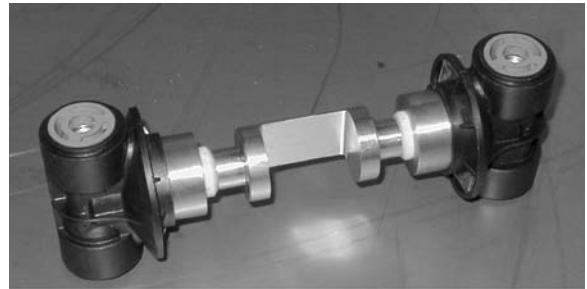


Figure 11

4. Assemble Sub-Assemblies:

Lubricate the o-ring inside the Tee Fitting Assembly with oil or vacuum grease. Push Guide Retainer Assembly into the Tee Fitting Assembly until it fits over the o-ring. Repeat for other Tee Fitting Assembly. Next the full Tee Fitting Assemblies with Guide Retainer Assembly are installed, onto the plunger rod assembly. Repeat for the other side of plunger. Check orientation: inlet valve side of valve casing (metal seat side of valve) towards the bottom and the plastic cage side up. The connecting rod cupped face should be orientated to face the motor pilot of the body half (Fig. 11).

5. Final Pump Head Assembly:

Lubricate and insert O-ring No. 1721-0227 into the bottom of the pump body's two circular cavities (Fig.12). Use grease or vacuum seal grease to hold o-rings in place. Carefully place sub-assembly into pump body's lower half. Slide or reposition parts to get the assembly to fit into place (Fig. 13). Extra care is usually necessary for positioning of the plunger guide. Next, place lubricated o-rings in upper body half and squeeze lower body with subassembly into upper body. Some lateral pressure will have to be applied to the two valve casings to get them to feed into the pump body. Once the two identical body halves are together, drop the bolts in so that the flanged nuts are positioned on the bottom (inlet) side. Tighten nuts to 45 in-lbs. Finally, lubricate connecting rod with wheel bearing grease (three pumps of grease gun). Pump head is now ready for assembly onto motor or gas engine.

Repair Instructions - cont'd.



Figure 12

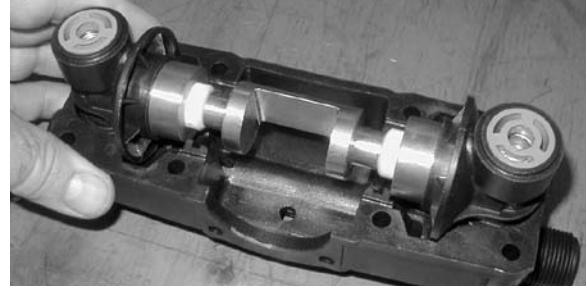


Figure 13

6. Shaft Eccentric and Bearing:

Be sure the correct eccentric is assembled onto your motor. Over-sizing the eccentric may cause damage to the motor. Check the parts breakdown for correct sizing. Press bearing onto shaft eccentric using an arbor press. Apply anti-seize lubricant to the internal bore of the eccentric to allow for easier removal during future service. Assemble eccentric shaft onto motor shaft with the flat surface aligned with the set screw. Tighten set screw down onto the shaft using a $5/32$ " Allen wrench. Front face of bearing should be no further than a 1.68" (1-11/16") distance from the mounting face that the pump mates up with. If the bearing distance is too great, interference can prevent the motor from turning or decrease bearing life. Next, align pump head with pilot on motor. Check that bearing is not interfering with connecting rod. Adjust eccentric shaft further back if necessary.

7. Install Pump Head onto Motor:

Install four (4) hex head cap screws into the four mounting holes on the front of the pump, and attach pump head onto motor. Tighten screws to 45 in-lbs. If your motor has a 56C face, you will need to use an adapter flange as well as a $3/32$ " X $3/16$ " rectangular key to create the flat for the set screw to lock on.

Notes

Notes

Notes

Limited Warranty on Hypro/SHURflo Agricultural Pumps & Accessories

Hypro/SHURflo (hereafter, "Hypro") agricultural products are warranted to be free of defects in material and workmanship under normal use for the time periods listed below, with proof of purchase.

- Pumps: one (1) year from the date of manufacture, or one (1) year of use. This limited warranty will not exceed two (2) years, in any event.
- Accessories: ninety (90) days of use.

This limited warranty will not apply to products that were improperly installed, misapplied, damaged, altered, or incompatible with fluids or components not manufactured by Hypro. All warranty considerations are governed by Hypro's written return policy.

Hypro's obligation under this limited warranty policy is limited to the repair or replacement of the product. All returns will be tested per Hypro's factory criteria. Products found not defective (under the terms of this limited warranty) are subject to charges paid by the returnee for the testing and packaging of "tested good" non-warranty returns.

No credit or labor allowances will be given for products returned as defective. Warranty replacement will be shipped on a freight allowed basis. Hypro reserves the right to choose the method of transportation.

This limited warranty is in lieu of all other warranties, expressed or implied, and no other person is authorized to give any other warranty or assume obligation or liability on Hypro's behalf. Hypro shall not be liable for any labor, damage or other expense, nor shall Hypro be liable for any indirect, incidental or consequential damages of any kind incurred by the reason of the use or sale of any defective product. This limited warranty covers agricultural products distributed within the United States of America. Other world market areas should consult with the actual distributor for any deviation from this document.

Return Procedures

All products must be flushed of any chemical (ref. OSHA section 1910.1200 (d) (e) (f) (g) (h)) and hazardous chemicals must be labeled/tagged before being shipped* to Hypro for service or warranty consideration. Hypro reserves the right to request a Material Safety Data Sheet from the returnee for any pump/product it deems necessary. Hypro reserves the right to "disposition as scrap" products returned which contain unknown fluids. Hypro reserves the right to charge the returnee for any and all costs incurred for chemical testing, and proper disposal of components containing unknown fluids. Hypro requests this in order to protect the environment and personnel from the hazards of handling unknown fluids.

Be prepared to give Hypro full details of the problem, including the model number, date of purchase, and from whom you purchased your product. Hypro may request additional information, and may require a sketch to illustrate the problem.

Contact Hypro Service Department at 800-468-3428 to receive a Return Merchandise Authorization number (RMA#). Returns are to be shipped with the RMA number clearly marked on the outside of the package. Hypro shall not be liable for freight damage incurred during shipping. Please package all returns carefully. All products returned for warranty work should be sent **shipping charges prepaid** to:

HYPRO / PENTAIR
Attention: Service Department
375 Fifth Avenue NW
New Brighton, MN 55112

For technical or application assistance, call the **Hypro Technical/Application number: 800-445-8360**, or send an email to: **technical@hypropumps.com**. To obtain service or warranty assistance, call the **Hypro Service and Warranty number: 800-468-3428**; or send a fax to the **Hypro Service and Warranty FAX: 651-766-6618**.

*Carriers, including U.S.P.S., airlines, UPS, ground freight, etc., require specific identification of any hazardous material being shipped. Failure to do so may result in a substantial fine and/or prison term. Check with your shipping company for specific instructions.