

**CRANE**

PUMPS & SYSTEMS



**Pre-Approval Submittal Overview of Equipment  
For  
Barnes™ Grinder Pump Stations**

Project: County of Brunswick, North Carolina  
Public Utilities Administration  
Utilities Operation Center  
Attn: Grinder Pump Station Packages  
250 Grey Water Road NE  
Supply, NC 28462  
PH: 910-253-2681

Representative: Pumps, Parts, and Service, Inc.  
9325 Forsyth Park Drive  
Charlotte, NC 28273  
PH: 704-588-6250  
FX: 704-588-6258  
Attn: Scott Dellinger

Prepared by: Crane Pumps & Systems, Inc.  
Attn: Scott Krites, P.S. Applications  
PH: 937-773-2772 ext 3044

**County of Brunswick, NC**

**Technical Specifications**

**for**

**Grinder Pump Station Packages**

**REVIEWED**

*By Scott Krites at 10:32 am, Sep 01, 2010*

## **Tank**

- YES Tank shall be constructed of High Density Polyethylene or Fiberglass Polyester Resin to withstand normal exposure to 150 percent of the maximum external soil and hydrostatic pressure.
- YES Tank capacity shall have reserve storage of 360 gallons above the pump on level.
- YES Tank base shall contain a sufficient collar to allow for the required anti-floatation ballast. This may be constructed so that the collar can be easily installed during installation.
- YES Tank top shall contain an aluminum hatch with access door to allow for inspection and maintenance, also the ability to lock top with a standard padlock for safety.
- YES Tank internal discharge piping shall include Shut-off Valve, Check Valve and 1 1/4 " discharge pipe.
- YES Tank shall include a stainless steel 4-way float bracket to hang 3 floats and pump power cord and a 2" NPT female electrical discharge coupling located at the top side of tank.

## **Control Panel**

- YES The control panel shall be a NEMA watertight enclosure with a hinged lockable cover.
- YES The panel shall have two 15 amp single pole breakers for separate control and alarm circuits. One two pole breaker sized to pump full load amps for each pump.
- YES Panel to have a Visual Alarm mounted to the top of panel, wired to stay on until wet well drops below high level float setting. An audio alarm externally mounted with a push-to-silence button.
- YES Motor starter shall be designed for continuous operation and equipped with thermal overloads sized for normal current load range. SKRITES - OVERLOADS ARE CONTAINED WITHIN THE MOTOR ASSEMBLY FOR THE BARNES MODELS OGP AND OGV SERIES GRINDERS
- YES Control system design shall be equipped to operate from mini float level sensors.
- YES Duplex Panel shall contain a manual emergency power transfer switch and generator receptacle. An automatic programmable phone dialer to include alarm points for high level, power loss, and control system failure.

## **Grinder Pump**

- YES The grinder pump shall be designed to be suitable for domestic wastewater service.
- YES Pump motor shall not exceed 2 HP and operate at 230-240 volts 1 phase.
- YES Grinder assembly shall be constructed of stainless steel material and capable of reducing all components in normal domestic sewage.
- YES Pump/core shall be provided with a mechanical shaft seal to prevent leakage between the motor and pump.

**REVIEWED**

**By Scott Krites at 10:33 am, Sep 01, 2010**

### **Spare Parts**

The manufacturer shall supply the following equipment as spare parts with the purchase of every 50 grinder pump station packages:

- YES A) One complete replacement pump.
- YES B) One motor starter with overload assembly. S KRITES - OVERLOAD IS PART OF THE PUMP MOTOR ASSEMBLY  
MOTOR START CAN BE PROVIDED SEPERATELY
- YES C) One set of replacement floats.
- YES D) One set capacitors. S KRITES - CAPACITORS ARE INCLUDED AS PART OF THE MOTOR ASSEMBLY.  
INDIVIDUAL CAPACITORS OR COMPLETE MOTOR ASSEMBLY CAN BE  
PROVIDED FOR SPARE PARTS NEEDS.

### **Warranty**

YES The manufacturer shall provide a 24-month warranty of all defects from the date of installation by the County but not to exceed 30 months from the date of receipt of purchase.

S KRITES - STANDARD CRANE PUMPS & SYSTEMS, INC. 36 MONTH WARRANTY PROVIDED. SEE WARRANTY PAGE PROVIDED WITHIN THIS SUBMITTAL FOR TERMS AND CONDITIONS.

### **Delivery**

YES The system shall be delivered to the County of Brunswick in first-class operating condition. Acceptance of the system shall be subject to inspection and approval by County personnel. All freight shall be prepaid and included in the unit price.

**REVIEWED**

**By Scott Krites at 10:33 am, Sep 01, 2010**

# CRANE

## PUMPS & SYSTEMS

Date: 09/01/2010

Re: Flex Hose System Project References

<u>Owner/Contact</u>	<u>Engineer/Contact</u>	<u>Number of Stations/ Type</u>	<u>Pump Type</u>	<u>Year Installed</u>
City of Lookout Mountain, GA 1214 Lula Lake Rd. Lookout Mountain, GA 30750 Brad Haven PH:706-820-1586	Consolidated Technologies, Inc. Chattanooga, TN Joseph Bishop PH: 423-267-7613	432 UltraGrind	SGV	1998-2002
Swan Quarter Sanitary District PO Box 21 Swan Quarter, NC 27885 Jeffrey Stotesberry PH: 252-542-0901	MacConnell & Associates, P.C. PO Box 3096 Cary, NC 27513 Gary MacConnell PH: 919-467-1239	269 UltraGrind	SGV	2002
Regional Utilities, FL 4430 East U.S. HWY 98 Santa Rosa Beach, FL 32459 Sylvia Daniel 850-231-9609 (On-going orders)	No Specifying Engineer	500 UltraGrind	SGVF	2006-2010

## BASIN BALLAST REQUIREMENTS

### 63 LB. PER CUBIC FOOT OF VOLUME REQUIRED

SIZE Dia X Ht	BASIN VOLUME	REQUIRED BALLAST	REQUIRED BALLAST
	CU. FT.	LBS.	CU. FT.
24 x 48	12.57	791.8	5.5
24 x 60	15.71	989.7	7.0
24 x 72	18.85	1187.7	8.5
24 x 78	20.44	1287.9	9.1
24 x 84	22.00	1386.4	9.9
24 x 90	23.58	1485.8	10.6
24 x 96	25.16	1585.2	11.3
24 x 108	28.30	1783.2	12.7
24 x 120	31.45	1981.1	14.1
24 x 144	37.73	2377.0	17.0
30 x 48	19.64	1237.4	8.8
30 x 60	24.55	1546.5	11.0
30 x 72	29.45	1855.6	13.3
30 x 78	31.91	2010.6	14.4
30 x 84	34.40	2164.7	15.5
30 x 90	36.77	2316.4	16.5
30 x 96	39.28	2474.7	17.7
30 x 108	44.19	2783.8	20.0
30 x 120	49.09	3093.0	22.0
30 x 144	58.90	3711.2	25.7
36 x 48	28.30	1783.2	12.7
36 x 60	35.38	2228.8	15.9
36 x 72	42.45	2674.3	19.1
36 x 78	45.99	2897.5	20.7
36 x 84	49.52	3119.9	22.3
36 x 90	53.07	3343.1	23.8
36 x 96	56.61	3566.3	25.5
36 x 108	63.68	4011.9	28.7
36 x 120	70.75	4457.5	31.8
36 x 132	77.77	4899.7	35.0
36 x 144	85.00	5348.7	38.2
36 x 150	88.37	5567.7	39.8
42 x 48	38.49	2425.0	17.3
42 x 60	48.11	3030.6	21.6
42 x 72	57.73	3637.1	26.0
42 x 78	62.54	3940.3	28.1
42 x 84	67.35	4243.6	30.3
42 x 90	72.17	4546.8	32.5
42 x 96	76.98	4850.0	34.6
42 x 108	86.59	5455.6	38.9
42 x 120	96.22	6062.1	43.3
42 x 144	115.48	7275.0	51.9
48 x 48	50.27	3167.1	22.6
48 x 60	62.81	3957.2	28.3
48 x 72	75.37	4748.1	33.9
48 x 78	81.65	5144.0	36.7
48 x 84	87.93	5539.9	39.5
48 x 90	94.21	5935.8	42.4
48 x 96	100.50	6331.6	45.2
48 x 108	113.06	7122.6	50.8
48 x 120	125.62	7914.3	56.5
48 x 144	164.12	10339.3	73.8
60 x 48	78.54	4948.6	35.3
60 x 60	98.19	6185.9	44.2
60 x 72	117.83	7423.3	53.0
60 x 78	127.64	8041.5	57.4
60 x 84	137.47	8660.6	62.0
60 x 90	147.28	9279.0	66.3
60 x 96	157.10	9897.1	70.6
60 x 108	176.73	11134.5	79.5
60 x 120	196.37	12371.9	88.4
60 x 144	235.66	14846.6	106.0
72 x 162	381.75	24050.5	171.8

**NOTES:**

- 1) Gallons x .1337 = cu. ft.
- 2) One cu. ft. ballast = 140 lbs.

# BARNES®



## Limited 3 Year Warranty

Crane Pumps & Systems warrants that products of our manufacture will be free of defects in material and workmanship under normal use and service for thirty-six (36) months after manufacture date, when installed and maintained in accordance with our instructions. This warranty gives you specific legal rights, and there may also be other rights which vary from state to state. In the event the product is covered by the Federal Consumer Product Warranties Law (1) the duration of any implied warranties associated with the product by virtue of said law is limited to the same duration as stated herein, (2) this warranty is a LIMITED WARRANTY, and (3) no claims of any nature whatsoever shall be made against us, until the ultimate consumer, his successor, or assigns, notifies us in writing of the defect, and delivers the product and/or defective part(s) freight prepaid to our factory or nearest authorized service station. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply. **THE SOLE AND EXCLUSIVE REMEDY FOR BREACH OF ANY AND ALL WARRANTIES WITH RESPECT TO ANY PRODUCT SHALL BE TO REPLACE OR REPAIR AT OUR ELECTION, F.O.B. POINT OF MANUFACTURE OR AUTHORIZED REPAIR STATION, SUCH PRODUCTS AND/OR PARTS AS PROVEN DEFECTIVE. THERE SHALL BE NO FURTHER LIABILITY, WHETHER BASED ON WARRANTY, NEGLIGENCE OR OTHERWISE.** Unless expressly stated otherwise, guarantees in the nature of performance specifications furnished in addition to the foregoing material and workmanship warranties on a product manufactured by us, if any, are subject to laboratory tests corrected for field performance. Any additional guarantees, in the nature of performance specifications must be in writing and such writing must be signed by our authorized representative. Due to inaccuracies in field testing if a conflict arises between the results of field testing conducted by or for user, and laboratory tests corrected for field performance, the latter shall control. **RECOMMENDATIONS FOR SPECIAL APPLICATIONS OR THOSE RESULTING FROM SYSTEMS ANALYSES AND EVALUATIONS WE CONDUCT WILL BE BASED ON OUR BEST AVAILABLE EXPERIENCE AND PUBLISHED INDUSTRY INFORMATION. SUCH RECOMMENDATIONS DO NOT CONSTITUTE A WARRANTY OF SATISFACTORY PERFORMANCE AND NO SUCH WARRANTY IS GIVEN.**

This warranty shall not apply when damage is caused by (a) improper installation, (b) improper voltage (c) lightning (d) excessive sand or other abrasive material (e) scale or corrosion build-up due to excessive chemical content. Any modification of the original equipment will also void the warranty. We will not be responsible for loss, damage or labor cost due to interruption of service caused by defective parts. Neither will we accept charges incurred by others without our prior written approval.

This warranty is void if our inspection reveals the product was used in a manner inconsistent with normal industry practice and/or our specific recommendations. The purchaser is responsible for communication of all necessary information regarding the application and use of the product. **UNDER NO CIRCUMSTANCES WILL WE BE RESPONSIBLE FOR ANY OTHER DIRECT OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO TRAVEL EXPENSES, RENTED EQUIPMENT, OUTSIDE CONTRACTOR FEES, UNAUTHORIZED REPAIR SHOP EXPENSES, LOST PROFITS, LOST INCOME, LABOR CHARGES, DELAYS IN PRODUCTION, IDLE PRODUCTION, WHICH DAMAGES ARE CAUSED BY ANY DEFECTS IN MATERIAL AND/OR WORKMANSHIP AND/OR DAMAGE OR DELAYS IN SHIPMENT. THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER EXPRESS OR IMPLIED WARRANTY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.**

No rights extended under this warranty shall be assigned to any other person, whether by operation of law or otherwise, without our prior written approval.

Pump Model/Serial #: \_\_\_\_\_ Job Name: \_\_\_\_\_

Sales Order #: \_\_\_\_\_ Date: \_\_\_\_\_

Factory Authorized Signature: \_\_\_\_\_ Title: \_\_\_\_\_

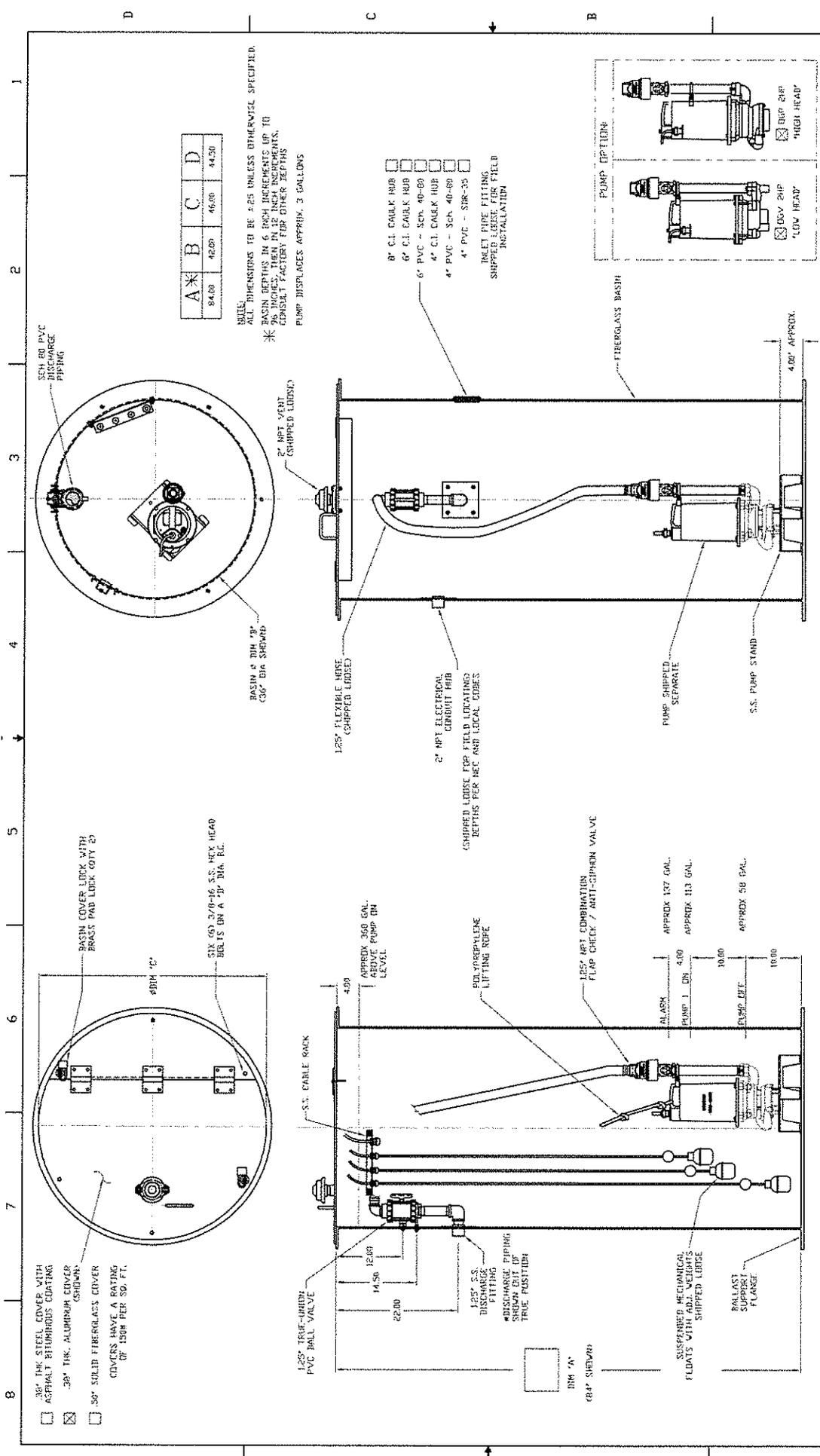
**CRANE**

**PUMPS & SYSTEMS**

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420 Third Street  
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Phone: (937) 778-8947  
Fax: (937) 773-7157  
www.cranepumps.com

83 West Drive, Bramton  
Ontario, Canada L6T 2J6  
Phone: (905) 457-6223  
Fax: (905) 457-2650



A*	B	C	D
84.00	42.00	46.00	44.20

**TITLE**  
 SIMPLEX FLEX HOSE SYSTEM - BRUNSWICK, CO., NC

**CAGE NO**  
 96046

**REV**  
 A

**CD-BRUNSWICK-SFHS**

**CRANE**

**PUMPS & SYSTEMS**

**DWG NO**  
 CD-BRUNSWICK-SFHS

**REVISION**  
 A

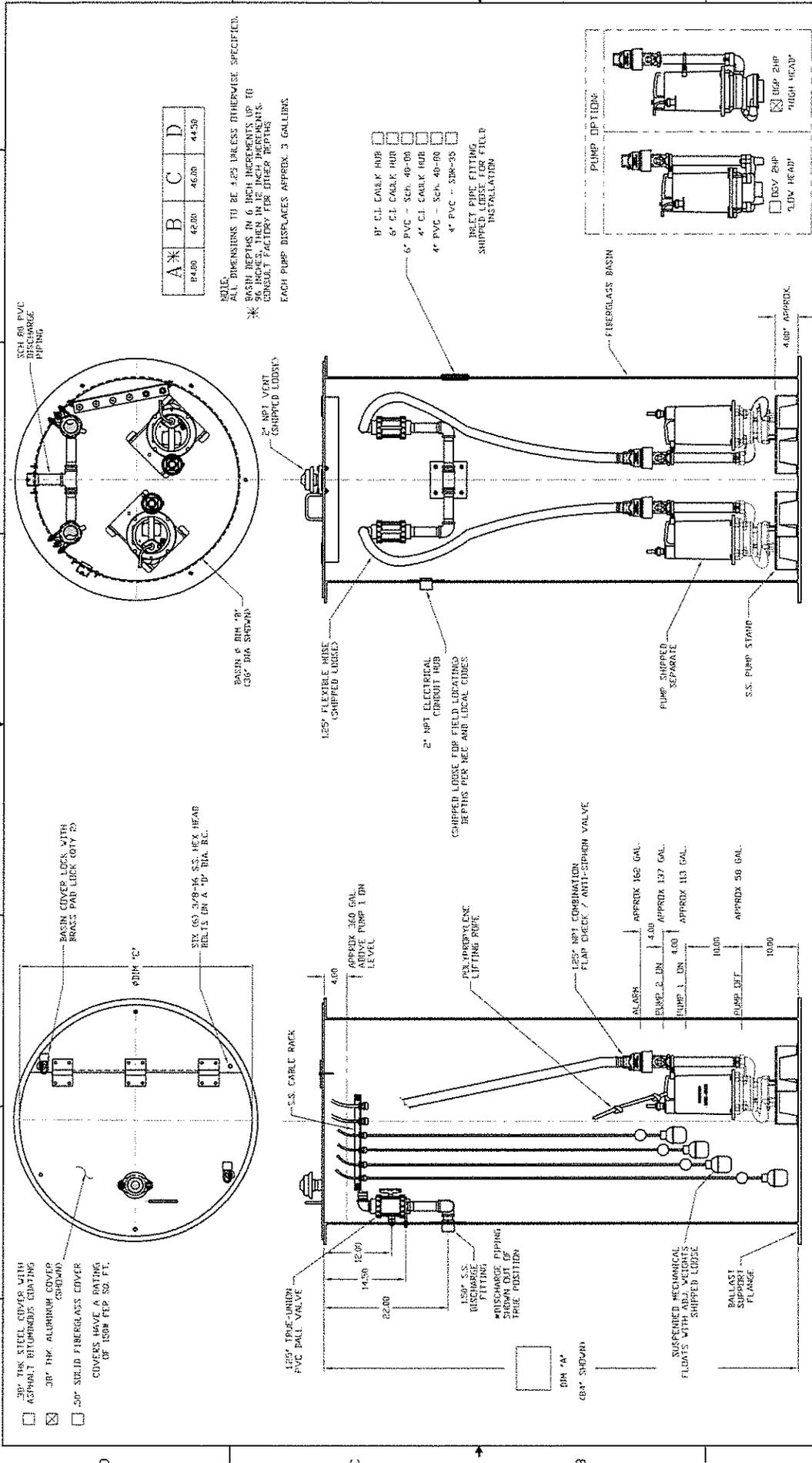
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**SHEET 1 OF 1**

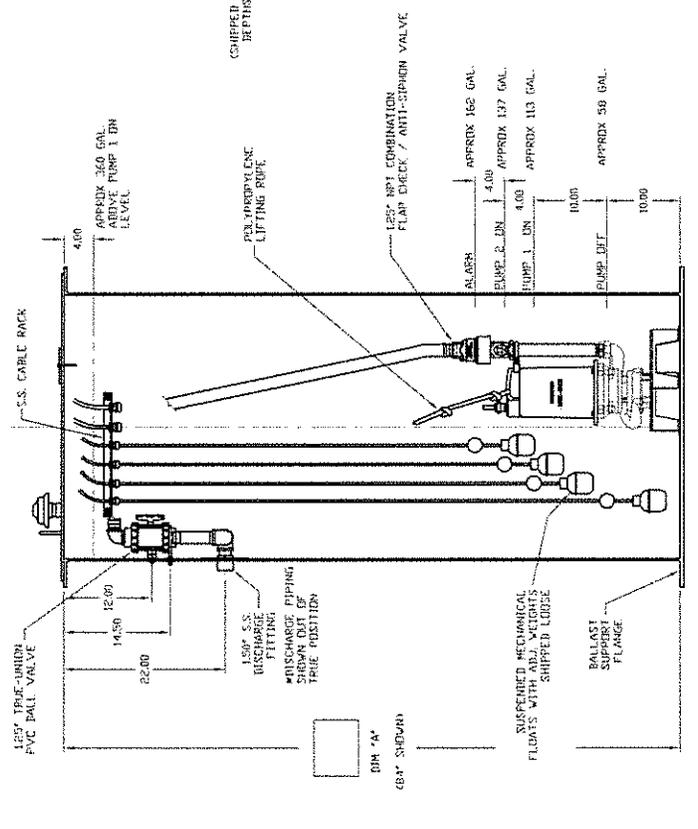
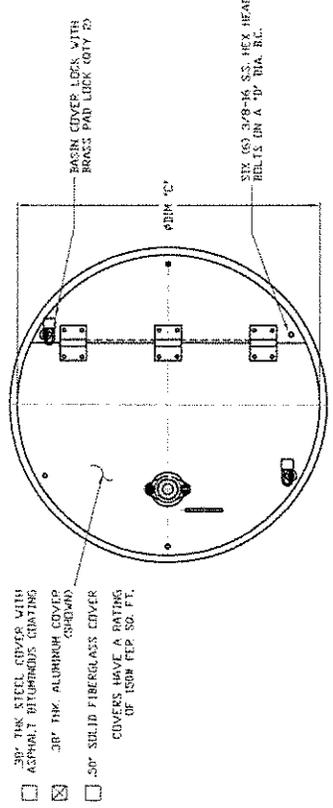
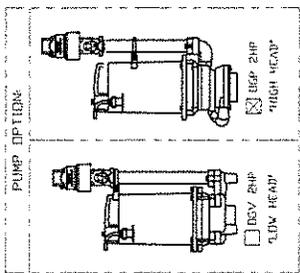
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A*	B	C	D
84.00	42.00	46.00	44.50

NOTE:  
ALL DIMENSIONS TO BE 4:25 UNLESS OTHERWISE SPECIFIED.  
BASIN DEPTHS IN 6 INCH INCREMENTS UP TO 56 INCHES, THEN IN 12 INCH INCREMENTS. CONSULT FACTORY FOR OTHER DEPTHS.  
EACH PUMP DISPLACES APPROX. 3 GALLONS.

- 8" C.I. CALK HUB
  - 6" C.I. CALK HUB
  - 6" PVC - SCH. 40-80
  - 4" C.I. CALK HUB
  - 4" PVC - SCH. 40-80
  - 4" PVC - SCH. 80-35
- INLET PIPE FITTING  
SHIPPED FOR FIELD  
INSTALLATION



CASE NO. **96046**

**DUPLEX FLEX HOSE SYSTEM - BRUNSWICK, CO., NC**

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REV **A** **CD-BRUNSWICK-DFHS** **CRANE** **PS**

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WWW.BARNES-PS.COM SHEET 1 OF 1

# BARNES®

## Pressure Sewer Systems

# omni GRIND™

CENTRIFUGAL GRINDER PUMPS *plus*

The Omni Grind Plus provides heads up to 200' and flows to 28gpm. With the high head capabilities of a progressive cavity pump and the long life of Barnes centrifugal grinder pumps, the Omni Grind Plus is truly a universal grinder pump for single family residents.

### Superior Performance

- Two stage pump design provides high head capability
- Installed with the Barnes ESPS, (Environmentally Sealed Pressure Switch) problems with grease build up are nonexistent
- Start and run capacitors are located in the motor housing so no expensive control panel required
- UL and CSA listed to assure quality and electrical safety
- 1 1/4" NPT vertical connection in removable discharge flange makes installation a breeze

### Long Life

- Centrifugal grinder pumps recognized for reliable and trouble free operation
- Recessed impeller creates a vortex action for minimal component wear
- Two stage design allows pump to run continuously at high or low heads
- 100,000 hour L-10 rated angular contact bearing easily handles any pump load
- Silicon carbide, single mechanical seals hold up to damaging grit
- Oil filled motor for superior cooling
- Built in, automatic resetting overload protection extends motor life
- Exclusive Slicerator has superior grinding action which eliminates jams

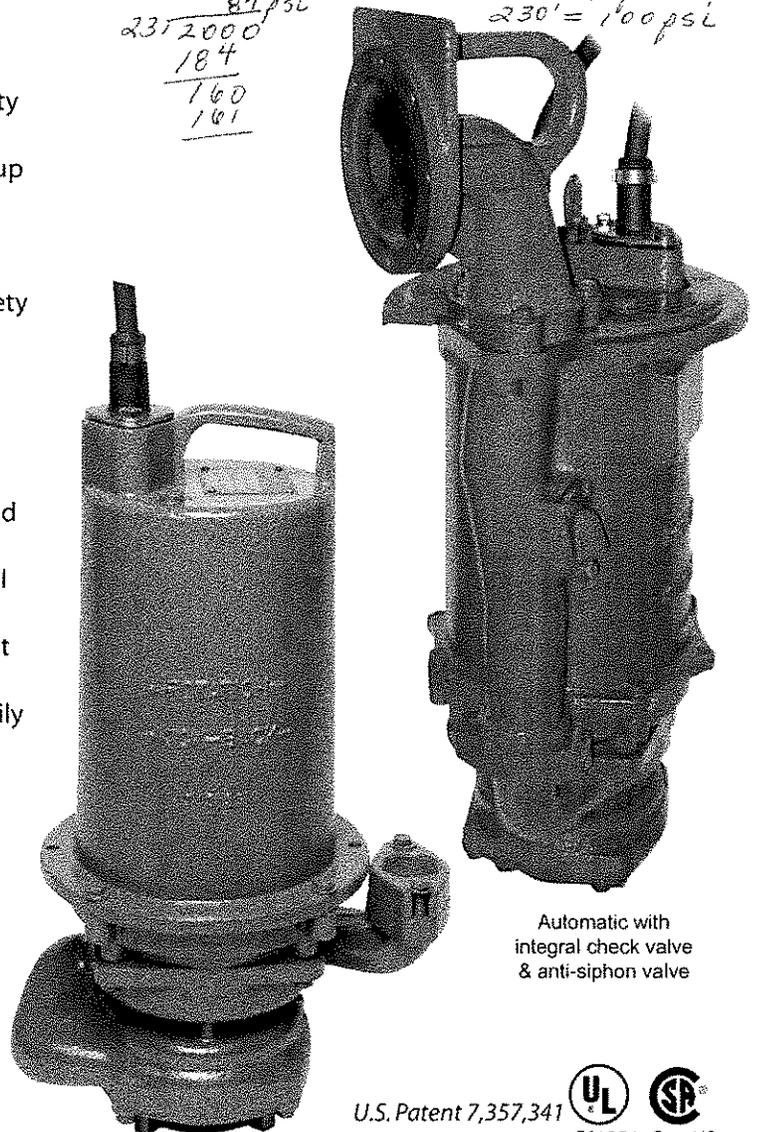
### Efficient

- Hydraulic performance superior to 1hp PC pump  
WITH COMPARABLE POWER CONSUMPTION

$$\begin{array}{r} 2.3 \overline{) 200} \\ \underline{46} \\ 184 \\ \underline{160} \\ 160 \\ \underline{160} \\ 0 \end{array}$$

87 psi

$$\begin{array}{l} 2.3' = 1 \text{ psi} \\ 23' = 16 \text{ psi} \\ 230' = 100 \text{ psi} \end{array}$$



Automatic with  
integral check valve  
& anti-siphon valve

Manual

U.S. Patent 7,357,341

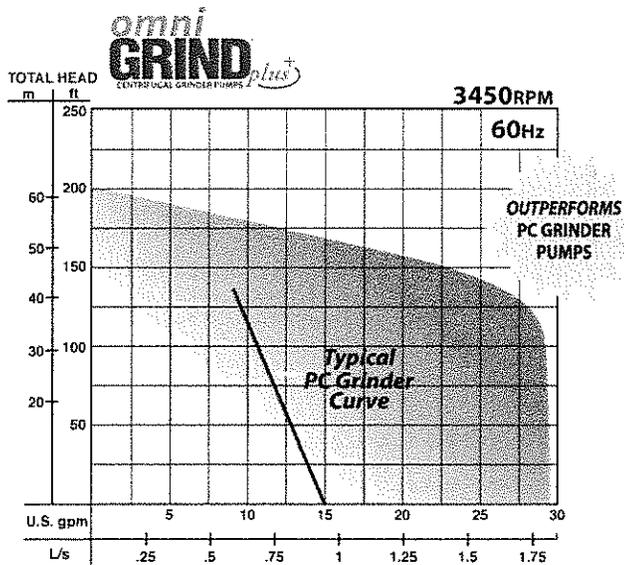
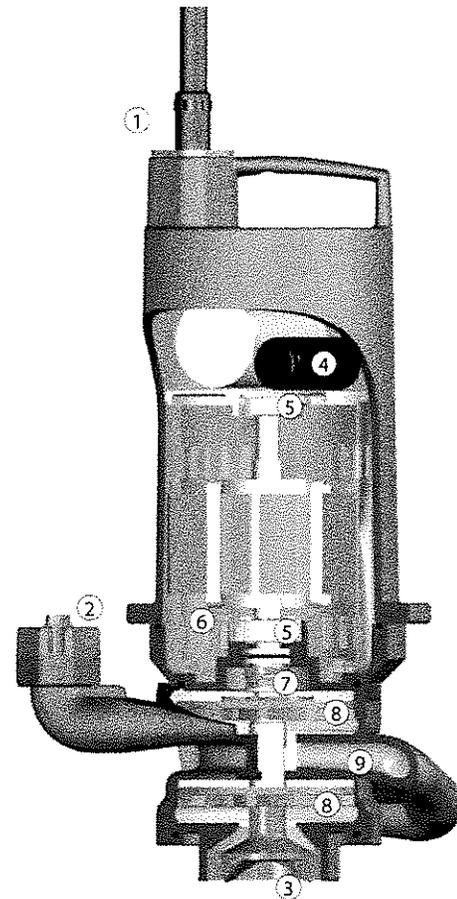
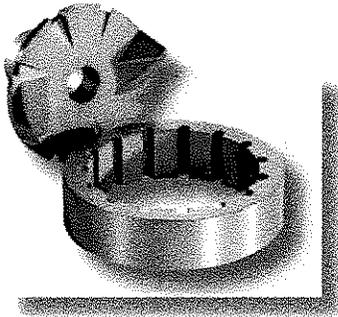


# BARNES®

## Pressure Sewer Systems

### Exclusive Slicerator™

The staggered slicing action of the grinder radial cutter dramatically reduces the torque requirement of the motor, cuts with less horsepower, and increases the unit's efficiency. Eliminates clogging with particularly troublesome objects such as plastic, rubber, sanitary napkins, disposable diapers and cloth items.



### Omni Grind Plus Features

1. Quick disconnect cord
2. Threaded discharge flange
3. Exclusive Slicerator
4. Integral capacitors for start and run
5. Angular contact bearings 100,000 hour L-10 rating
6. Oil filled motor with overload protection
7. Silicon carbide mechanical seal for long life
8. Vortex impellers for solids handling
9. Interstage passage

**CRANE**

**PUMPS & SYSTEMS**

A Crane Co. Company

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Fax (937) 773-7157  
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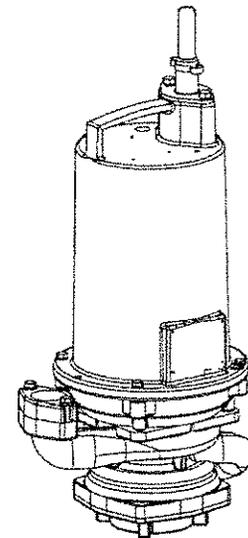
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A Crane Co. Company  
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BPSOMNIPLUS - Rev. B (4/10)

PS-091

**Submersible Grinder Pumps**

**Specifications:**

<b>DISCHARGE</b> .....	1¼" NPT, Vertical, Bolt-on Flange
<b>LIQUID TEMPERATURE</b> .....	104°F (40°C) Continuous
<b>VOLUTE</b> .....	Cast Iron ASTM A-48, Class 30
<b>MOTOR HOUSING</b> .....	Cast Iron ASTM A-48, Class 30
<b>SEAL PLATE</b> .....	Cast Iron ASTM A-48, Class 30
<b>IMPELLERS:</b>	
<i>Design</i> .....	12 Vane, Vortex, With Pump Out Vanes On Back Side. Dynamically Balanced, ISO G6.3.
<i>Material</i> .....	85-5-5-5 Bronze
<b>IMPELLER SPACER</b> .....	300 Series Stainless Steel
<b>SHREDDING RING</b> .....	Hardened 440C Stainless Steel Rockwell® C-55.
<b>CUTTER</b> .....	Hardened 440C Stainless Steel, Rockwell® C-55.
<b>SHAFT</b> .....	416 Stainless Steel
<b>SQUARE RINGS</b> .....	Buna-N
<b>HARDWARE</b> .....	300 Series Stainless Steel
<b>PAINT</b> .....	Air Dry Enamel.
<b>SEAL:</b>	
<i>Design</i> .....	Single Mechanical
<i>Material</i> .....	Rotating Faces - Silicon-Carbide Stationary Faces - Silicon-Carbide Elastomer - Buna-N Hardware -300 Series Stainless
<b>CORD ENTRY</b> .....	30 ft. (9.1m) Std. Cord. Custom Molded Quick Connect, for Sealing and Strain Relief
<b>CORD</b>	
<i>Manual</i> .....	CSA/UL Approved 12/3 Type SOW
<b>UPPER BEARING:</b>	
<i>Design</i> .....	Single Row, Angular contact Ball
<i>Lubrication</i> .....	Oil
<i>Load</i> .....	Radial & Thrust
<b>LOWER BEARING:</b>	
<i>Design</i> .....	Single Row, Angular contact Ball
<i>Lubrication</i> .....	Oil
<i>Load</i> .....	Radial & Thrust
<b>MOTOR:</b>	
<i>Design</i> .....	NEMA L-Single Phase Torque Curve, Oil-Filled, Squirrel Cage Induction
<i>Insulation</i> .....	Class F
<b>SINGLE PHASE</b> .....	Capacitor Start/Capacitor Run.



**Series: OGP**  
**2HP, 3450RPM, 60Hz**



CSA 108 - File No. LR16567  
UL 778

**DESCRIPTION:**

THE GRINDER PUMP IS DESIGNED TO REDUCE DOMESTIC SEWAGE TO A FINELY GROUND SLURRY.

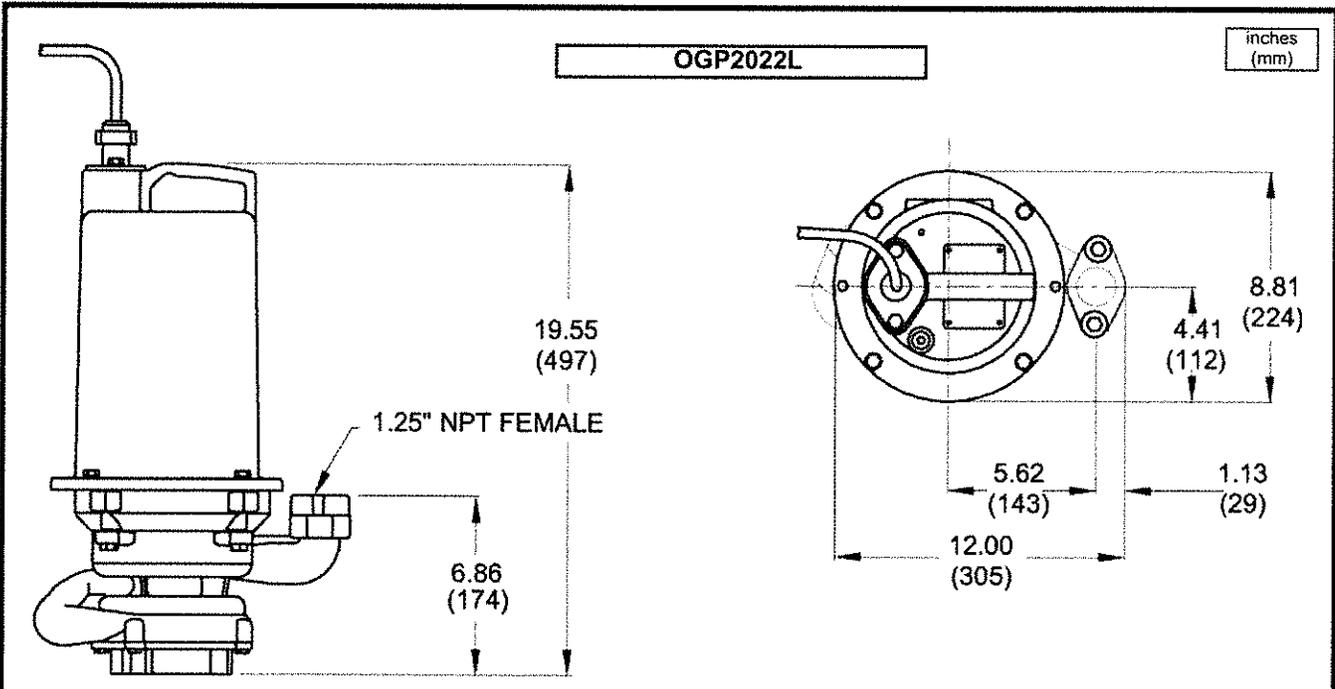
**Model OGP**  
Recessed Vortex



www.cranepumps.com

**Submersible Grinder Pumps**

PS-092



MODEL NO	PART NO	HP	VOLT	PH/Hz	RPM (Nom)	NEMA START CODE	FULL LOAD AMPS	LOCKED ROTOR AMPS	CORD SIZE	CORD TYPE	CORD O.D. ± .02 (.5) in (mm)
OGP2022L	115328	2	240	1 / 60	3450	H	16.5	53.8	12/3	SOW	.61 (15.5)

**IMPORTANT !**

- 1.) PUMP MAY BE OPERATED "DRY" FOR EXTENDED PERIODS WITHOUT DAMAGE TO MOTOR AND/OR SEALS.
- 2.) THIS PUMP IS APPROPRIATE FOR THOSE APPLICATIONS SPECIFIED AS CLASS I DIVISION II HAZARDOUS LOCATIONS.
- 3.) THIS PUMP IS NOT APPROPRIATE FOR THOSE APPLICATIONS SPECIFIED AS CLASS I DIVISION I HAZARDOUS LOCATIONS.
- 4.) INSTALLATIONS SUCH AS DECORATIVE FOUNTAINS OR WATER FEATURES PROVIDED FOR VISUAL ENJOYMENT MUST BE INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE ANSI/NFPA 70 AND/OR THE AUTHORITY HAVING JURISDICTION. THIS PUMP IS NOT INTENDED FOR USE IN SWIMMING POOLS, RECREATIONAL WATER PARKS, OR INSTALLATIONS IN WHICH HUMAN CONTACT WITH PUMPED MEDIA IS A COMMON OCCURRENCE.

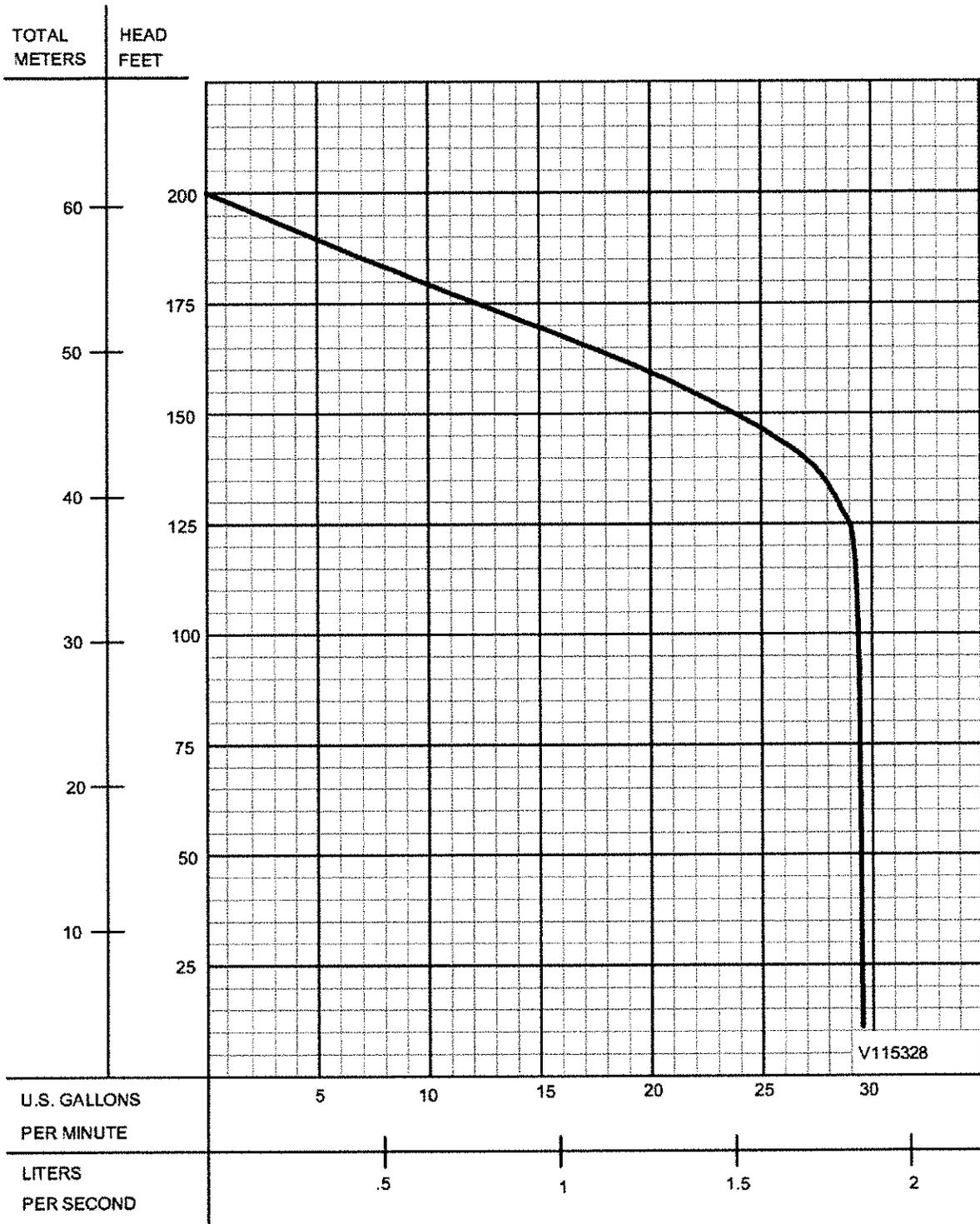
SECTION A  
PAGE 2  
DATE 3/07

**CRANE**

A Crane Co. Company

**PUMPS & SYSTEMS**

USA: (937) 778-8947 • Canada: (905) 457-6223 • International: (937) 615-3598



Testing is performed with water, specific gravity 1.0 @ 68° F @ (20°C), other fluids may vary performance

**CRANE**

PUMPS & SYSTEMS

**BARNES**<sup>®</sup>  
Pressure Sewer Systems

*omni*  
**GRIND**<sup>™</sup>  
CENTRIFUGAL GRINDER PUMPS

*Barnes<sup>®</sup> exclusive Quick-Connect Power Cord, and internally mounted starting components make the Omni Grind<sup>™</sup> easy to install and maintain. Omni Grind<sup>™</sup> also features a hardened stainless steel cutter and shredding ring (reversible for twice the cutting life), and abrasion resistant silicon carbide mechanical seal.*

**Omni Grind<sup>™</sup> Advantages**

- Recessed vortex impeller design easily handles ground solids
- Large pump end bearing and short shaft overhang significantly extends mechanical seal life
- Exclusive Slicerator<sup>™</sup> eliminates jams
- Removable discharge flange for easier installation
- Heavy-duty 2 hp motor with oil lubricated upper and lower ball bearing is standard
- Heavy-duty industrial silicon carbide seal

**Omni Grind<sup>™</sup> Offers**

- Low initial costs
- Extended MTBSC (Mean Time Between Service Calls)
- Low life-cycle cost
- Trouble-free operation

**Design Features**

- **Higher Flow Version:** Flows to 55 gpm; heads to 104 ft shutoff
- **Higher Head Version:** Flows to 33 gpm; heads to 125 ft shutoff
- Integral level controls available with ESPS pressure switch or tethered mechanical level controls
- Oil-filled motor enables the pump motor to run cooler under severe operating conditions
- Bolt-On discharge flange design allows pump to be easily installed
- 1-1/4" NPT, vertical connection
- Built-in automatic resetting motor overload
- Quick connect power cord



**CRANE**

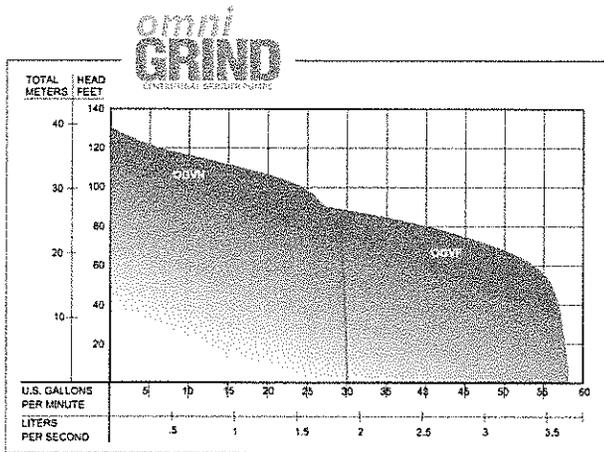
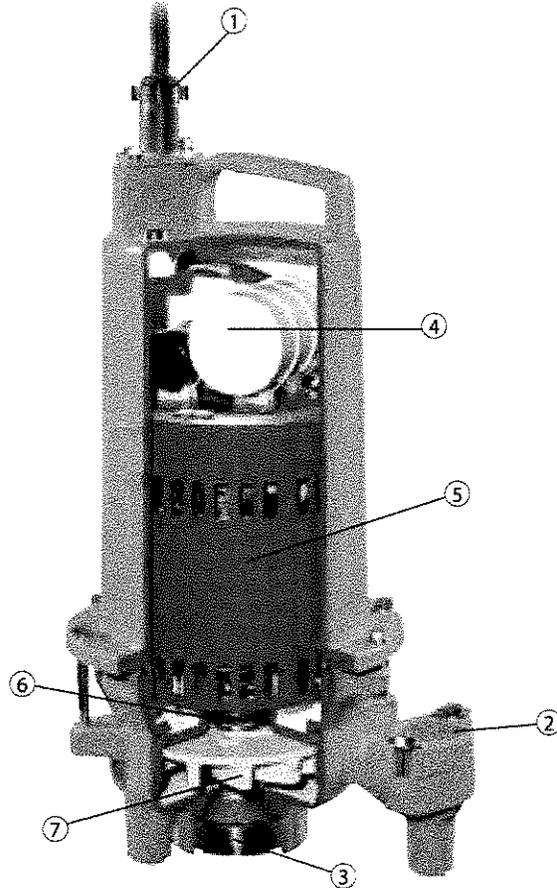
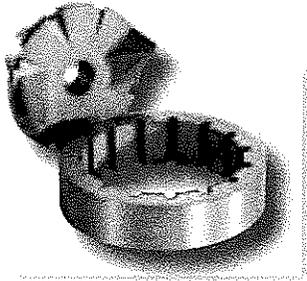
PUMPS &amp; SYSTEMS

**BARNES**

Pressure Sewer Systems

**Exclusive Slicerator™**

The staggered slicing action of the grinder radial cutter dramatically reduces the torque requirement of the motor, cuts with less horsepower, and increases the unit's efficiency. Eliminates clogging with particularly troublesome objects such as plastic, rubber, sanitary napkins, disposable diapers and cloth items.

**Omni Grind™ Features**

1. Quick disconnect cord
2. Threaded discharge flange
3. Exclusive Slicerator
4. Integral capacitors for start and run
5. Oil filled motor with overload protection
6. Silicon carbide mechanical seal for long life
7. Vortex impeller for solids handling

**CRANE**

PUMPS &amp; SYSTEMS

For more information contact your Barnes Pump Representative

A Crane Co. Company

**Crane Pumps & Systems**

420 Third Street  
Piqua, Ohio 45356  
(937) 778-8947

Fax (937) 773-7157

www.cranepumps.com

**Crane Pumps & Systems**

1485 Lexington Avenue  
Mansfield, Ohio 44907  
(937) 778-8947

Fax (419) 774-1530

**Crane Pumps & Systems Canada**

83 West Drive  
Brampton, Ont. Canada L6T 2J6  
(905) 457-6223

Fax (905) 457-2650

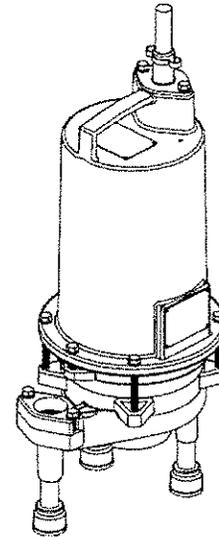
BPSOMNI  
© Crane Pumps & Systems  
Printed in U.S.A.  
08/2005

PS-079

**Submersible Grinder Pumps**

**Specifications:**

<b>DISCHARGE</b> .....	1¼" NPT, Vertical, Bolt-on Flange
<b>LIQUID TEMPERATURE</b> .....	160°F (71°C) Intermittent
<b>VOLUTE</b> .....	Cast Iron ASTM A-48, Class 30
<b>MOTOR HOUSING</b> .....	Cast Iron ASTM A-48, Class 30
<b>SEAL PLATE</b> .....	Cast Iron ASTM A-48, Class 30
<b>IMPELLER:</b>	
<i>Design</i> .....	12 Vane, Vortex, With Pump Out Vanes On Back Side. Dynamically Balanced, ISO G6.3.
<i>Material</i> .....	85-5-5-5 Bronze
<b>SHREDDING RING</b> .....	Hardened 440C Stainless Steel Rockwell® C-55.
<b>CUTTER</b> .....	Hardened 440C Stainless Steel, Rockwell® C-55.
<b>SHAFT</b> .....	416 Stainless Steel
<b>SQUARE RINGS</b> .....	Buna-N
<b>HARDWARE</b> .....	300 Series Stainless Steel
<b>PAINT</b> .....	Air Dry Enamel.
<b>SEAL:</b>	
<i>Design</i> .....	Single Mechanical
<i>Material</i> .....	Rotating Faces - Silicon-Carbide Stationary Faces - Silicon-Carbide Elastomer - Buna-N Hardware -300 Series Stainless
<b>CORD ENTRY</b> .....	30 ft. (9.1m) Std. Cord. Custom Molded Quick Connect, for Sealing and Strain Relief
<b>CORD</b>	
<i>Manual</i> .....	CSA/UL Approved 12/3 Type SOW
<b>UPPER BEARING:</b>	
<i>Design</i> .....	Single Row, Ball, Oil Lubricated
<i>Load</i> .....	Radial
<b>LOWER BEARING:</b>	
<i>Design</i> .....	Single Row, Ball, Oil Lubricated
<i>Load</i> .....	Radial & Thrust
<b>MOTOR:</b>	
<i>Design</i> .....	NEMA L-Single Phase Torque Curve, Oil-Filled, Squirrel Cage Induction
<i>Insulation</i> .....	Class F
<b>SINGLE PHASE</b> .....	Capacitor Start/Capacitor Run.



**Series: OGVF**  
**2HP, 3450RPM, 60Hz**  
**High-Flow**



CSA 108 - File No. LR16567  
UL 778

**DESCRIPTION:**

THE GRINDER PUMP IS DESIGNED TO REDUCE DOMESTIC, COMMERCIAL, INSTITUTIONAL AND LIGHT INDUSTRIAL SEWAGE TO A FINELY GROUND SLURRY.

# Model OGVF

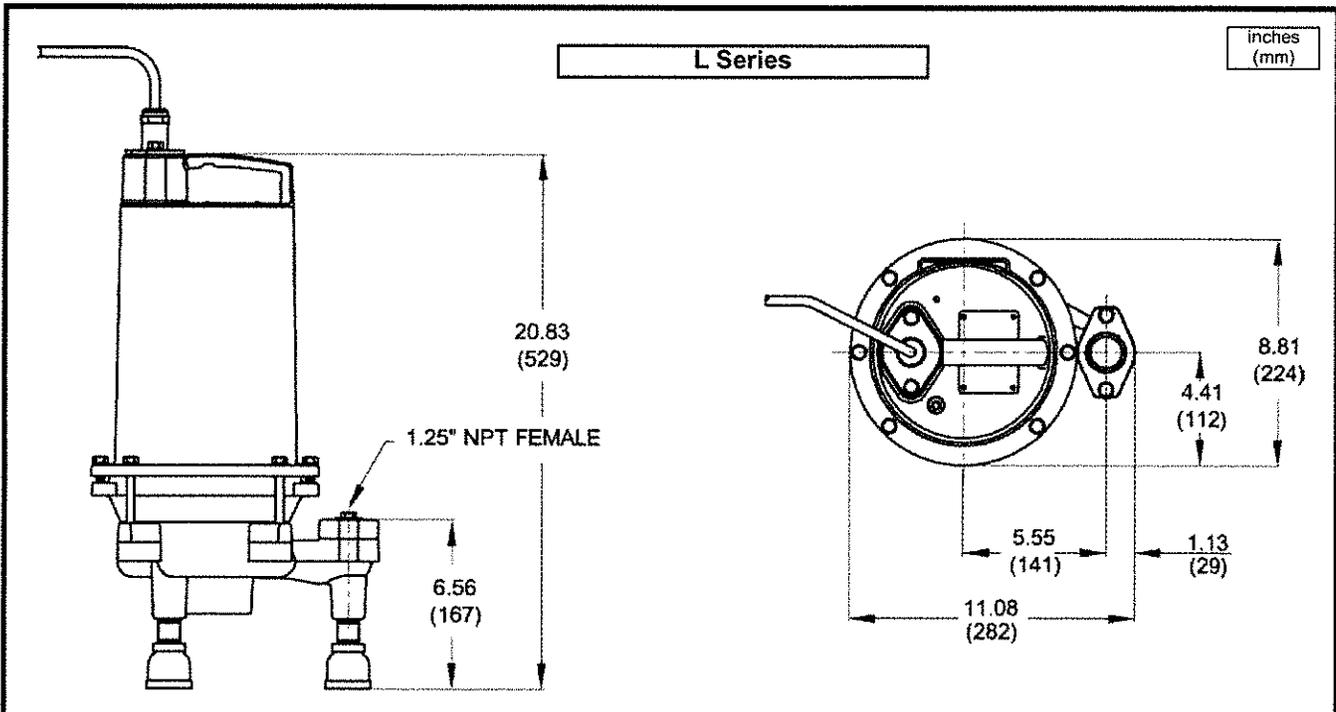
## Recessed Vortex



www.cranepumps.com

### Submersible Grinder Pumps

PS-080



MODEL NO	PART NO	HP	VOLT	PH/Hz	RPM (Nom)	NEMA START CODE	FULL LOAD AMPS	LOCKED ROTOR AMPS	CORD SIZE	CORD TYPE	CORD O.D. ± .02 (.5) in (mm)
<b>HIGH-FLOW</b>											
OGVF2022L	110651	2	240	1 / 60	3450	H	15.0	53.8	12/3	SOW	.61 (15.5)

#### IMPORTANT !

- 1.) PUMP MAY BE OPERATED "DRY" FOR EXTENDED PERIODS WITHOUT DAMAGE TO MOTOR AND/OR SEALS.
- 2.) THIS PUMP IS APPROPRIATE FOR THOSE APPLICATIONS SPECIFIED AS CLASS I DIVISION II HAZARDOUS LOCATIONS.
- 3.) THIS PUMP IS NOT APPROPRIATE FOR THOSE APPLICATIONS SPECIFIED AS CLASS I DIVISION I HAZARDOUS LOCATIONS.
- 4.) INSTALLATIONS SUCH AS DECORATIVE FOUNTAINS OR WATER FEATURES PROVIDED FOR VISUAL ENJOYMENT MUST BE INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE ANSI/NFPA 70 AND/OR THE AUTHORITY HAVING JURISDICTION. THIS PUMP IS NOT INTENDED FOR USE IN SWIMMING POOLS, RECREATIONAL WATER PARKS, OR INSTALLATIONS IN WHICH HUMAN CONTACT WITH PUMPED MEDIA IS A COMMON OCCURRENCE.

SECTION A  
PAGE 10  
DATE 3/07



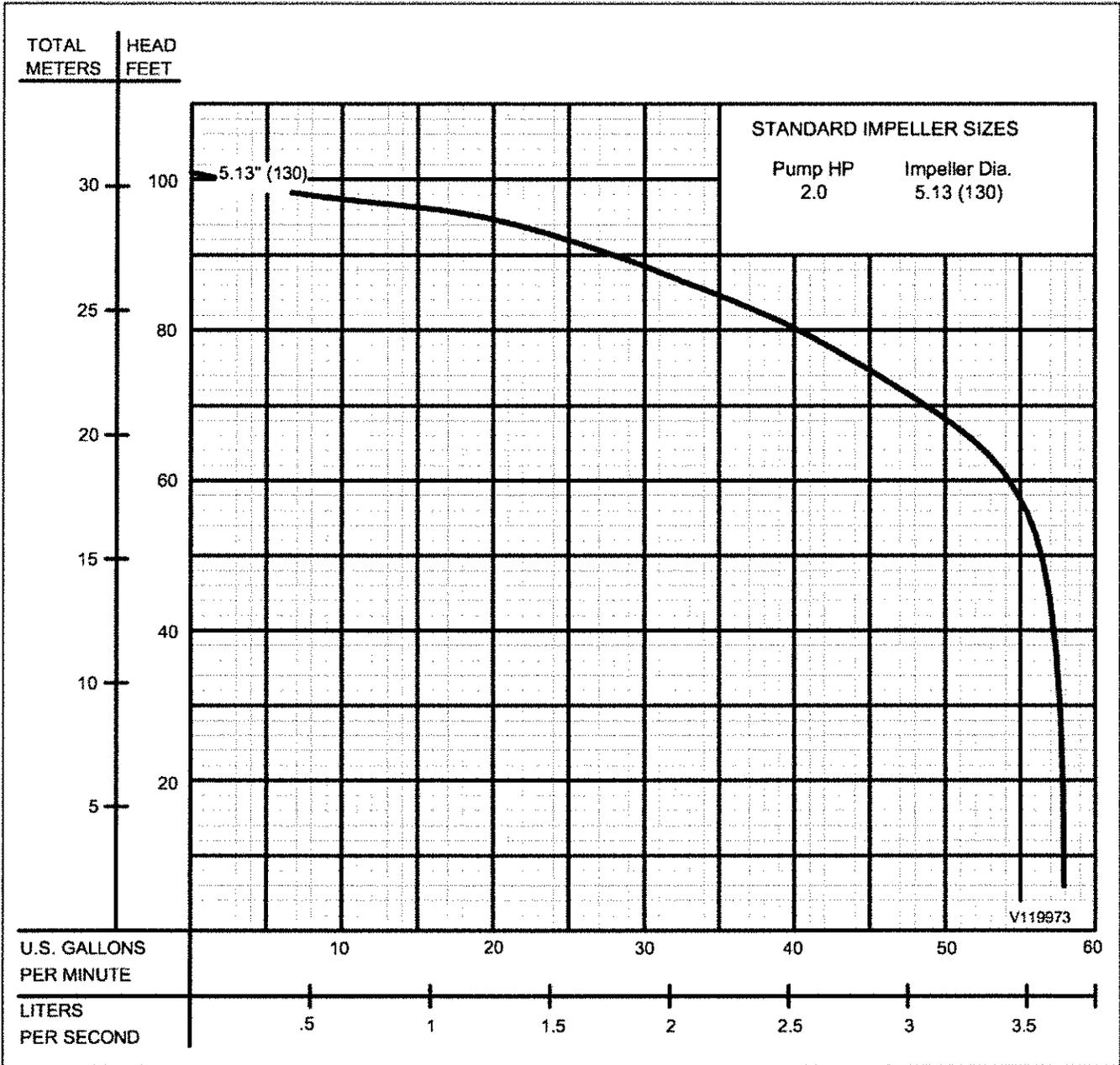
A Crane Co. Company

## PUMPS & SYSTEMS

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PS-081

**Submersible Grinder Pumps**

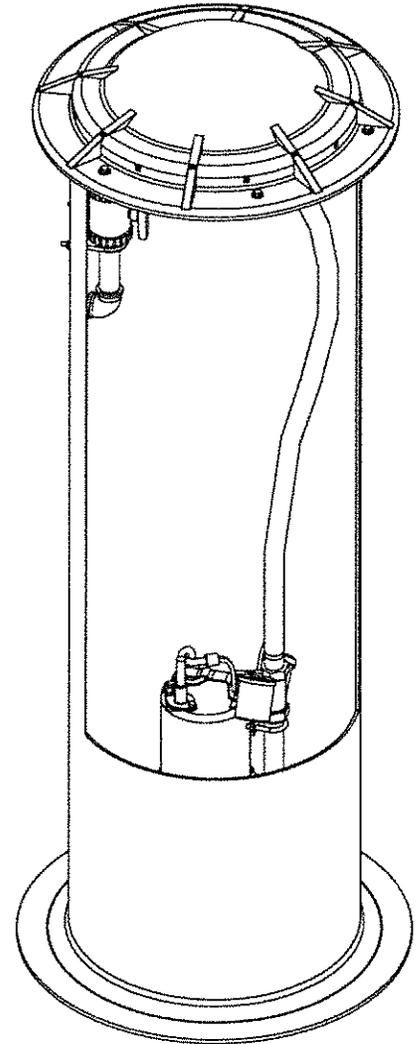


Testing is performed with water, specific gravity 1.0 @ 68° F @ (20°C), other fluids may vary performance

**Specifications:**

inches  
(mm)

- BASIN** ..... Fiberglass w/ 3" (76) Ballast Support Flange
- DISCHARGE COUPLING**..... 300 Series Stainless Steel
  - Size ..... 1.25" NPT- Simplex
  - Size ..... 1.50" NPT- Duplex
- INLET** ..... 4" SDR35 (102) Flexible Pipe Fitting,  
(For Field Installation) (STD)
- COVER: Polyethylene** ... Moided, Green, 24" (610) Dia. (STD)
- ELECTRICAL**..... Cord grips for Direct Burial Cables  
(For Field Installation) (STD)
- DBC** ..... Direct Burial Cable, Type TC (STD)
- SHUT-OFF BALL VALVE:**
  - Design..... Full Port True Union
  - Material ..... PVC
  - Size ..... 1¼" NPT
- FLAP STYLE / ANTI-SIPHON CHECK VALVE:**
  - Housing..... Class 30 Cast Iron, Powder Coated
  - Flapper..... Nitrile, Nylon Reinforced
  - Size ..... 1¼" NPT
- LIFTING ROPE** ..... 1/2" Dia. (13) Polypropylene with Knots in  
12" (305) increments. Breaking Strength of  
3750 lbs. (1701kg)
- HARDWARE** ..... 300 Series Stainless Steel
- DISCHARGE PIPING**..... EPDM Hose, and Sch. 80 PVC Pipe
- OPTIONS** ..... Pump, Cover, Inlet, Level Control, Cable Length



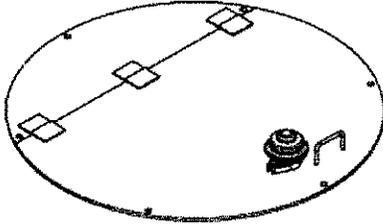
**Series: SFHS & DFHS**  
1¼" NPT Discharge  
1½" NPT Discharge



File No. E151564

## Accessories

PS-055



For 36" (914) & 42" (1067) Diameter Basins

**Basin Cover**  
Aluminum

## Specifications:

Basin covers have hinged access door, lifting handle, locking provisions, stainless steel hinges and hardware and provisions for 2" NPT vent.

### Aluminum:

Covers available for basin diameters 36" through 60" (914 through 1524mm) and are .38" (6.4mm) thick.

ALL covers have a service rating of 150 lbs/sq. ft. (732kgs/sq. meter) minimum.



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**CRANE**

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**PUMPS & SYSTEMS**

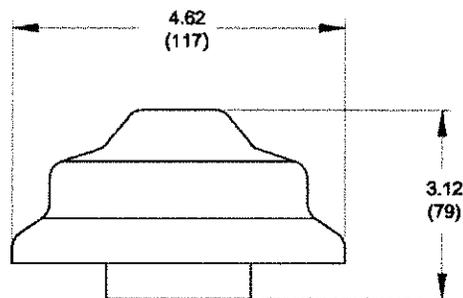
USA: (937) 778-8947 • Canada: (905) 457-6223 • International: (937) 615-3598

PS-056

*Accessories*

## Specifications:

The Bug-Free vent has a rustproof vinyl coating that resists gases, acids, alkalies, sun and weather. The vent is constructed of heavy 14 gauge top hat with a galvanized coupling and bronze screen. The screen area is 5.00 sq. in. (3226 sq. mm). The vent has a 2" Female NPT threaded connection.



**Bug-Free Vent, 2" Female NPT**  
P/N: 075831

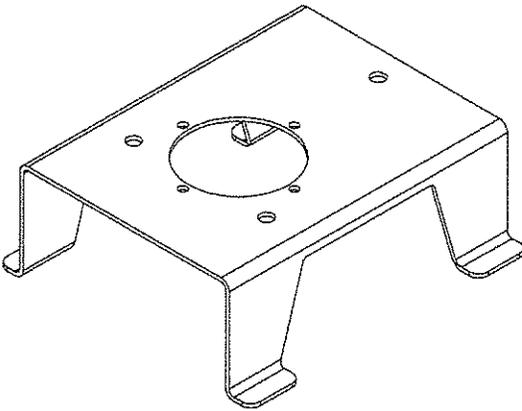


# Pump Support Stand

## Accessories

### Specifications:

The Pump Support Stand is fabricated of 300 series stainless steel with rubberized pads on the feet to eliminate damaging the basin floor. The Stand can be used with the 2HP SGVF, SGVH, OGVF, OGVH, OGP or the SGPC Grinder pumps which supports the pump the required distance from the basin floor.



Pump Support Stand  
P/N: 111182



# Flap Style Check Valve

For use with flex hose systems

1 1/4" NPT

PS-

## Accessories

### Specifications:

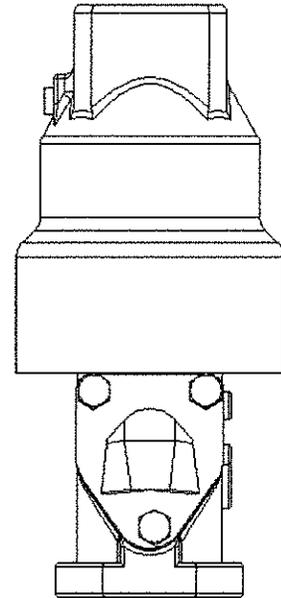
**HOUSING** ..... ASTM Class 30 Cast Iron, Powder Coated  
**FLAPPER** ..... Nitrile, Nylon Reinforced  
**TEMPERATURE** ..... 160°F (71°C) continuous  
**PRESSURE RATING** ..... 150 Lbs./Sq. In. (10.6 kgs/sq. cm)

### FEATURES:

- Works in BARNES standard flex hose systems
- Full port check with minimum head loss
- 18" static head requirement for minimum seat
- Valve includes integrated anti-siphon
- 300 series stainless steel hardware
- Resilient seat flapper
- Quiet operation
- No maintenance
- Vertical position mounting

### APPLICATIONS:

Waste water or residential sewage, liquid manure, etc.



**Flap Style Check Valve**

1 1/4" NPT P/N: 121583



PS-045

*Accessories*

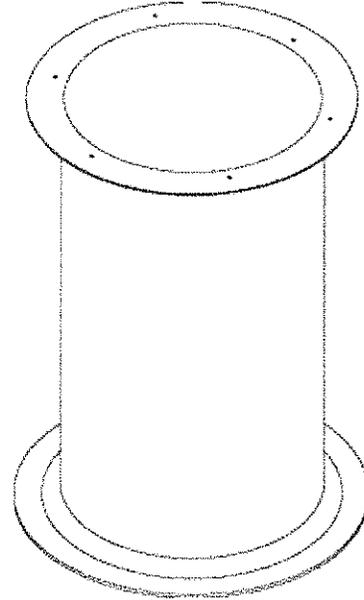
## Specifications:

Basin construction is custom molded fiberglass reinforced polyester resin.

The wall thickness shall be sufficient to withstand a water-saturated sand load of 120 lbs per cubic foot (1.9 gms/cu. cm) with a 1.5 safety factor.

The Ballast support flange shall extend a minimum of three inches (76mm) on the radius of the basin. The flange is fiberglassed to the bottom of the basin. When secured properly to a concrete pad or pouring concrete over and around the flange, prevents the basin from rising, or floating out of the ground when empty as a result of static ground pressure.

The basin will withstand a maximum temperature of 150°F (66°C).

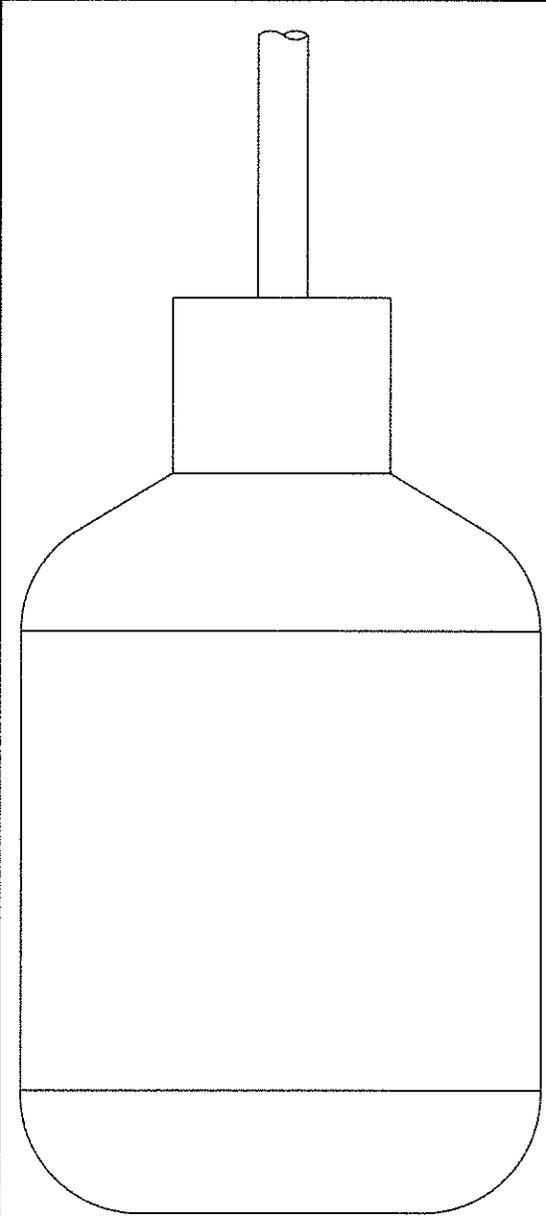
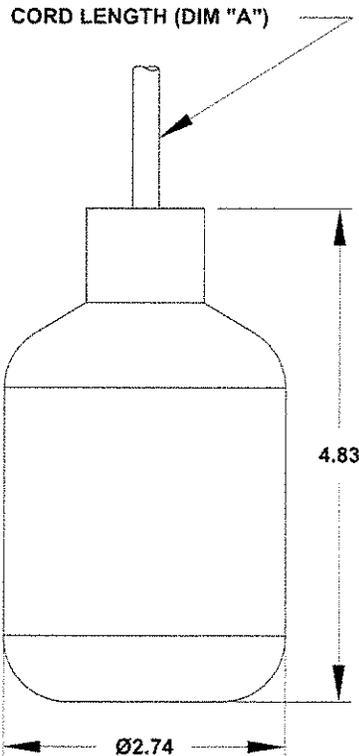


### Specifications:

**CORD** ..... 18/2 SJOW  
**PLUG** ..... None  
**FLOAT** ..... Polypropylene for use in water & sewage up to 140° (60° C).  
**WATER DEPTH** ..... Maximum 30' (9m), 13 PSI  
**SWITCH:**  
     P/N 125148: ..... Snap Action, Normally Open  
     P/N 125149: ..... Snap Action, Normally Closed  
**CLAMP** ..... Stainless Steel Construction. Range: 1" to 3" Dia.  
**MOUNTING SADDLE** ..... ABS/Nylon  
**SWITCH COMPONENT ELECTRICAL RATINGS:**  
     125/250 VAC: ...Maximum Electrical Load: 5.0 Amps  
                   Minimum Electrical Load: 100.0 Milliamps @ 12 VAC  
**ELECTRICAL CONFIGURATION:**  
     P/N 125148: ..... Normally Open  
     P/N 125149: ..... Normally Closed  
**COLOR** ..... Black  
**PACKING** ..... Pack Float Assembly, Clamp, Saddle & Instruction Sheet in Individual Carton.

PART NUMBER	CORD LENGTH	TYPE INSTALLATION	CONTACTS
125148	15', 30', 50', 100'	Pipe Mounted 125/250 Volt	OPEN
125149	15', 30', 50', 100'	Pipe Mounted 125/250 Volt	CLOSED

inches  
(mm)



**P/N: 125148**  
**125149**



# True Union Ball Valves

1 1/4" NPT



www.cranepumps.com

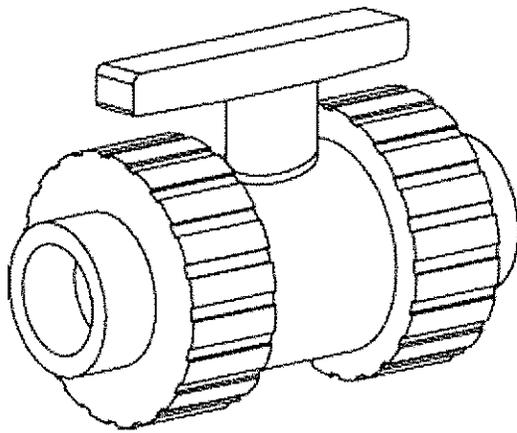
## Accessories

PS-068

## Specifications:

### True Union Ball Valves:

The True Union Ball Valves are manufactured of Type I Schedule 80 PVC, (Cell Classification 12454-B) with EPDM O-rings for superior chemical and corrosion resistance. These valves are rated at 150 PSI, (10.6 kgs/sq. cm) non-shock, with a maximum operating pressure at 73°F (23°C). The valves are of quick disconnect design for maintenance and can be repairable to the component level, also full port bore, 1/4 turn, leak tight shut-off and are listed by NSF for use in portable water service.



### True Union Valves

1 1/4" NPT P/N: 085115



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**CRANE**

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# Discharge Couplings

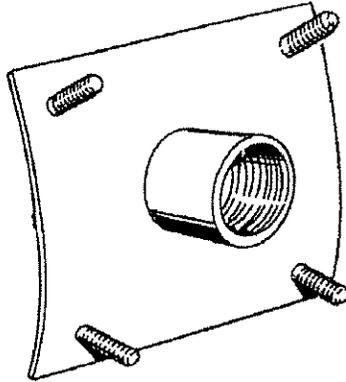
1¼" NPT thru 2½" NPT



www.cranepumps.com

## Accessories

PS-048



**Discharge Couplings**  
1¼" NPT thru 2½" NPT

## Specifications:

Stainless Steel Bolt-On Couplings

P/N	Description
094790	1¼" NPT, Female
094801	1½" NPT, Female
094802	2" NPT, Female
094964	2½" NPT, Female



SECTION F  
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**CRANE**

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PS-069

## Specifications:

The Flexible Discharge Couplings are designed to dampen or suppress noise, absorb vibration (horizontal, vertical, angular), accommodate thermal expansion and stresses, and adjust or correct for misalignment in piping systems. The Flexible Couplings have the unique properties of metals; high strength and high resistance to temperature and corrosion. Each Coupling is equipped with an outer braid to prevent elongation under internal pressure. The braid is a tubular sheath of metal wires woven in a basket weave fashion. It is made to fit snugly over the hose, and is fastened to the ends of the hose. It is designed to be strong enough to withstand elongation for the full pressure rating of the hose.

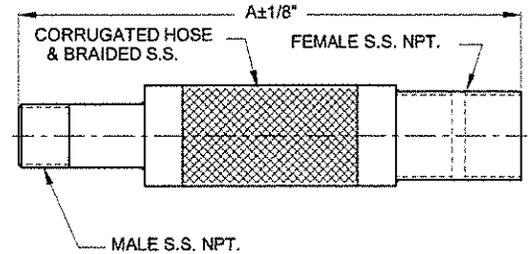
Inner Corrugated Hose..... 300 Series Stainless Steel

Outer Braid..... 300 Series Stainless Steel

Maximum Permanent Offset From Center Line ..... 1/2" (13mm)

Maximum Intermittent Offset From Center Line ..... 1/4" (6.3mm)

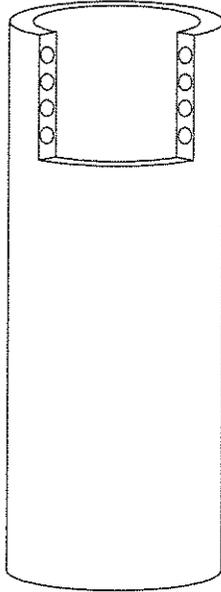
PARTNO.	PIPE NPT	"A" DIM ± .12"	MAX. WORKING PRESS. @ 70°F (21°C)
100159	1.25"	12" (305mm)	250 PSI (17.5 kg/cm <sup>2</sup> )
100160	2.00"	14" (356mm)	250 PSI (17.5 kg/cm <sup>2</sup> )
100571	1.50"	12" (305mm)	250 PSI (17.5 kg/cm <sup>2</sup> )
100572	2.50"	16" (406mm)	250 PSI (17.5 kg/cm <sup>2</sup> )



Flexible Discharge Couplings



## Basins & Accessories



Flexible Discharge Hose

### Specifications:

The Flexible Discharge Hose is constructed of type P, EPDM material, black in color jacketing. Reinforced synthetic fabric with helix wire. The Hose Has A 1.25 inch (32mm) ID, With A Temperature Range Of -40°F to 180°F (4.4°C to 82°C) And A Working Pressure of 150 PSI (10.6 kgs/sq. cm).

Comes with Stainless Steel 1-1/4" FNPT Fittings on each end.

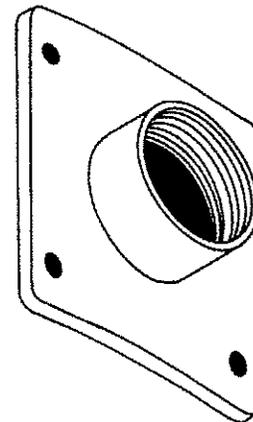
\*For use with 1-1/4" NPT Grinder Pumps and Pump Stand Part Number 111182 or equal.

PART No.	LENGTH (Overall)	*BASIN DEPTH
112169	34" (864mm)	48" (1219mm)
112169A	46" (1168mm)	60" (1524mm)
112169B	58" (1473mm)	72" (1829mm)
112169C	70" (1778mm)	84" (2134mm)
112169D	82" (2082mm)	96" (2438mm)

## Specifications:

Bolt-On Hub. Constructed of glass filled nylon. Includes; gasket, stainless steel cap screws, sealing washers and hex nuts.

P/N	Description
078470	1 1/4" NPT Hub
078471	1 1/2" NPT Hub
078471D	2" NPT Hub



**Electrical Conduit Hubs**  
1 1/4" NPT, 1 1/2" NPT & 2" NPT



# Flexible Pipe Fittings

1 1/4" thru 6"

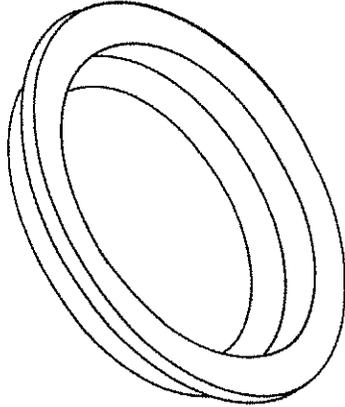
BARNES<sup>®</sup>  
PRESSURE SYSTEMS



www.cranepumps.com

## Accessories

PS-046



Flexible Pipe Fittings

## Specifications:

The Flexible Pipe fitting is super-tough for weather and corrosion resistance. The fitting has superior vapor and water leakproof sealing ability. Shipped loose for field installation.

P/N:	Description
076619	1 1/4" (32mm) PVC, Sch 40-80
099730	1 1/2" (38mm) PVC, Sch 40-80
076125	2" (51mm) PVC, Sch 40-80
076149	4" (102mm) PVC, Sch. 40-80
075898	4" (102mm) PVC, SDR-35
076941*	6" (152mm) PVC, Sch. 40-80

(\* ) 6" Sch 40 inlet can only be used on 36" diameter and larger basin.



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PS-047

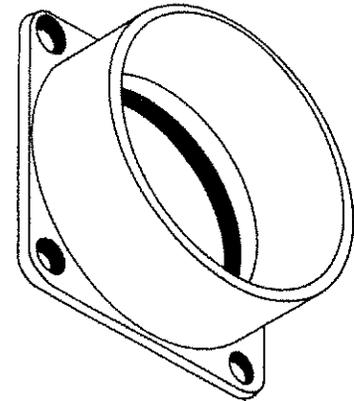
**Accessories**

**Specifications:**

Cast iron inlet hubs are recommended for cast iron, ceramic, plastic or ductile iron gravity sewer pipe, designed to fit curvature of basin. Shipped loose for field installation. Includes gasket and four fasteners for mounting to basin.

P/N	Description
063847	4" (102mm)Caulking Type
063848*	6" (152mm)Caulking Type
063850*	8" (203mm)Caulking Type

(\* ) 6" Sch 40 inlet can only be used on 36" diameter and larger basin.



**Inlet Hubs**  
 4", 6" & 8" Cast Iron



# Lifting Rope

Polypropylene



www.cranepumps.com

## Accessories

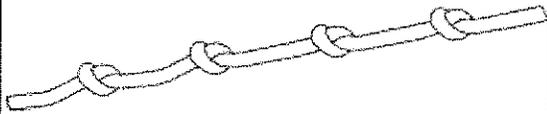
PS-057

### Specifications:

1/2" (13mm) Tuff line polypropylene rope, 3 strand twisted, breaking strength 3780 lbs. (1715kg) Safe working load is 1/5 breaking strength. Weight: .028 lbs per foot (.04kgs/meter).

P/N: 093973

10 ft. (3m) of rope with knots in 12 inch (305mm) increments.



Lifting Rope  
P/N: 093973



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**CRANE**

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PS-071

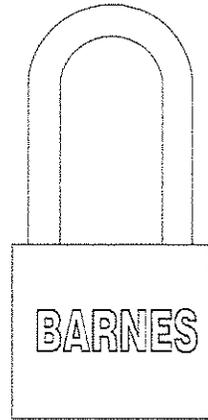
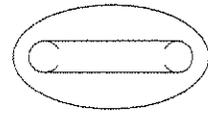
*Accessories*

## Specifications:

The Padlock has a brass body with a .25 (6.4mm) diameter by .88 inches (22.4mm) long or 2.00 inches (50.8mm) long, brass shackle. All locks are keyed alike.

**P/N: 102567** - 0.88" (22.4mm) Shackle

**P/N: 102568** - 2.00" (50.8mm) Shackle



**Brass Padlocks**



## DATA SHEET

CRANE PUMPS & SYSTEMS

DATE: September 1, 2010

PROJECT NAME: BRUNSWICK CO.

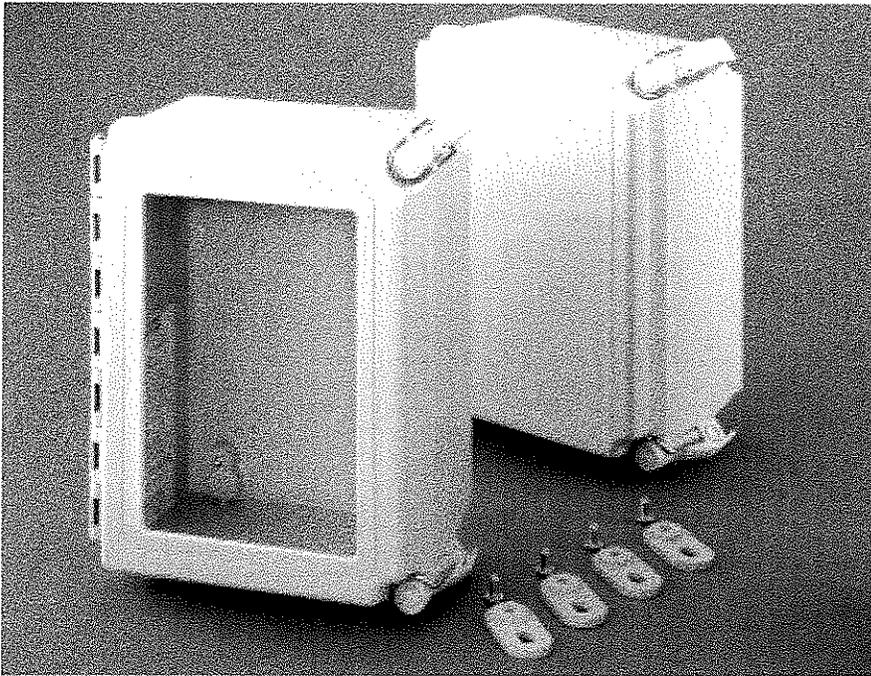
PROJECT NO: Q10770-A

HORSEPOWER: 2      VOLTAGE: 230      PHASE: 1      TYPE: Simplex

QTY	ITEM	MFG	MODEL #
<b>ENCLOSURE &amp; ACCESSORIES</b>			
1	ENCLOSURE	HOFFMAN	A12106CHQRFG
1	SUBPANEL	HOFFMAN	A12P10AL
<b>MAIN POWER COMPONENTS</b>			
1	CIRCUIT BREAKER	SQUARE D	QOU230
1	CONTACTOR	SQUARE D	LC1D18G7
<b>CONTROL COMPONENTS</b>			
2	CONTROL BREAKER	SQUARE D	QOU115
<b>SWITCHES &amp; INDICATORS</b>			
1	SWITCH PLATE	QCI	2-HOLE
1	HOA SWITCH	AC/DC	EZ-03-8179
1	GREEN INDICATOR LIGHT	NHD	N-NLD22-GE
<b>RELAYS &amp; MISC COMPONENTS</b>			
1	CONTROL RELAY	SQUARE D	RPM22F7
1	RELAY BASE	IDEC	SH2B-05
1	GROUND LUG	BURNDY	K2A25U
1	6-pt. TERMINAL STRIP	ALTECH	HE6HWPR/06
<b>ALARM COMPONENTS</b>			
1	ALARM SILENCE SWITCH	SQUARE D	XB5AA21
1	ALARM LIGHT SMALL	AC/DC	R10-SM-10
1	ALARM BUZZER	CONERY	PB-120-A
<b>LABELS</b>			
1	"SILENCE" INSERT	SQUARE D	ZBA-147



## Fiberglass Hinged Cover Type 4X Enclosures



### Application

Designed for use as a junction box or instrument housing in both indoor and outdoor settings. The enclosure is used in highly corrosive environments typically found in oil refineries, chemical processing plants, waste water treatment, marine installations, pulp and paper processing, and electroplating plants. The efficient design and simple construction create a low cost, durable, and aesthetic enclosure.

### Construction

- Molded fiberglass polyester has outstanding chemical and temperature resistance and exhibits excellent weatherability and physical properties
- Fiberglass is easily punched, drilled, filed, or sawed
- Seamless foam-in-place gasket assures watertight and dust-tight seal
- Polyester mounting feet and stainless steel attachment screws are provided with each enclosure
- Scratch-resistant GE Lexan Margard® windows are permanently bonded in place
- Molded-in-place threaded brass inserts and plated steel screws are provided for mounting optional panels and terminal kits
- Removable hinged cover attached to body with monel hinge pin
- Screw cover enclosures are secured with two captivated Type 316 stainless steel slotted cross point cover screws
- Enclosures with quick-release latches (U.S. patent number 4,917,421) have corrosion-resistant polyester latches located in corners which provide unobstructed access to enclosure
- Hinge pin and bail are corrosion-resistant monel
- Knockout padlock provisions included in each latch

### Finish/Color

Optional steel panels are white. Optional stainless steel, aluminum, and composite panels are unpainted. Fiberglass material is light gray inside and out.

### Industry Standards

UL 508 File No. E61997: Type 4, Type 4X, Type 12, and Type 13  
NEMA/EEMAC Type 4, Type 4X, Type 12, and Type 13  
Enclosure flammability rating per UL 508  
Window flammability rating per UL 508  
CSA File No. LR42186: Type 4, Type 4X, Type 12, and Type 13  
IEC 60529, IP66

### Accessories

See *General Accessories index*

• Panels (See table)  
• Terminal Kit Assembly  
• Ventilators  
• Wiring Duct

### Modification Services™ Program

You can customize this product to your unique requirements by specifying from these options:

- Colors
- Holes and cutouts in body, doors, subpanels
- Doors
- Subpanels
- Environmental control (louvers, fans, filters)
- Windows
- Standard accessories
- Solar shields

For details, see Modification Services at [hoffmanonline.com](http://hoffmanonline.com).

To order, contact your local Hoffman sales representative.

Standard Sizes Solid Cover Type 4X Enclosures

Catalog Number		Enclosure Size A x B x C	* Panel Catalog Number	Panel Size D x E	Mounting G x H	Overall L x W	F	J	K	O	P	Q	R	T	U
Screw Cover	Quick-Release														
A-664CHSCFG	A-664CHQRFQ	6.00 x 6.00 x 4.00 (152 x 152 x 102)	A-6P6	4.88 x 4.88 (124 x 124)	6.94 x 4.00 (176 x 102)	6.50 x 6.50 (165 x 165)	3.45 (88)	3.25 (83)	1.00 (25)	4.25 (108)	4.25 (108)	5.64 (143)	5.12 (130)	0.12 (3)	5.64 (143)
A-864CHSCFG	A-864CHQRFQ	8.00 x 6.00 x 4.00 (203 x 152 x 102)	A-8P6	6.75 x 4.88 (171 x 124)	8.94 x 4.00 (227 x 102)	8.50 x 6.50 (216 x 165)	3.45 (88)	3.25 (83)	1.00 (25)	4.25 (108)	6.25 (159)	7.64 (194)	7.12 (181)	0.12 (3)	5.64 (143)
A-1086CHSCFG	A-1086CHQRFQ	10.00 x 8.00 x 6.00 (254 x 203 x 152)	A-10P8	8.75 x 6.88 (222 x 175)	10.94 x 6.00 (278 x 152)	10.50 x 8.50 (267 x 216)	5.45 (138)	4.94 (125)	1.31 (33)	6.25 (159)	8.25 (210)	9.61 (244)	9.12 (232)	0.12 (3)	7.61 (193)
A-12106CHSCFL	A-12106CHQRFQ	12.00 x 10.00 x 6.00 (305 x 254 x 152)	A-12P10	10.75 x 8.88 (273 x 226)	12.94 x 8.00 (329 x 203)	12.50 x 10.50 (318 x 267)	5.45 (138)	4.69 (119)	1.56 (40)	8.25 (210)	10.25 (260)	11.58 (294)	11.12 (282)	0.12 (3)	9.58 (243)
A-14128CHSCFG	A-14128CHQRFQ	14.00 x 12.00 x 8.00 (356 x 305 x 203)	A-14P12	12.75 x 10.88 (324 x 276)	14.94 x 10.00 (379 x 254)	14.55 x 12.55 (370 x 319)	7.45 (189)	6.50 (165)	1.81 (46)	10.25 (260)	12.25 (311)	13.59 (345)	13.12 (333)	0.15 (4)	11.59 (294)
A-16148CHSCFG	A-16148CHQRFQ	16.00 x 14.00 x 8.00 (406 x 356 x 203)	A-16P14	14.75 x 12.88 (375 x 327)	16.94 x 12.00 (430 x 305)	16.55 x 14.55 (420 x 370)	7.45 (189)	6.23 (158)	2.08 (53)	12.25 (311)	14.25 (362)	15.56 (395)	15.12 (384)	0.15 (4)	13.56 (344)
A-181610CHSCFG	A-181610CHQRFQ	18.00 x 16.00 x 10.00 (457 x 406 x 254)	A-18P16	16.75 x 14.88 (425 x 378)	18.94 x 14.00 (481 x 356)	18.58 x 16.58 (472 x 421)	9.45 (240)	7.66 (195)	2.66 (68)	14.25 (362)	16.25 (413)	17.53 (445)	17.12 (435)	0.16 (4)	15.53 (394)

Standard Sizes Window Cover Type 4X Enclosures

Catalog Number		Enclosure Size A x B x C	* Panel Catalog Number	Panel Size D x E	Mounting G x H	Overall L x W	F	J	K	M	N	O	P	Q	R	T	U
Screw Cover	Quick-Release																
A-664CHSCFGW	A-664CHQRFQW	6.00 x 6.00 x 4.00 (152 x 152 x 102)	A-6P6	4.88 x 4.88 (124 x 124)	6.94 x 4.00 (176 x 102)	6.50 x 6.50 (165 x 165)	3.45 (88)	3.25 (83)	1.00 (25)	4.25 (108)	4.25 (108)	4.25 (108)	4.25 (108)	5.64 (143)	5.12 (130)	0.12 (3)	5.64 (143)
A-864CHSCFGW	A-864CHQRFQW	8.00 x 6.00 x 4.00 (203 x 152 x 102)	A-8P6	6.75 x 4.88 (171 x 124)	8.94 x 4.00 (227 x 102)	8.50 x 6.50 (216 x 165)	3.45 (88)	3.25 (83)	1.00 (25)	6.25 (159)	4.25 (108)	4.25 (108)	6.25 (159)	7.64 (194)	7.12 (181)	0.12 (3)	5.64 (143)
A-1086CHSCFGW	A-1086CHQRFQW	10.00 x 8.00 x 6.00 (254 x 203 x 152)	A-10P8	8.75 x 6.88 (222 x 175)	10.94 x 6.00 (278 x 152)	10.50 x 8.50 (267 x 216)	5.45 (138)	4.94 (125)	1.31 (33)	8.25 (210)	6.25 (159)	6.25 (159)	8.25 (210)	9.61 (244)	9.12 (232)	0.12 (3)	7.61 (193)
A-12106CHSCFGW	A-12106CHQRFQW	12.00 x 10.00 x 6.00 (305 x 254 x 152)	A-12P10	10.75 x 8.88 (273 x 226)	12.94 x 8.00 (329 x 203)	12.50 x 10.50 (318 x 267)	5.45 (138)	4.69 (119)	1.56 (40)	10.25 (260)	8.25 (210)	8.25 (210)	10.25 (260)	11.58 (294)	11.12 (282)	0.12 (3)	9.58 (243)
A-14128CHSCFGW	A-14128CHQRFQW	14.00 x 12.00 x 8.00 (356 x 305 x 203)	A-14P12	12.75 x 10.88 (324 x 276)	14.94 x 10.00 (379 x 254)	14.55 x 12.55 (370 x 319)	7.45 (189)	6.50 (165)	1.81 (46)	12.25 (311)	10.25 (260)	10.25 (260)	12.25 (311)	13.59 (345)	13.12 (333)	0.15 (4)	11.59 (294)
A-16148CHSCFGW	A-16148CHQRFQW	16.00 x 14.00 x 8.00 (406 x 356 x 203)	A-16P14	14.75 x 12.88 (375 x 327)	16.94 x 12.00 (430 x 305)	16.55 x 14.55 (420 x 370)	7.45 (189)	6.23 (158)	2.08 (53)	14.25 (362)	12.25 (311)	12.25 (311)	14.25 (362)	15.56 (395)	15.12 (384)	0.15 (4)	13.56 (344)
A-181610CHSCFGW	A-181610CHQRFQW	18.00 x 16.00 x 10.00 (457 x 406 x 254)	A-18P16	16.75 x 14.88 (425 x 378)	18.94 x 14.00 (481 x 356)	18.58 x 16.58 (472 x 421)	9.45 (240)	7.66 (195)	2.66 (68)	16.25 (413)	14.25 (362)	14.25 (362)	16.25 (413)	17.53 (445)	17.12 (435)	0.16 (4)	15.53 (394)

Millimeter dimensions ( ) are for reference only; do not convert metric dimensions to inch.

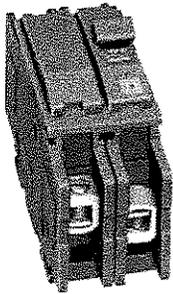
\* Panels must be ordered separately. Optional stainless steel, aluminum, and composite material panels are also available for most sizes. See General Accessories.

# QOU Unit Mount

## Miniature Circuit Breakers

### Class 720

**Square D**  
www.squared.com  
FOR CURRENT INFORMATION



### Low Ampere QOU Miniature Circuit Breakers

General Specifications Common to All Low Ampere QOU Circuit Breakers

- Terminal lug wire size 1 – #14 - #2 AWG Cu or Al.
- Reversible line and load lugs for convenient flush or surface mount wiring.
- DIN mount (symmetrical rail 35 x 7.5 DIN/EN 50 022).
- UL Listed as HACR type – 15-70 A.
- Field installable quick connectors.
- Single handle with internal common trip.
- UL Listed 48 Vdc (5,000 AIR).
- Bulk pack circuit breakers do not have mounting feet included.

### Special Ordering Instructions:

#### For Bulk Packed QOU Circuit Breakers and Accessories

QOU circuit breakers and accessories must be ordered in multiples of the quantities listed. Units provided in standard quantity of one are individually packaged; standard quantities greater than one are bulk packed. Bulk packed circuit breakers do not include mounting brackets.

#### EXAMPLE:

Individual pack – small quantity orders: To receive five QOU220 circuit breakers, order five individual QOU220 circuit breakers at \$55.00 each. Product will be individually packaged, and will include necessary mounting feet.

Bulk pack – large quantity order. To order 440 QOU220 circuit breakers using bulk packaging, order 440 QOU220B at \$53.00 each. Product will be packaged in 22 packages of 20 pieces each. Product will not include mounting feet. To order mounting feet, order 880 pieces of QOUMFB2. Product will be packaged in eleven packages of 80 pieces each.

#### For QOUQ Low Amp Circuit Breakers with Four Point Quick Connect Terminals

QOUQ Low Amp circuit breakers with four point quick connect terminals are provided with permanent factory installed terminals which are affixed to the Load or "OFF" end of the circuit breaker. This special terminal will accommodate up to four 1/4 inch female quick connect wire terminations. Total ampacity of these connections must not exceed the rating of the circuit breaker. Price addition is \$5.60 for single-pole, \$11.20 for 2-pole and \$16.80 for 3-pole circuit breakers.

#### EXAMPLE:

To order QOUQ circuit breakers, change the Catalog Number prefix from "QOU" to "QOUQ". To order a QOU220 with factory installed four point quick connect terminals, order one QOUQ220 circuit breaker at \$55.00 each plus \$5.60 per pole (a total price of \$65.60).

Interrupting Ratings ..... Page 6-2  
Accessories ..... Pages 6-37, 6-38, 6-43  
Dimensions ..... Pages 6-45, 6-46

### Low Ampere QOU Series 3 Circuit Breaker

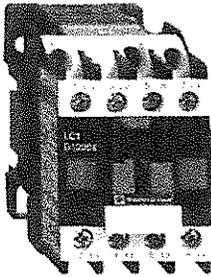
No. of Poles	Description	AIR Rating	Voltage Rating	Ampere Rating	Catalog Number	Unit Price	Order Qty.
One	Thermal-Magnetic Circuit Breaker	10,000 AIR	120/240 Vac	10	QOU110	\$ 25.50	1
					QOU110B	24.00	40
		5,000 AIR	277 Vac	11	QYU110□	77.00	1
					QYU110B□	76.00	40
		10,000 AIR	120/240 Vac	15	QOU115	25.50	1
					QOU115B	24.00	40
		5,000 AIR	277 Vac	15	QOU115HM	25.50	1
					QOU115HMB	24.00	40
		10,000 AIR	120/240 Vac	20	QOU120	25.50	1
					QOU120B	24.00	40
		5,000 AIR	277 Vac	20	QYU120□	77.00	1
					QYU120B□	76.00	40
		10,000 AIR	120/240 Vac	25	QOU125	25.50	1
					QOU125B	24.00	40
		5,000 AIR	277 Vac	25	QYU125□	77.00	1
					QYU125B□	76.00	40
		10,000 AIR	120/240 Vac	30	QOU130	25.50	1
					QOU130B	24.00	40
5,000 AIR	277 Vac	30	QYU130□	77.00	1		
			QYU130B□	76.00	40		
10,000 AIR	120/240 Vac		35	QOU135	25.50	1	
			QOU135B	24.00	40		
			40	QOU140	25.50	1	
			QOU140B	24.00	40		
			45	QOU145	25.50	1	
			QOU145B	24.00	40		
			50	QOU150	25.50	1	
QOU150B	24.00	40					
10,000 AIR	120/240 Vac		60	QOU160	25.50	1	
			QOU160B	24.00	40		
10,000 AIR	120/240 Vac		70	QOU170	49.40	1	
			QOU170B	44.90	40		
Two	Thermal-Magnetic Circuit Breaker	10,000 AIR	120/240 Vac	10	QOU210	55.00	1
					QOU210B	53.00	20
		10,000 AIR	240 Vac	15	QOU215H	107.00	1
					QOU215HB	102.00	20
		10,000 AIR	120/240 Vac	20	QOU220	55.00	1
					QOU220B	53.00	20
		10,000 AIR	240 Vac	20	QOU220H	107.00	1
					QOU220HB	102.00	20
		10,000 AIR	120/240 Vac	25	QOU225	55.00	1
					QOU225B	53.00	20
		10,000 AIR	240 Vac	25	QOU225H	107.00	1
					QOU225HB	102.00	20
10,000 AIR	120/240 Vac	30	QOU230	55.00	1		
			QOU230B	53.00	20		
10,000 AIR	240 Vac	30	QOU230H	107.00	1		
			QOU230HB	102.00	20		
10,000 AIR	120/240 Vac		35	QOU235	55.00	1	
			QOU235B	53.00	20		
			40	QOU240	55.00	1	
10,000 AIR	120/240 Vac		45	QOU245	55.00	1	
			QOU245B	53.00	20		
			50	QOU250	55.00	1	
10,000 AIR	120/240 Vac		50	QOU250B	53.00	20	
			60	QOU260	55.00	1	
			QOU260B	53.00	20		
10,000 AIR	120/240 Vac		70	QOU270	109.00	1	
			QOU270B	107.00	20		
			Three	Thermal-Magnetic Circuit Breaker	10,000 AIR	240 Vac	10
QOU310B	178.00	40					
15	QOU315	181.00					1
	QOU315B	178.00					40
20	QOU320	181.00					1
	QOU320B	178.00					40
25	QOU325	181.00					1
	QOU325B	178.00					40
30	QOU330	181.00					1
	QOU330B	178.00					40
35	QOU335	181.00					1
	QOU335B	178.00					40
40	QOU340	181.00	1				
	QOU340B	178.00	40				
45	QOU345	181.00	1				
	QOU345B	178.00	40				
50	QOU350	181.00	1				
	QOU350B	178.00	40				
60	QOU360	181.00	1				
	QOU360B	178.00	40				
Non-Auto Switch	N/A	240 Vac	60	QOU300	181.00	1	
				QOU300B	178.00	40	

□ UL Recognized Component, Supplementary Protector.

Note: See ordering instructions above left, all catalog numbers ending in B must be ordered in bulk package quantities.



# TeSys D-Line Contactors, Enclosed Starters, Overload Relays, and Accessories Resistive Loads

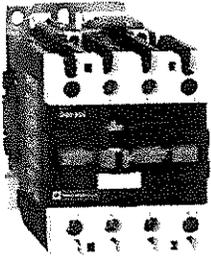


**LC1D12004\*\***

*NOTE: 3-pole contactors without auxiliary contacts conform to standard EN50012. For further information on auxiliary contact blocks and modules, see pages 106 to 107.*

### AC Control Circuit — 3- or 4-pole Contactors with Touch-safe Terminals for Power Cabling (AC-1 category)

Non-inductive loads maximum current (θ ≤ 55 °C [131 °F]) Utilization category AC-1	Number of Poles		Instantaneous Auxiliary Contacts		Catalog Number ◆ ▼	Weight lb (kg)
<b>A</b>	N/O	N/C	N/O	N/C		
25	3	—	1	1	or ▲ LC1D09**	0.75 (0.340)
	4	—	—	—	LC1D12**	0.77 (0.345)
	2	2	—	—	LC1D12004**	0.77 (0.350)
32	3	—	1	1	LC1D18**	0.79 (0.355)
	3	—	1	1	LC1D25**	0.89 (0.400)
40	4	—	—	—	LC1D25004**	1.18 (0.530)
	2	2	—	—	LC1D25008**	1.19 (0.535)
	3	—	1	1	or ▲ LC1D32** or LC1D38 ◆	1.21 (0.545)
60	3	—	1	1	LC1D40**	3.11 (1.400)
	4	—	—	—	LC1D40004**	3.20 (1.440)
	2	2	—	—	LC1D40008**	3.22 (1.450)
80	3	—	1	1	or ▲ LC1D50**	3.11 (1.400)
	4	—	—	—	LC1D65**	3.11 (1.400)
	2	2	—	—	LC1D65004**	3.20 (1.440)
125	3	—	1	1	or ▲ LC1D80**	3.53 (1.590)
	4	—	—	—	LC1D95** ◆	3.58 (1.610)
	2	2	—	—	LC1D80004**	3.91 (1.760)
200	3	—	1	1	or ▲ LC1D115**	5.38 (2.420)
	4	—	—	—	LC1D150**	5.42 (2.440)
	4	—	—	—	LC1D115004**	6.35 (2.860)

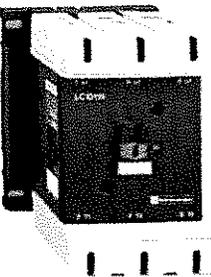


**LC1D65004\*\***

- ◆ For LC1D09 to LC1D38: clip-on mounting on 35 mm DIN rail AM1DP or screw mounting.  
For LC1D40 to LC1D95: clip-on mounting on 35 mm DIN rail AM1DE or 75 mm DIN rail AM1DL or screw mounting.  
For LC1D115 and LC1D150: clip-on mounting on 2 x 35 mm DIN rails AM1DP or screw mounting.
- ▲ Select between the two shown based upon the number of operating cycles; see the AC-1 graph on page 22 for further information.
- ▼ Use voltage codes on page 49 "Coil Selection" to complete catalog number.
- ◆ LC1D38 and LC1D95 are UL listed at the same HP rating as 32 and 80 amp devices respectively.

### AC Control Circuit — 3-pole Spring Terminal Connections (AC-1 category)

For contactors LC1D09, LC1D12, and LC1D18 only, add 3 to the last digit. Example: LC1D09\*\* becomes LC1D093\*\*.

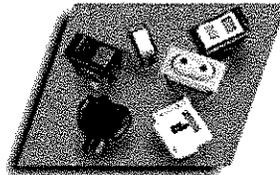


**LC1D115004\*\***



## McGill Electric Switches

ap-action, toggle, rocker and custom switches from the McGill Electric Switch Product group are widely applied in appliances, power tools, marine and recreational vehicles, and a variety of other industries. McGill electric switches are available for electrical loads to 25A/250V and can be customized for specific applications.



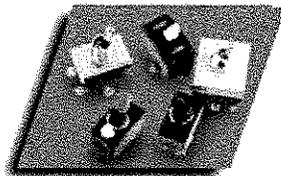
**McGill Rocker Switches.** McGill offers more than a dozen rocker switch lines to meet your application needs.

Choose from our standard rockers or contact your McGill representative for assistance in designing a customized rocker.

Choose from:

- Contemporary "Euro-style" designs
- Standard or miniature sizes
- Lighted, non-lighted, or paddle actuators
- Special lock-out actuators
- One to four poles
- Dual circuits
- Snap-in or screw mounting
- Variety of colors and finishes
- Screw, solder, spade, or leaded terminations
- UV-stabilized constructions
- Environmental barriers
- Matching indicator lights

McGill rocker switches are used in a variety of industries, including major and small appliance, marine, HVAC, automotive, power tool, business equipment and commercial food service.



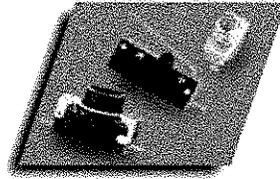
**McGill Toggle Switches.** McGill toggle switches provide you with excellent function and a wide choice of styles. Our wide selection of circuitries and design choices enables you to choose the style that best meets your needs.

Choose from:

- Standard or designer styles
- Lighted or non-lighted indicating plates and bats

- Variety of bat styles in plastic or metal
- One to four poles
- Optional "O" ring in bushing for moisture resistance
- Screw, solder, spade or leaded terminations

McGill toggle switches can be found in industrial, commercial and consumer products, including major appliance, small appliance, marine, power tool and HVAC applications.



**McGill Snap Action and Pushbutton Switches.**

When you specify McGill snap action and pushbutton switches, you are specifying proven cost-effective design solutions. From subminiature single pole, to our large double pole constructions, we can find a solution to meet your application needs.

A variety of design options is available, including:

- Subminiature, miniature, large size and plunger-type switches
- Choice of contacts, terminals and actuators
- Variable plunger lengths
- Levered or non-levered constructions
- Optional moisture and contamination resistance in subminiature switches
- Snap-in mounting capabilities

McGill snap action and pushbutton switches may be found in applications such as timers, float switches, limit switches, garage door openers, vending machines, ice cube makers, instruments and controls, relays, games, vacuum cleaners, floor buffers and office equipment.

## → **N-NLD22GE**

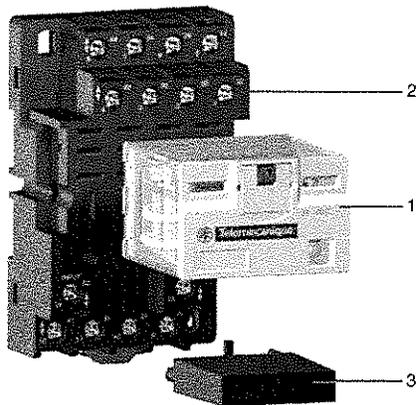
### **Green LED Light**

**DESCRIPTION:** One-piece LED pilot light for direct 120V supply.



### **FEATURES:**

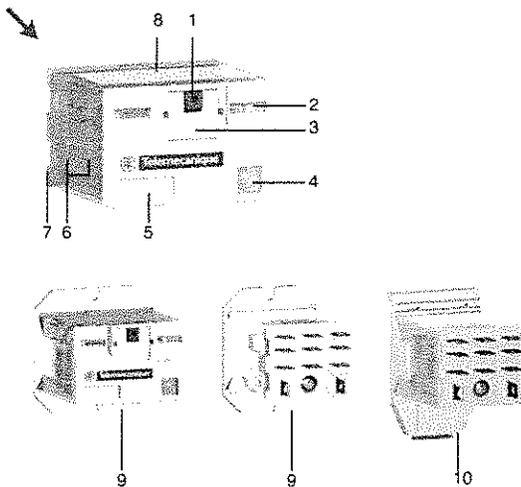
- Fluted lens without marking.
- Rated 100,000 Hour Life
- UL recognized auxiliary device pilot light File I76045(M).
- Rated oiltight & watertight NEMA 4, 4X, 12, and 13.



**Product Description**

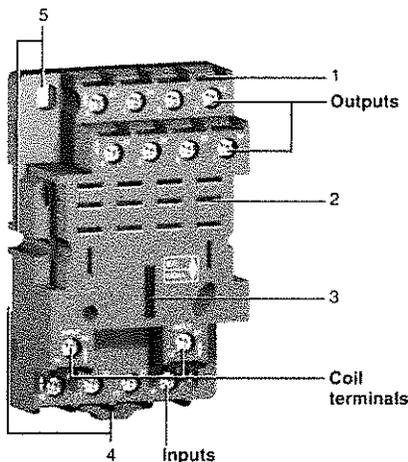
The RPM miniature relay range consists of:

1. 15 A relays with SPDT, DPDT, 3PDT, and 4PDT contacts.
2. Sockets with mixed contact terminals.
3. Protection modules (diode, RC circuit, or varistor) or 1 timer module. All these modules are common to all the sockets except for the timer module, which can only be used on the 3-pole or 4-pole sockets.
4. A metal hold-down clip for SPDT relays.



**Relay Description**

1. Spring return push button for testing the contacts (green: DC, red: AC).
2. Mechanical "relay status" indicator.
3. Optional removable lock-down door and push button, enabling forced maintaining of the contacts for test or maintenance purposes. During operation, this lock-down door must always be in the closed position.
4. Bipolar LED (depending on version) indicating the relay status.
5. Removable legend for relay identification.
6. Four notches for DIN rail mounting adapter or panel mounting adapter.
7. Five, eight, eleven, or fourteen pins.
8. Area by which the product can be easily gripped.
9. Mounting adapter enabling direct mounting of the relay on a panel.
10. Mounting adapter enabling direct mounting of the relay on a DIN rail.



**Socket Description**

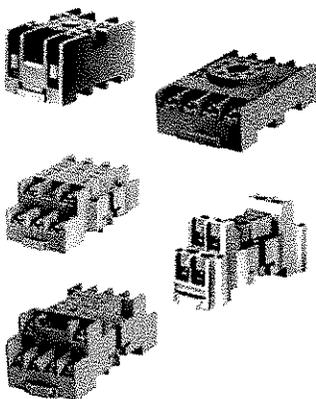
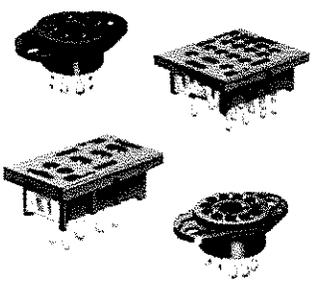
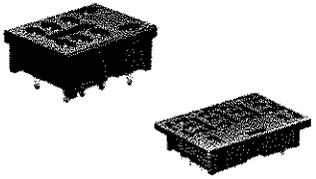
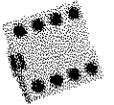
**Sockets with mixed contact terminals**

1. Connection by screw clamp terminals.
2. Five, eight, eleven, or fourteen female contacts for the relay pins.
3. Location for protection modules or the timer module.
4. Locating slot for mounting on DIN rail with mounting clip.
5. Two or four mounting holes for panel mounting.

*NOTE: The inputs are mixed with the relay coil terminals, with the outputs being located on the opposite side of the socket.*

**Relay and Timer Socket Selection Guide**

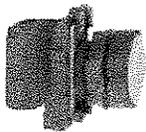
**Relay and Timer Sockets**

Mounting	Series	Page	Part No.	No. of Poles	Receptacle	Terminal	Compatible IDEC Relay and Timer	
	SR	F-6	SR2P-05 SR2P-05C SR2P-06	2	8-Pin	M3.5 Screw	RR2P, GT5P, RTE-P1, GT3 (8-pin)	
			SR3P-05 SR3P-05C SR3P-06	3	11-Pin		RR3PA, RR2KP, RTE-P2 GT3 (11-pin)	
			SR3B-05	3	11-Blade		RR1BA, RR2BA, RR3B, RTE-B	
	SH	F-9	SH1B-05 SH1B-05C	1	5-Blade	M3.5 Screw	M3.5 Screw Coil Terminal: M3	RH1B
			SH2B-05 SH2B-05C	2	8-Blade		RH2B	
			SH3B-05 SH3B-05C	3	11-Blade		RH3B, RH2LB	
			SH4B-05 SH4B-05C	4	14-Blade		RH4B	
	SY	F-13	SY2S-05 SY2S-05C	2	8-Blade	M3 Screw	RH3B, RH2LB	RY2S, RY22S
			SY4S-05 SY4S-05C	4	14-Blade		RU4S, RY4S, RY42S, RY2KS, RY2LS, RM2S, GT5Y	
	SM	F-15	SM2S-05 SM2S-05C					RU2S
		SR	F-16	SR2P-51	2	8-Pin	Solder	RR2P, RAPP, RBPP, GT5P, RTE-P1, GT3 (8-pin)
				SR3P-51	3	11-Pin		RR3PA, RR2KP, RTE-P2, GT3 (11-pin)
SR3B-51				3	11-Blade	RR1BA, RR2BA, RR3B		
SH		F-17	SH1B-51	1	5-Blade	RH1B, RAHB, RBHB		
			SH2B-51	2	8-Blade	RH2B, RAMB, RBMB		
			SH3B-51	3	11-Blade	RH3B, RH2LB		
			SH4B-51	4	14-Blade	RH4B		
SY		F-19	SY2S-51	2	8-Blade	RY2S, RY22S		
			SY4S-51	4	14-Blade	RY4S, RY42S, RY2KS, RY2LS, RM2S, GT5Y		
		SH	F3-20	SH1B-62	1	5-Blade		PC Board
	SH2B-62			2	8-Blade	RH2B, RAMB, RBMB		
	SH3B-62			3	11-Blade	RH3B, RH2LB		
	SH4B-62			4	14-Blade	RH4B		
	SY	F3-21	SY2S-61	2	8-Blade	RY2S, RY22S		
			SY4S-61	4	14-Blade	RY4S, RY42S, RY2KS, RY2LS, RM2S, GT5Y		
			SY4S-62	4	14-Blade	RY4S, RY42S, RY2KS, RY2LS, RM2S, GT5Y		
	SH	F-23	SH2B-02	2	8-Blade	M3.5 Screw	RH2B, RAMB, RBMB	
<b>For Panel Mounted Timers</b>								
	SR	F-23	SR6P-M08G	2	8-pin	M3.5 Screw	GE1A; RTE-P1; GT3A-1,-2,-3; GT3D-1,-2,-3; GT3W (8-pin); GT3S; GT3F	
			SR6P-M11G		11-pin		RTE-P2; GT3A-4,-5,-6; GT3D-4,-8; GT3W (11-pin)	



For relay mounting accessories, see page F-24.

**Non-Illuminated Push Buttons, Momentary (screw clamp terminal connections)**



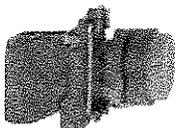
**XB5AA31**



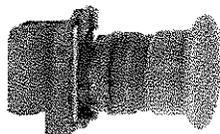
**XB5AA4322**



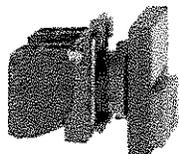
**XB5AP51**



**XB5AL42**



**XB5AC21**



**XB5AL845**

Shape of Head	Type of Push	Type of Contact		Marking	Color of Cap	Catalog Number (Components)	Price	
		N.O.	N.C.					
	Flush	1	...	...	Black	XB5AA21 (ZB5AZ101 + ZB5AA2)	\$17.50	
					Green	XB5AA31 (ZB5AZ101 + ZB5AA3)		
					Yellow	XB5AA51 (ZB5AZ101 + ZB5AA5)		
					Blue	XB5AA61 (ZB5AZ101 + ZB5AA6)		
		...	1	...	...	Red	XB5AA42 (ZB5AZ102 + ZB5AA4)	17.50
						Black	XB5AA25 (ZB5AZ105 + ZB5AA2)	25.60
						Green	XB5AA35 (ZB5AZ105 + ZB5AA3)	
						Red	XB5AA45 (ZB5AZ105 + ZB5AA4)	
	Flush	1	...	"T" (white)	Green	XB5AA3311 (ZB5AZ101 + ZB5AA331)	20.30	
						...	1	"O" (white)
	Flush with clear silicone boot (color of pusher unobscured)	1	...	...				
					Green	XB5AP31 (ZB5AZ101 + ZB5AP3)		
					Yellow	XB5AP51 (ZB5AZ101 + ZB5AP5)		
					Blue	XB5AP61 (ZB5AZ101 + ZB5AP6)		
	Extended	...	1	...	Red	XB5AP42 (ZB5AZ102 + ZB5AP4)	23.90	
					Red	XB5AL42 (ZB5AZ102 + ZB5AL4)	17.50	
	Extended	1	1	...	Red	XB5AL45 (ZB5AZ105 + ZB5AL4)	25.60	
						1	...	...

**Two Button Push Buttons, Momentary (screw clamp terminal connections)**

Shape of Head	Type of Push	Type of Contact		Degree of Protection	Catalog Number (Components)	Price
		N.O.	N.C.			
	One flush green push (marked "T") One extended red push (marked "O")	1	1	IP40	XB5AL845 (ZB5AZ105 + ZB5AL8434)	\$31.50

For additional information, reference Catalog #9001CT0001.

# Alarm Light Lenses

Panel Mount Style



**R10-S-10**

**G10-S-10 B10-S-10**

- 2" diameter x 2" height
- 10 watt appliance bulb
- Light socket with 12" pre-wired leads & mounting hardware as shown

(available in red, amber, green and blue)



**R15-M-15**

**G15-M-15 B15-M-15**

- 2.25" diameter x 3" height
- 15 watt appliance bulb
- Light socket with 36" pre-wired leads & mounting hardware as shown

(available in red, amber, green and blue)

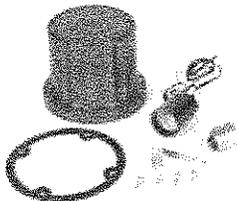


**R25-L-15**

**G25-L-15 B25-L-15**

- 3" diameter x 3" height
- 15 watt appliance bulb
- Light socket with 36" pre-wired leads & mounting hardware as shown

(available in red, amber, green and blue)



**R40-XL-25 A40-XL-25**

**B40-XL-25**

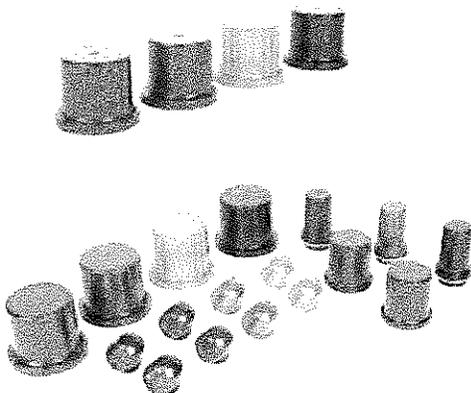
- 4.25" diameter x 3.5" height
- 25 watt appliance bulb
- Light socket with 36" pre-wired leads & mounting hardware as shown

(available in red, amber, green and blue)

**R40-XL-40**

**G40-XL-40 B40-XL-40**

- Same as above except supplied with 40-watt bulb and 120 Vac flasher unit



## SPECIFICATIONS (all lenses)

Flame resistant, unstabilized GE Lexan material

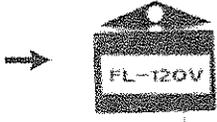
NEMA Type 3R, 4, 4X, 12 & 13

UL508 recognized component



# Panel Components

## Buzzers, Flashers and Cord Grips



### FLASHER

- Solid state 120 Vac
- 75 flashes per minute
- 1/4" quick disconnect terminals
- Molded on mounting foot w/single screw attachment for easy installation



### PIEZO BUZZER

- PB-024-AD 5-24 Vac/Vdc  
PB-120-A 40-125 Vac
- Single hole panel mount alarm buzzer
  - 95 db @ 2 feet
  - Frequency - 2900 +/- 250 hz
  - 1/4" quick disconnect terminals
  - Type 3, 3R, 4X, 12, 13



### CORD GRIPS - Standard wire

- Available in 1/2", 3/4", and 1" sizes to accommodate different wire sizes
- Ensures liquidtight seal for electrical cables in liquid environments
- Suitable for NEMA Type 4 and 6 enclosures



### CORD GRIPS - Flat wire

- Designed to accommodate flat wire sizes
- Available in 1/2", 3/4", and 1" sizes to accommodate different wire sizes
- Ensures liquidtight seal for electrical cables in liquid environments
- Suitable for NEMA Type 4 and 6 enclosures

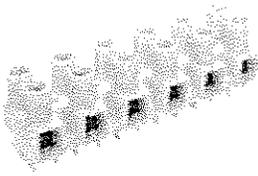


SOLID STATE FLASHER		LIST PRICE	WIRE SIZE INFORMATION	(SHOW 300 volt)
→ FL 120v	120v solid state		18/2	0.280"
PIEZO BUZZERS			18/3	0.300"
Pb-024-ad	5-24 Vac/Vdc		18/4	0.325"
Pb-120-a	40-125 Vac		16/2	0.305"
CORD GRIPS			16/3	0.325"
1/2" cg	for 0.170" - 0.470" wire		16/4	0.350"
3/4" cg	for 0.450 - 0.709" wire		14/2	0.335"
1" cg	for 0.710 - 0.100" wire		14/3	0.360"
Uf grip	for 12/2 & 12/3 awg flat wire		14/4	0.390"
			12/2	0.405"
			12/3	0.425"
			12/4	0.465"
			10/3	0.565"
			10/4	0.625"

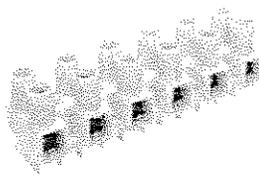
**HE6H**

**HE10H**

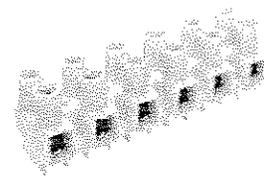
**HE16H**



Standoff feet with wire protector



Standoff feet with wire protector



Standoff feet with wire protector

12 mm

15 mm

15 mm

4.2 mm

4.3/5.7 mm

4.3/5.7 mm

7 mm

8.5 mm

8.5 mm



4-6 mm<sup>2</sup>

20-10 AWG



6-10 mm<sup>2</sup>

18-8 AWG



10-16 mm<sup>2</sup>

18-6 AWG

400 V

600 V

400 V

600 V

400 V

600 V

16 A

40 A

25 A

50 A

35-63 A

63 A

0.8 Nm

7.0 lb-in

1.2 Nm

10.6 lb-in

2.0 Nm

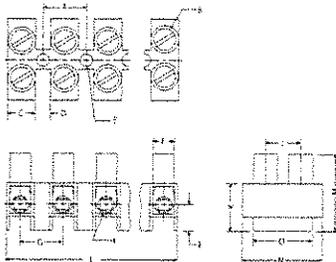
17.7 lb-in



Cat. No.	Std. Pk.
HE6HWPR/02	100
HE6HWPR/03	100
HE6HWPR/04	100
HE6HWPR/05	100
HE6HWPR/06	50
HE6HWPR/07	50
HE6HWPR/08	50
HE6HWPR/09	50
HE6HWPR/10	25
HE6HWPR/11	25
HE6HWPR/12	25

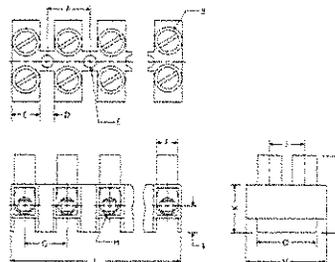
Cat. No.	Std. Pk.
HE10HWPR/02	40
HE10HWPR/03	40
HE10HWPR/04	40
HE10HWPR/05	40
HE10HWPR/06	20
HE10HWPR/07	20
HE10HWPR/08	20
HE10HWPR/09	10
HE10HWPR/10	10
HE10HWPR/11	10
HE10HWPR/12	10

Cat. No.	Std. Pk.
HE16HWPR/02	40
HE16HWPR/03	40
HE16HWPR/04	40
HE16HWPR/05	40
HE16HWPR/06	20
HE16HWPR/07	20
HE16HWPR/08	20
HE16HWPR/09	10
HE16HWPR/10	10
HE16HWPR/11	10
HE16HWPR/12	10



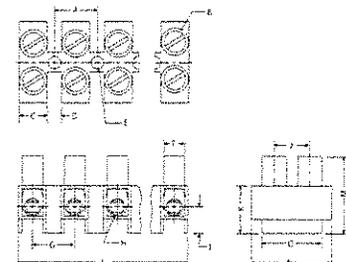
Dimensions mm

A = 12.0    I = 9  
 B = M3.5    J = 9.6  
 C = 7.7    K = 13.9  
 D = 4.3    L = 140 (12 pole)  
 E = Ø4.2    M = 21.8  
 F = Ø6.3    N = 22.6  
 G = 12.0    O = 15  
 H = Ø4.1



Dimensions mm

A = 15.0    I = 10.7  
 B = M4    J = 11.3  
 C = 9.3    K = 17.5  
 D = 5.7    L = 175 (12 pole)  
 E = Ø4.3/5.7    M = 27.8  
 F = Ø8.2    N = 25.1  
 G = 15.0    O = 16  
 H = Ø5.0



Dimensions mm

A = 15.0    I = 10.7  
 B = M5    J = 11.3  
 C = 9.3    K = 17.5  
 D = 5.7    L = 175 (12 pole)  
 E = Ø4.3/5.7    M = 27.8  
 F = Ø8.2    N = 25.1  
 G = 15.0    O = 16  
 H = Ø5.6

## DATA SHEET

CRANE PUMPS & SYSTEMS

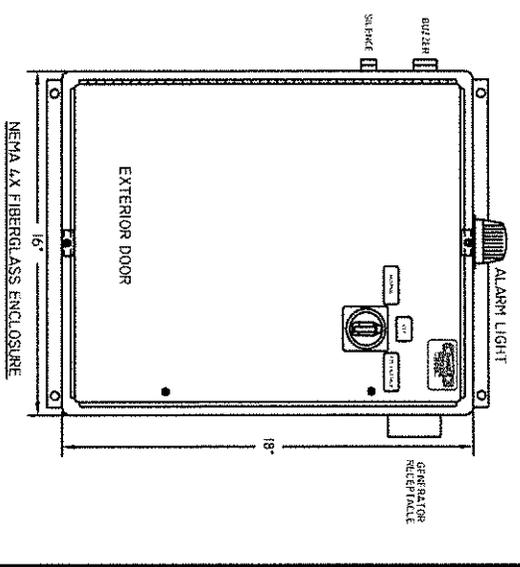
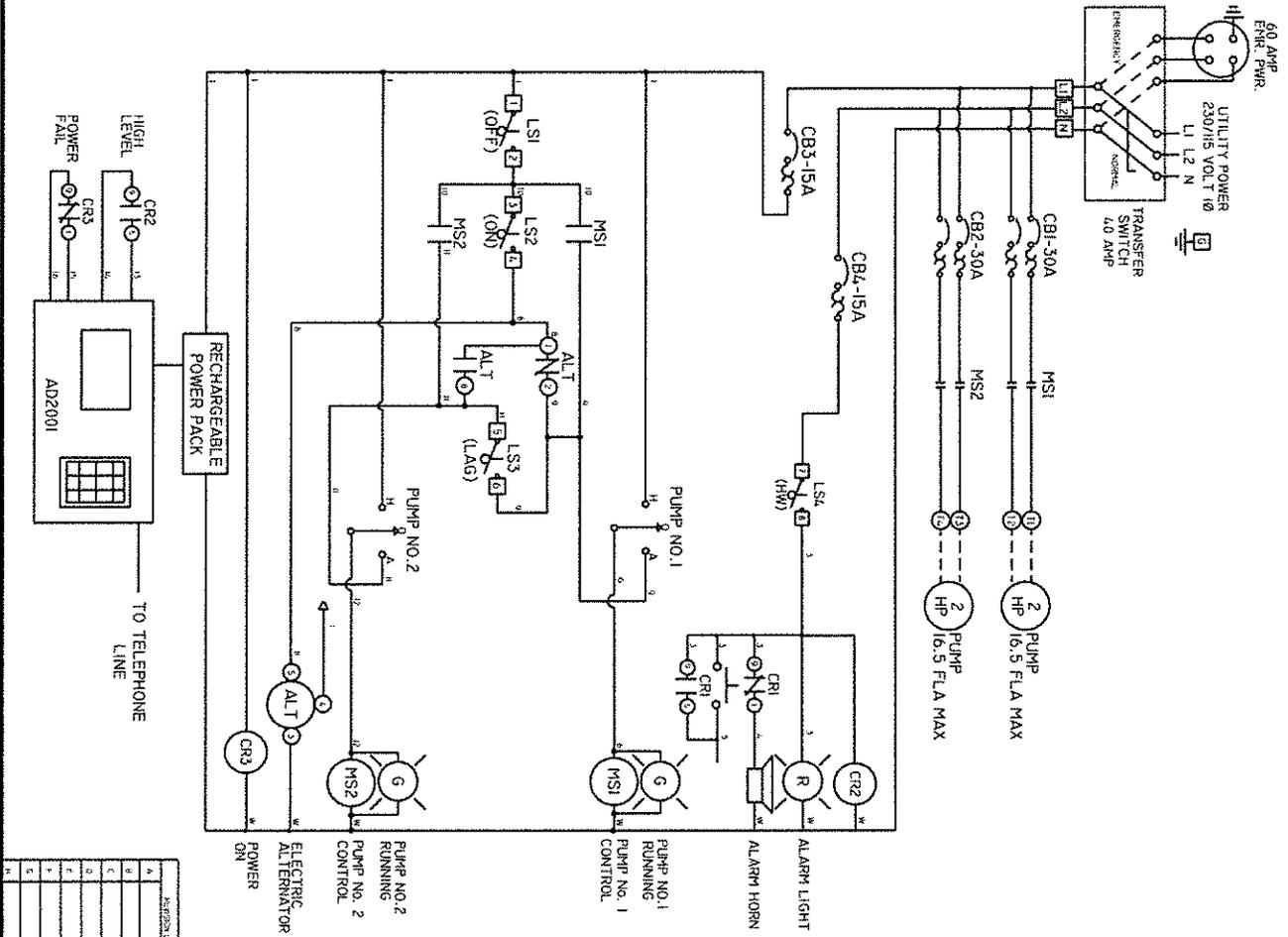
DATE: September 1, 2010

PROJECT NAME: BRUNSWICK CO.

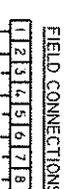
PROJECT NO: Q10770-B

HORSEPOWER: 2      VOLTAGE: 230      PHASE: 1      TYPE: Duplex

QTY	ITEM	MFG	MODEL #
<b>ENCLOSURE &amp; ACCESSORIES</b>			
1	ENCLOSURE	HOFFMAN	A181610CHQRFG
1	SUBPANEL	HOFFMAN	A18P16AL
<b>MAIN POWER COMPONENTS</b>			
1	POWER BLOCK	CONNECTRON	NDN63-WH
1	GENERATOR RECEPTACLE	MELTRIC	33-68076
1	GEN. RECEPT. COVER	MELTRIC	31-6A226
1	TRANSFER SWITCH	ABB	OT40F3C
1	HANDLE	ABB	OHB65L6E011
1	SHAFT	ABB	EXP6X210
2	CIRCUIT BREAKERS	SQUARE D	QOU230
2	CONTACTORS	SQUARE D	LC1D18G7
<b>CONTROL COMPONENTS</b>			
2	CONTROL BREAKER	SQUARE D	QOU115
<b>SWITCHES &amp; INDICATORS</b>			
1	SWITCH PLATE	QCI	4-HOLE
2	HOA SWITCHES	AC/DC	EZ-03-8179
2	GREEN INDICATOR LIGHTS	NHD	N-NLD22-GE
<b>RELAYS &amp; MISC COMPONENTS</b>			
3	CONTROL RELAYS	SQUARE D	RPM22F7
3	RELAY BASES	IDEC	SH2B-05
1	ALTERNATOR	DIVERSIFIED	ARB-120-ABA
1	ALTERNATOR BASE	SQUARE D	8501-NR51B
1	GROUND LUG	BURNDY	K2A25U
1	8-pt. TERMINAL STRIP	ALTECH	HE6HWPR/08
<b>TELEMETRY COMPONENTS</b>			
1	DIALER	USP	AD-2001
1	POWER PACK	USP	PP-12P
<b>ALARM COMPONENTS</b>			
1	ALARM SILENCE SWITCH	SQUARE D	XB5AA21
1	ALARM LIGHT SMALL	AC/DC	BL2R
1	ALARM BUZZER	CONERY	PB-120-A
<b>LABELS</b>			
1	"SILENCE" INSERT	SQUARE D	ZBA-147



**NOTE:**  
 1) PANEL'S GROUND TERMINAL MUST BE CONNECTED TO EARTH GROUND  
 2) FACTORY WIRE SHOWN AS .....  
 3) INSTALLER MUST PROVIDE MAIN DISCONNECTING DEVICE WITH CIRCUIT PROTECTION  
 4) INSTALLER MUST VERIFY THAT PHASE TO NEUTRAL IS 230 VOLTS BEFORE CONNECTING CONTROL CIRCUIT. MAIN WIRE MUST BE AT LEAST 1/2 INCH FROM 25 INCH HOLES. 1Ø VOLT CONTROL WIRE AND LOW VOLTAGE 2Ø BRN/BLK/WHY HOLES AND SPACE PROVIDED ON OUTER DOOR OR ENCLOSURE FOR PANEL LOCK  
 5) THIS CIRCUIT IS SHOWN IN A DE-ENERGIZED STATE  
 6) LEVEL SWITCHES ARE SHOWN WITH NO WATER IN TANK IN 0%  
 7) THIS CIRCUIT IS 117V. 6A  
 8) THIS CONTROL PANEL IS DESIGNED ONLY TO CONTROL PUMPS. ALL OTHER NOTICES WITH BUILT IN START CHARACTERISTICS AND OTHER ELECTRICAL PROTECTION



PUMP NO. 1 RUNNING PUMP NO. 1 CONTROL  
 ALARM LIGHT  
 ALARM HORN  
 PUMP NO. 2 RUNNING PUMP NO. 2 CONTROL  
 ELECTRIC ALTERNATOR POWER ON

WIRING CODE	SIZE	COLOR
A	2/0	RED
B	4/0	WHITE
C	4/0	RED
D	4/0	GREEN
E	4/0	YELLOW
F	4/0	YELLOW
G	4/0	YELLOW
H	4/0	YELLOW

WIRING CODE	SIZE	COLOR
A	2/0	RED
B	4/0	WHITE
C	4/0	RED
D	4/0	GREEN
E	4/0	YELLOW
F	4/0	YELLOW
G	4/0	YELLOW
H	4/0	YELLOW

WIRING CODE	SIZE	COLOR
A	2/0	RED
B	4/0	WHITE
C	4/0	RED
D	4/0	GREEN
E	4/0	YELLOW
F	4/0	YELLOW
G	4/0	YELLOW
H	4/0	YELLOW

WIRING CODE	SIZE	COLOR
A	2/0	RED
B	4/0	WHITE
C	4/0	RED
D	4/0	GREEN
E	4/0	YELLOW
F	4/0	YELLOW
G	4/0	YELLOW
H	4/0	YELLOW

WIRING CODE	SIZE	COLOR
A	2/0	RED
B	4/0	WHITE
C	4/0	RED
D	4/0	GREEN
E	4/0	YELLOW
F	4/0	YELLOW
G	4/0	YELLOW
H	4/0	YELLOW

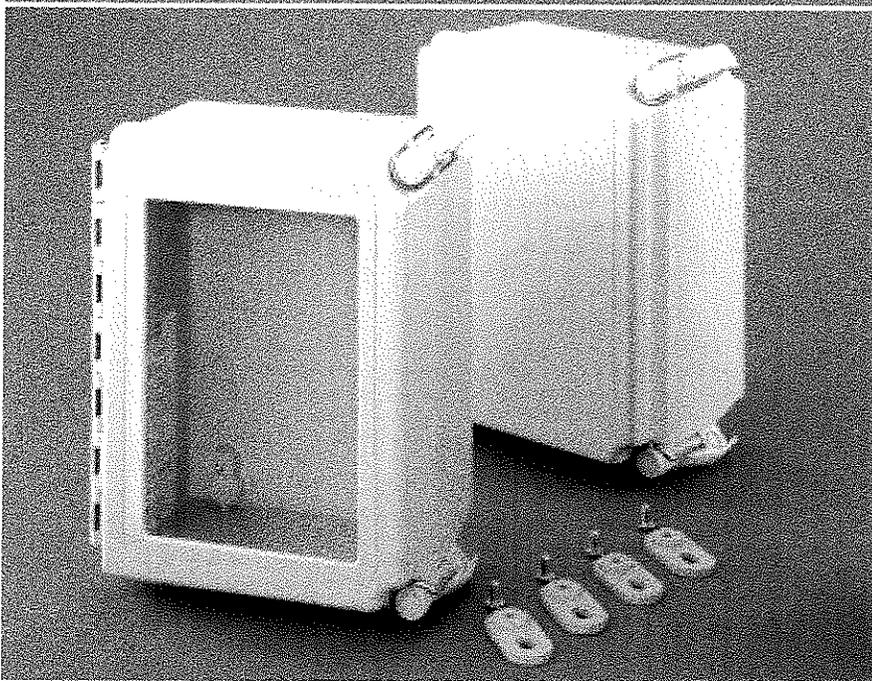
CRANE PUMPS & SYSTEMS  
 BRUNSWICK COUNTY  
 DUPLEX PUMP CONTROL PANEL

DESIGNED BY: [Signature]  
 APPROVED BY: [Signature]  
 DATE: [Date]  
 JOB #: [Job Number]  
 CUSTOMER: [Customer Name]



A Pentair Company

# Fiberglass Hinged Cover Type 4X Enclosures



## Application

Designed for use as a junction box or instrument housing in both indoor and outdoor settings. The enclosure is used in highly corrosive environments typically found in oil refineries, chemical processing plants, waste water treatment, marine installations, pulp and paper processing, and electroplating plants. The efficient design and simple construction create a low cost, durable, and aesthetic enclosure.

## Construction

- Molded fiberglass polyester has outstanding chemical and temperature resistance and exhibits excellent weatherability and physical properties
- Fiberglass is easily punched, drilled, filed, or sawed
- Seamless foam-in-place gasket assures watertight and dust-tight seal
- Polyester mounting feet and stainless steel attachment screws are provided with each enclosure
- Scratch-resistant GE Lexan Margard® windows are permanently bonded in place
- Molded-in-place threaded brass inserts and plated steel screws are provided for mounting optional panels and terminal kits
- Removable hinged cover attached to body with monel hinge pin
- Screw cover enclosures are secured with two captivated Type 316 stainless steel slotted cross point cover screws
- Enclosures with quick-release latches (U.S. patent number 4,917,421) have corrosion-resistant polyester latches located in corners which provide unobstructed access to enclosure
- Hinge pin and bail are corrosion-resistant monel
- Knockout padlock provisions included in each latch

## Finish/Color

Optional steel panels are white. Optional stainless steel, aluminum, and composite panels are unpainted. Fiberglass material is light gray inside and out.

## Industry Standards

UL 508 File No. E61997: Type 4, Type 4X, Type 12, and Type 13  
NEMA/EEMAC Type 4, Type 4X, Type 12, and Type 13  
Enclosure flammability rating per UL 508  
Window flammability rating per UL 508  
CSA File No. LR42186: Type 4, Type 4X, Type 12, and Type 13  
IEC 60529, IP66

## Accessories

See *General Accessories index*

Panels (See table)  
Terminal Kit Assembly  
Ventilators  
Wiring Duct

## Modification Services™ Program

You can customize this product to your unique requirements by specifying from these options:

- Colors
- Holes and cutouts in body, doors, subpanels
- Doors
- Subpanels
- Environmental control (louvers, fans, filters)
- Windows
- Standard accessories
- Solar shields

For details, see *Modification Services* at [hoffmanonline.com](http://hoffmanonline.com).

To order, contact your local Hoffman sales representative.

**Standard Sizes Solid Cover Type 4X Enclosures**

Catalog Number		Enclosure Size A x B x C	* Panel Catalog Number	Panel Size D x E	Mounting G x H	Overall L x W	F	J	K	O	P	Q	R	T	U
Screw Cover	Quick-Release														
A-664CHSCFG	A-664CHQRFG	6.00 x 6.00 x 4.00 (152 x 152 x 102)	A-6P6	4.88 x 4.88 (124 x 124)	6.94 x 4.00 (176 x 102)	6.50 x 6.50 (165 x 165)	3.45 (88)	3.25 (83)	1.00 (25)	4.25 (108)	4.25 (108)	5.64 (143)	5.12 (130)	0.12 (3)	5.64 (143)
A-864CHSCFG	A-864CHQRFG	8.00 x 6.00 x 4.00 (203 x 152 x 102)	A-8P6	6.75 x 4.88 (171 x 124)	8.94 x 4.00 (227 x 102)	8.50 x 6.50 (216 x 165)	3.45 (88)	3.25 (83)	1.00 (25)	4.25 (108)	6.25 (159)	7.64 (194)	7.12 (181)	0.12 (3)	5.64 (143)
A-1086CHSCFG	A-1086CHQRFG	10.00 x 8.00 x 6.00 (254 x 203 x 152)	A-10P8	8.75 x 6.88 (222 x 175)	10.94 x 6.00 (278 x 152)	10.50 x 8.50 (267 x 216)	5.45 (138)	4.94 (125)	1.31 (33)	6.25 (159)	8.25 (210)	9.61 (244)	9.12 (232)	0.12 (3)	7.61 (193)
A-12106CHSCFG	A-12106CHQRFG	12.00 x 10.00 x 6.00 (305 x 254 x 152)	A-12P10	10.75 x 8.88 (273 x 226)	12.94 x 8.00 (329 x 203)	12.50 x 10.50 (318 x 267)	5.45 (138)	4.69 (119)	1.56 (40)	8.25 (210)	10.25 (260)	11.58 (294)	11.12 (282)	0.12 (3)	9.58 (243)
A-14128CHSCFG	A-14128CHQRFG	14.00 x 12.00 x 8.00 (356 x 305 x 203)	A-14P12	12.75 x 10.88 (324 x 276)	14.94 x 10.00 (379 x 254)	14.55 x 12.55 (370 x 319)	7.45 (189)	6.50 (165)	1.81 (46)	10.25 (260)	12.25 (311)	13.59 (345)	13.12 (333)	0.15 (4)	11.59 (294)
A-16148CHSCF	A-16148CHQRFG	16.00 x 14.00 x 8.00 (406 x 356 x 203)	A-16P14	14.75 x 12.88 (375 x 327)	16.94 x 12.00 (430 x 305)	16.55 x 14.55 (420 x 370)	7.45 (189)	6.23 (158)	2.08 (53)	12.25 (311)	14.25 (362)	15.56 (395)	15.12 (384)	0.15 (4)	13.56 (344)
A-181610CHSCFG	A-181610CHQRFG	18.00 x 16.00 x 10.00 (457 x 406 x 254)	A-18P16	16.75 x 14.88 (425 x 378)	18.94 x 14.00 (481 x 356)	18.58 x 16.58 (472 x 421)	9.45 (240)	7.66 (195)	2.66 (68)	14.25 (362)	16.25 (413)	17.53 (445)	17.12 (435)	0.16 (4)	15.53 (394)

**Standard Sizes Window Cover Type 4X Enclosures**

Catalog Number		Enclosure Size A x B x C	* Panel Catalog Number	Panel Size D x E	Mounting G x H	Overall L x W	F	J	K	M	N	O	P	Q	R	T	U
Screw Cover	Quick-Release																
A-664CHSCFGW	A-664CHQRFGW	6.00 x 6.00 x 4.00 (152 x 152 x 102)	A-6P6	4.88 x 4.88 (124 x 124)	6.94 x 4.00 (176 x 102)	6.50 x 6.50 (165 x 165)	3.45 (88)	3.25 (83)	1.00 (25)	4.25 (108)	4.25 (108)	4.25 (108)	4.25 (108)	5.64 (143)	5.12 (130)	0.12 (3)	5.64 (143)
A-864CHSCFGW	A-864CHQRFGW	8.00 x 6.00 x 4.00 (203 x 152 x 102)	A-8P6	6.75 x 4.88 (171 x 124)	8.94 x 4.00 (227 x 102)	8.50 x 6.50 (216 x 165)	3.45 (88)	3.25 (83)	1.00 (25)	6.25 (159)	4.25 (108)	4.25 (108)	6.25 (159)	7.64 (194)	7.12 (181)	0.12 (3)	5.64 (143)
A-1086CHSCFGW	A-1086CHQRFGW	10.00 x 8.00 x 6.00 (254 x 203 x 152)	A-10P8	8.75 x 6.88 (222 x 175)	10.94 x 6.00 (278 x 152)	10.50 x 8.50 (267 x 216)	5.45 (138)	4.94 (125)	1.31 (33)	8.25 (210)	6.25 (159)	6.25 (159)	8.25 (210)	9.61 (244)	9.12 (232)	0.12 (3)	7.61 (193)
A-12106CHSCFGW	A-12106CHQRFGW	12.00 x 10.00 x 6.00 (305 x 254 x 152)	A-12P10	10.75 x 8.88 (273 x 226)	12.94 x 8.00 (329 x 203)	12.50 x 10.50 (318 x 267)	5.45 (138)	4.69 (119)	1.56 (40)	10.25 (260)	8.25 (210)	8.25 (210)	10.25 (260)	11.58 (294)	11.12 (282)	0.12 (3)	9.58 (243)
A-14128CHSCFGW	A-14128CHQRFGW	14.00 x 12.00 x 8.00 (356 x 305 x 203)	A-14P12	12.75 x 10.88 (324 x 276)	14.94 x 10.00 (379 x 254)	14.55 x 12.55 (370 x 319)	7.45 (189)	6.50 (165)	1.81 (46)	12.25 (311)	10.25 (260)	10.25 (260)	12.25 (311)	13.59 (345)	13.12 (333)	0.15 (4)	11.59 (294)
A-16148CHSCFGW	A-16148CHQRFGW	16.00 x 14.00 x 8.00 (406 x 356 x 203)	A-16P14	14.75 x 12.88 (375 x 327)	16.94 x 12.00 (430 x 305)	16.55 x 14.55 (420 x 370)	7.45 (189)	6.23 (158)	2.08 (53)	14.25 (362)	12.25 (311)	12.25 (311)	14.25 (362)	15.56 (395)	15.12 (384)	0.15 (4)	13.56 (344)
A-181610CHSCFGW	A-181610CHQRFGW	18.00 x 16.00 x 10.00 (457 x 406 x 254)	A-18P16	16.75 x 14.88 (425 x 378)	18.94 x 14.00 (481 x 356)	18.58 x 16.58 (472 x 421)	9.45 (240)	7.66 (195)	2.66 (68)	16.25 (413)	14.25 (362)	14.25 (362)	16.25 (413)	17.53 (445)	17.12 (435)	0.16 (4)	15.53 (394)

Millimeter dimensions ( ) are for reference only; do not convert metric dimensions to inch.

\* Panels must be ordered separately. Optional stainless steel, aluminum, and composite material panels are also available for most sizes. See General Accessories.

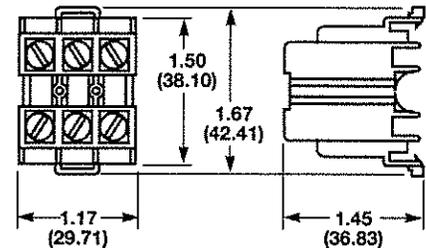
## Rail Mount Terminal Blocks

### NDN63

Inches (Millimeters)

#### SPECIFICATIONS

**Rating:** 65A, 600V; UL/CSA  
**Center spacing:** .375" (9.52)  
**Number of poles:** 3  
**Circuits per foot:** 30  
**Circuit jumper:** JN3, 2 circuits  
**Wire size:** AWG #6-18 CU  
**Screw size:** #10-32  
**Mounting options:** 35mm DIN rail, C-rail  
**Marking tape:** MT12-1/2  
**Torque rating:** 35 in/lb max.  
**Operating temperature:** 105°C

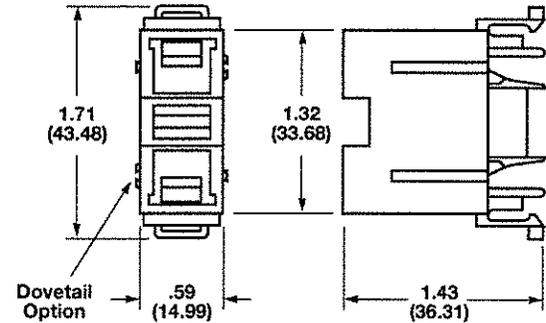


### NDN1

Inches (Millimeters)

#### SPECIFICATIONS

**Rating:** 90A, 600V  
**Center spacing:** .635" (16.13)  
**Number of poles:** 1  
**Circuits per foot:** 18  
**Wire size:** AWG #2-18 CU  
**Screw size:** 1/4-28  
**Mounting options:** 35mm DIN rail, C-rail  
 \* Dove-tail option is available for mounting side-by-side. Order part no. NDN1-A.  
**Marking tape:** MT12-1/2  
**Torque rating:** 32 in/lb max.  
**Operating temperature:** 105°C

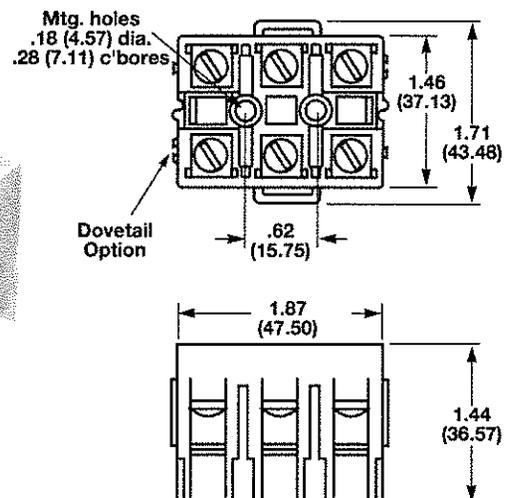
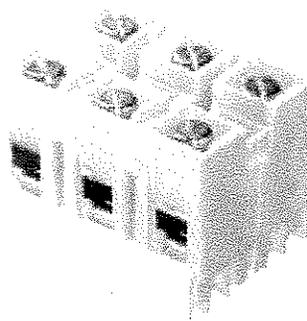


### NDN111

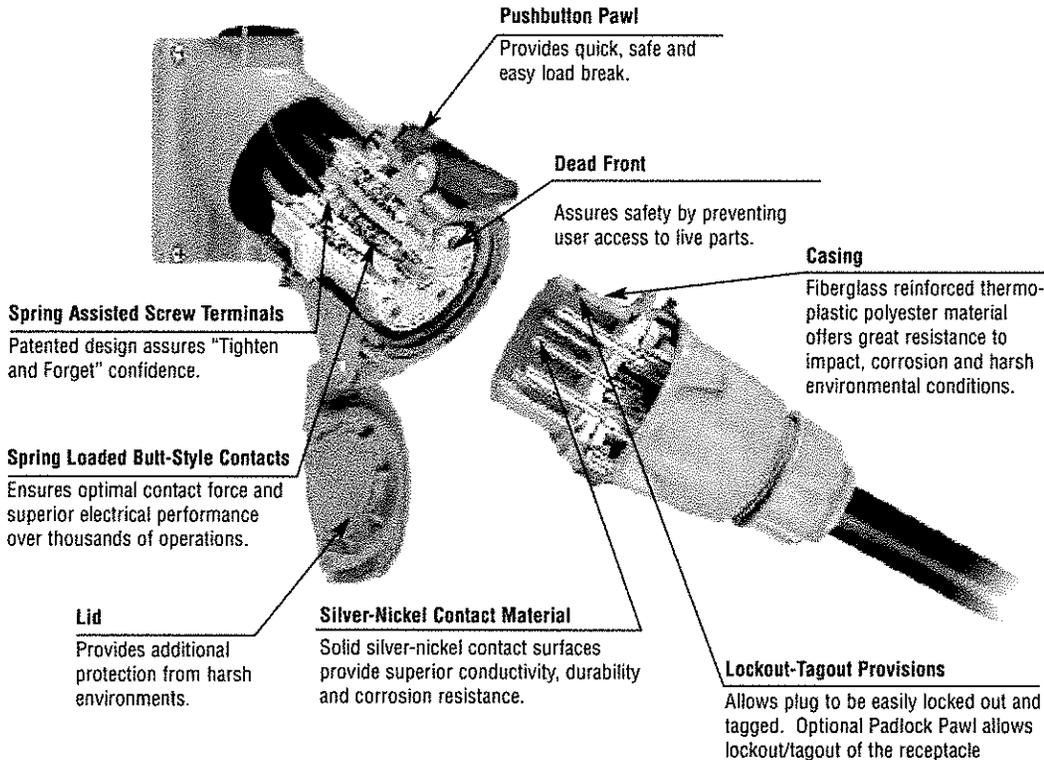
Inches (Millimeters)

#### SPECIFICATIONS

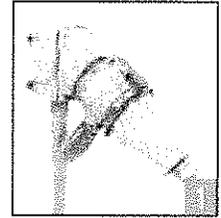
**Rating:** 90A, 600V; UL/CSA  
**Center spacing:** .635" (16.13)  
**Number of poles:** 3  
**Circuits per foot:** 18  
**Circuit jumper:** JN1, 2 circuits  
**Wire size:** AWG #2-18 CU  
**Screw size:** 1/4-28  
**Mounting options:** 35mm DIN rail, C-rail, Base Mount. \* Dove tail option is available for mounting side-by-side. Order part no. NDN111-A.  
**Marking tape:** MT12-1/2  
**Torque rating:** 32 in/lb max.  
**Operating temperature:** 105°C



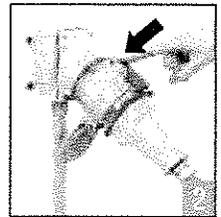
# Product Features



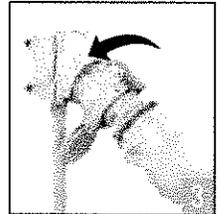
## Operating Instructions



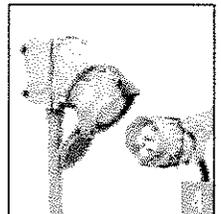
When the plug and receptacle are latched together, the circuit is connected.



Pressing the pawl causes the DECONTACTOR to break the circuit. The plug is ejected to its rest position; its contacts are now dead.



Rotating the 'dead' plug 30° counterclockwise closes the safety shutter and frees the plug to be withdrawn from the receptacle.



The plug and the receptacle are separated. The safety shutter prevents access to live parts.

To reconnect, insert plug into receptacle, rotate 30° clockwise, and apply insertion force.

## General Ratings

<b>Amperage</b>	20 to 200A
<b>Voltage</b>	600 VAC, 250 VDC Max
<b>Frequency</b>	50-400 Hz
<b>Horsepower</b>	1/2 to 25 hp
<b>Short-Circuit (Make &amp; Withstand)</b>	65kA to 100kA*
<b>Environmental</b>	NEMA 3R, IP54/55**
<b>Temperature</b>	min -40°F/max 140°F

\* DS20, 30, 60 & 100C are rated 100kA. Testing was performed with RK1 current limiting fuses sized at 400% of the highest full load motor ampacity associated with the devices hp rating.

\*\* DS100 & 200 are rated 65kA. Testing was performed with RK5 time delay fuses sized at 100% of the devices rated ampacity.

\*\* IP54 rated when receptacle and plug are mated, when not mated receptacle alone is IP55 rated provided that the lid is latched closed.

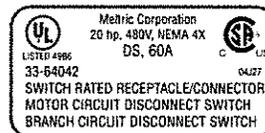
## Listings

Category	UL	CSA	IEC
Plugs and Receptacles	UL 1682	C22.2 No. 182.1	60309-1
Branch Circuit Disconnect Switching (AC only)	UL Subject 2682 (Performance tested to UL 98)	UL Subject 2682	60947-3, AC22, AC23
Motor Circuit Disconnect Switching (AC only)	UL Subject 2682 (Performance tested to UL 508)	UL Subject 2682	

CE ratings available upon request

## Highlighted Feature

### Typical Device Labels



DS Decontactors are UL & CSA rated for "motor circuit" and "branch circuit" disconnect switching -- up to 25 hp and up to 200A

DS60



# DECONTACTOR™ – 60A

## Switch Rated Plugs & Receptacles

### Ratings

- Voltage**  
600 VAC, 250 VDC
- Switch Ratings (AC Only)**  
Branch Circuit & Motor Circuit Disconnect Switching
- Horsepower ratings**

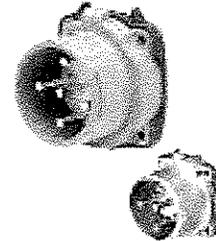
120V	1Ø	2 hp
125V	1Ø	3 hp
208V	3Ø	7 1/2 hp
240V	3Ø	7 1/2 hp
480V	3Ø	20 hp
600V	3Ø	25 hp
- Short Circuit Rating**  
100kA Close & Withstand  
Testing was performed with RK1 current limiting fuses sized at 400% of the highest full load motor ampacity associated with the devices hp rating.
- Environmental Ratings**  
NEMA 3R, IP54/55\*  
\* IP54 when the plug & receptacle are mated. IP55 on the receptacle alone when the lid is latched closed.
- Temperature Range**  
Min -40°F/Max 140°F  
See pg 188 for temps below -15°F or above 105°F.
- Wiring Capacity**  
Min 6 AWG Max 2 AWG  
Aux Contacts - Max 14 AWG
- Listings**  
UL, CSA, IEC, CE\*  
\* Contact Customer Service

### Receptacle (female)



Don't forget to add installation accessories to your order!

### Inlet (male)



Voltage	Polarity	Part #	
		Poly	Metal
120/208V	3P+N+E	33-64167	37-64167
125V	1P+N+E	33-64075	37-64075
125/240V	2P+N+E	33-64076	37-64076
208V	2P+E	33-64162	37-64162
208V	3P+E	33-64163	37-64163
240V	2P+E	33-64072	37-64072
240V	3P+E	33-64073	37-64073
277V	1P+N+E	33-64045	37-64045
277/480V	3P+N+E	33-64047	37-64047
480V	3P+N+E	33-64147	37-64147
480V	2P+E	33-64042	37-64042
480V	3P+E	33-64043	37-64043
600V	2P+E	33-64142	37-64142
600V	3P+E	33-64143	37-64143

Voltage	Polarity	Part #	
		Poly	Metal
120/208V	3P+N+E	33-68167	37-68167
125V	1P+N+E	33-68075	37-68075
125/240V	2P+N+E	33-68076	37-68076
208V	2P+E	33-68162	37-68162
208V	3P+E	33-68163	37-68163
240V	2P+E	33-68072	37-68072
240V	3P+E	33-68073	37-68073
277V	1P+N+E	33-68045	37-68045
277/480V	3P+N+E	33-68047	37-68047
480V	3P+N+E	33-68147	37-68147
480V	2P+E	33-68042	37-68042
480V	3P+E	33-68043	37-68043
600V	2P+E	33-68142	37-68142
600V	3P+E	33-68143	37-68143

Other voltage configurations are available – contact customer service at 800.433.7642.

### Main Options



Auxiliary/Pilot Contacts



Emergency Stop Pawl



Padlockable Mushroom Pawl



Self-Ejecting Devices

\* Requires straight insertion receptacle or inlet and self-ejecting plug or connector

See pgs 166-174 for detailed information on these options

### Receptacle Options

### Suffix #

With 2 Auxiliary/Pilot Contacts	Recept # - 972
With 3 Auxiliary/Pilot Contacts	Recept # - 263
LP Watertightness (low pressure)	Recept # - LP
HP Watertightness (high pressure)	Recept # - HP
Straight Insertion	Recept # - A188
Self-Ejecting Connector Release	Recept # - 348-A188
Emergency Stop Pawl	Recept # - 375
Locking Mushroom Pawl	Recept # - 845
Padlockable Mushroom Pawl	Recept # - 843
Metal Pawl (on poly receptacle)	Recept # - 824
Closed Lid Configuration	Recept # - NC
With Auxiliary Switch	Recept # - 270
Recess Plate	Recept # - 142

### Inlet Options

### Suffix #

With 2 Auxiliary/Pilot Contacts	Inlet # - 972
With 3 Auxiliary/Pilot Contacts	Inlet # - 263
LP Watertightness (low pressure)	Inlet # - LP
HP Watertightness (high pressure)	Inlet # - HP
Self-Ejecting Plug Release	Inlet # - 338-A188
Straight Insertion	Inlet # - A188
With No Lockout Hole	Inlet # - A155
For Auxiliary Switch	Inlet # - NNF

#### DS60 Order Example:

To order 2 auxiliary/pilot contacts on an inlet and receptacle add **-972** to the part numbers.

DS60 Poly inlet 3P+E=33-68043-**972**

DS60 Poly receptacle 3P+E=33-64043-**972**

Appropriate accessory part numbers must also be included on the order.

# Installation Accessories

Unless indicated otherwise, accessories can be used with either poly or metal plugs and receptacles

## Handles



NPT	Poly Handle	Metal* Handle	Cable Range	Poly Handle w/Clamp & Bushing	Nylon Handle	Neoprene Handle	Poly Handle w/built in Draw Grips
1/2"	6PH12	6H12	.50 - 1.25	-	-	31-611	-
3/4"	6PH34	6H34	.51 - 1.38	-	FH611	-	FH611-473
1"	6PH1	6H1	1.250 - 1.375	6PM622	-	-	-
1 1/4"	6PH114	6H114	1.438 - 1.562	6PM625	-	-	-
1 1/2"	6PH112	6H112	1.562 - 1.688	6PM627	-	-	-
			1.688 - 1.812	6PM629	-	-	-

**Notes:**

- Finger draw plates are recommended for easier connector closure on cord to cord assemblies.
- For available cord grips, see pgs 163-164.
- For metal devices only

• For a guideline of NPT sizes based on cable ranges, see DS30 on pg 38.

## Angles



Nylon 30° Angle	Metal 30° Angle	Metal 70° Angle	Metal Angle Oversized 30°	Metal Straight Adapter	Metal Lateral Angle 30°
MP6	MA6	89-6A027	MA660	MS6	MAB6

## Junction Boxes



NPT	Metal Box	Metal Box with Nylon Angle	Metal Box with Metal Angle	Poly* Conduit Entry
1/2"	-	-	-	MC612
3/4"	-	-	-	MC634
1"	MB61	31-6A053-080-1	39-6A053-080-1	MC61
1 1/4"	MB6114	31-6A053-080-114	39-6A053-080-114	MC6114
1 1/2"	MB6112	31-6A053-080-112	39-6A053-080-112	-
2"	MB62	31-6A053-080-2	39-6A053-080-2	-

\* For poly devices only

## Miscellaneous Accessories



Finger Drawplates	Protective Cap	Padlockable Cap	Inlet Spring-Loaded cap
FDP6	31-6A126	DS6MC	31-6A226 ←

## Accessory Spotlight

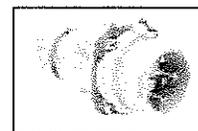
### Finger Drawplates



Finger drawplates are recommended for easier connector closure on cord to cord assemblies.

## Order Example

A typical order should include an inlet part number, a receptacle part number AND the matching handles, angles or other required accessories.

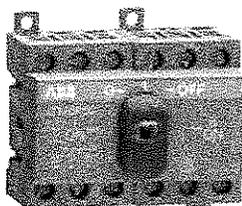


Male Inlet with Handle (Plug)  
33-68243-C-K04 + FH611



Female Receptacle with Angle Adapter  
33-64243-C-K04 + MP6

# Change-over



## OT40F3C

### PRODUCT FEATURES

Conventional Free-air Thermal Current	q=40°C 40 A
Conventional Thermal Current	Fully Enclosed 40 A
Extended Product Type	OT40F3C
Number of Poles	3
Operating Mechanism	Mechanism on top of the switch
Rated Operational Current AC-21A	(690V) 40 A , (500V) 40 A , (380 ... 415V) 40 A
Rated Operational Current AC-22A	(690 V) 40 A , (500 V) 40 A , (380 ... 415 V) 40 A
Rated Operational Current AC-23A	(690 V) 12 A , (500 V) 23 A , (380 ... 415 V) 23 A

# SwitchLine Accessories Ordering information



OHB\_

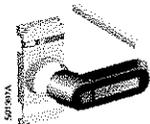
## Handles, door mounting

Plastic I - 0 - II handle, IP65, padlockable with three padlocks in 0-position, door interlock in I- and II-position and when padlocked.

Suitable for switches	Colour	Shaft diam. [mm]	Type	Order number	Weight [kg]
OT160...250E_C	black	6	→ OHB65J6E011	1SCA022383R2480	0.12
OT315...400E_C	black	12	OHB95J12E011	1SCA022621R0760	0.12
OT630...800E_C	black	12	OHB125J12E011	1SCA022589R3340	0.14

Plastic I - 0 - II handle, IP65, padlockable with three padlocks in I- , 0- and II-position, door interlock in I- and II-position and when padlocked.

OT160...250E_C	black	6	OHB65J6E311	1SCA022662R4730	0.12
OT315...400E_C	black	12	OHB95J12E311	1SCA022779R2140	0.12
OT630...800E_C	black	12	OHB125J12E311	1SCA022615R1730	0.14



OTV\_

## Handles, direct mounting

Plastic I - 0 - II handle, padlockable with three padlocks in 0-position. Includes a shaft and a mechanism cover.

OT160...250E_C	black	shaft included	OTV250ECK	1SCA022783R0090	0.08
OT315...400E_C	black	shaft included	OTV400ECK	1SCA022783R0170	0.26
OT630...800E_C	black	shaft included	OTV800ECK	1SCA022797R2470	0.30



OXP6\_



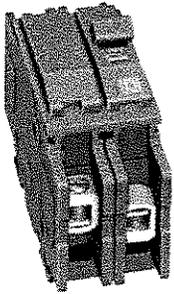
OXP12\_

## Extended shafts

Suitable for switches	Installation depth [mm]	Type	Order number	Weight [kg]
<b>Shaft diameter 6 mm</b>				
OT160...250E_C	166...214	OXP6X90	1SCA022064R1180	0.03
	209...254	OXP6X130	1SCA022057R0570	0.04
	240...285	OXP6X161	1SCA022067R1760	0.05
	289...334	→ OXP6X210	1SCA022295R6080	0.06
	369...414	OXP6X290	1SCA022042R6370	0.08
	439...484	OXP6X360	1SCA022042R6530	0.11
<b>Shaft diameter 12 mm</b>				
OT315...400E_C	209...266	OXP12X107	1SCA022029R9750	0.12
	243...307	OXP12X148	1SCA022658R5570	0.17
	261...325	OXP12X166	1SCA022325R7100	0.20
	280...344	OXP12X185	1SCA022325R6710	0.22
	345...409	OXP12X250	1SCA022325R6980	0.29
	375...439	OXP12X280	1SCA022137R5140	0.33
	420...484	OXP12X325	1SCA022042R5810	0.38
	490...554	OXP12X395	1SCA022042R5990	0.46
	560...624	OXP12X465	1SCA022042R6020	0.54
	OT630...800E_C	287...385	OXP12X148	1SCA022658R5570
324...422		OXP12X185	1SCA022325R6710	0.22
389...487		OXP12X250	1SCA022325R6980	0.29
464...562		OXP12X325	1SCA022042R5810	0.38
534...632		OXP12X395	1SCA022042R5990	0.46
604...702		OXP12X465	1SCA022042R6020	0.54

**QOU Unit Mount**  
Miniature Circuit Breakers  
Class 720

**Square D**  
[www.squared.com](http://www.squared.com)  
FOR CURRENT INFORMATION



**Low Ampere QOU Miniature Circuit Breakers**  
General Specifications Common to All Low Ampere QOU Circuit Breakers

- Terminal lug wire size 1 – #14 - #2 AWG Cu or Al.
- Reversible line and load lugs for convenient flush or surface mount wiring.
- DIN mount (symmetrical rail 35 x 7.5 DIN/EN 50 022).
- UL Listed as HACR type – 15-70 A.
- Field installable quick connectors.
- Single handle with internal common trip.
- UL Listed 48 Vdc (5,000 AIR).
- Bulk pack circuit breakers do not have mounting feet included.

**Special Ordering Instructions:**

**For Bulk Packed QOU Circuit Breakers and Accessories**

QOU circuit breakers and accessories must be ordered in multiples of the quantities listed. Units provided in standard quantity of one are individually packaged; standard quantities greater than one are bulk packed. Bulk packed circuit breakers do not include mounting brackets.

**EXAMPLE:**

Individual pack – small quantity orders: To receive five QOU220 circuit breakers, order five individual QOU220 circuit breakers at \$55.00 each. Product will be individually packaged, and will include necessary mounting feet.

Bulk pack – large quantity order. To order 440 QOU220 circuit breakers using bulk packaging, order 440 QOU220B at \$53.00 each. Product will be packaged in 22 packages of 20 pieces each. Product will not include mounting feet. To order mounting feet, order 880 pieces of QOUMFB2. Product will be packaged in eleven packages of 80 pieces each.

**For QOUQ Low Amp Circuit Breakers with Four Point Quick Connect Terminals**

QOUQ Low Amp circuit breakers with four point quick connect terminals are provided with permanent factory installed terminals which are affixed to the Load or "OFF" end of the circuit breaker. This special terminal will accommodate up to four 1/4 inch female quick connect wire terminations. Total ampacity of these connections must not exceed the rating of the circuit breaker. Price addition is \$5.60 for single-pole, \$11.20 for 2-pole and \$16.80 for 3-pole circuit breakers.

**EXAMPLE:**

To order QOUQ circuit breakers, change the Catalog Number prefix from "QOU" to "QOUQ". To order a QOU220 with factory installed four point quick connect terminals, order one QOUQ220 circuit breaker at \$55.00 each plus \$5.60 per pole (a total price of \$65.60).

Interrupting Ratings ..... Page 6-2  
Accessories ..... Pages 6-37, 6-38, 6-43  
Dimensions ..... Pages 6-45, 6-46

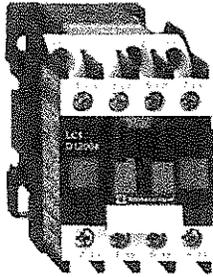
**Low Ampere QOU Series 3 Circuit Breaker**

No. of Poles	Description	AIR Rating	Voltage Rating	Ampere Rating	Catalog Number	Unit Price	Order Qty.				
One	Thermal-Magnetic Circuit Breaker	10,000 AIR	120/240 Vac	10	QOU110 QOU110B	\$ 25.50 24.00	1 40				
		5,000 AIR	277 Vac	1	QYU110□ QYU110B□	77.00 76.00	1 40				
		10,000 AIR	120/240 Vac	15	QOU115 QOU115B	25.50 24.00	1 40				
				15	QOU115HM QOU115HMB	25.50 24.00	1 40				
		5,000 AIR	277 Vac	15	QYU115□ QYU115B□	77.00 76.00	1 40				
		10,000 AIR	120/240 Vac	20	QOU120 QOU120B	25.50 24.00	1 40				
				20	QOU120HM QOU120HMB	25.50 24.00	1 40				
		5,000 AIR	277 Vac	20	QYU120□ QYU120B□	77.00 76.00	1 40				
		10,000 AIR	120/240 Vac	25	QOU125 QOU125B	25.50 24.00	1 40				
				25	QYU125□ QYU125B□	77.00 76.00	1 40				
		10,000 AIR	120/240 Vac	30	QOU130 QOU130B	25.50 24.00	1 40				
				30	QYU130□ QYU130B□	77.00 76.00	1 40				
		10,000 AIR	120/240 Vac	35	QOU135 QOU135B	25.50 24.00	1 40				
				40	QOU140 QOU140B	25.50 24.00	1 40				
				45	QOU145 QOU145B	25.50 24.00	1 40				
				50	QOU150 QOU150B	25.50 24.00	1 40				
				60	QOU160 QOU160B	25.50 24.00	1 40				
				70	QOU170 QOU170B	49.40 44.90	1 40				
				Two	Thermal-Magnetic Circuit Breaker	10,000 AIR	120/240 Vac	10	QOU210 QOU210B	55.00 53.00	1 20
								15	QOU215 QOU215B	55.00 53.00	1 20
15	QOU215H QOU215HB							107.00 102.00	1 20		
20	QOU220 QOU220B							55.00 53.00	1 20		
Three	Thermal-Magnetic Circuit Breaker	10,000 AIR	240 Vac	20	QOU220H QOU220HB	107.00 102.00	1 20				
				25	QOU225 QOU225B	55.00 53.00	1 20				
				25	QOU225H QOU225HB	107.00 102.00	1 20				
				30	QOU230 QOU230B	55.00 53.00	1 20				
				30	QOU230H QOU230HB	107.00 102.00	1 20				
				120/240 Vac	35	QOU235 QOU235B	55.00 53.00	1 20			
					40	QOU240 QOU240B	55.00 53.00	1 20			
					45	QOU245 QOU245B	55.00 53.00	1 20			
					50	QOU250 QOU250B	55.00 53.00	1 20			
				Non-Auto Switch	N/A	240 Vac	60	QOU200 QOU200B	55.00 53.00	1 20	
60	QOU260 QOU260B	55.00 53.00	1 20								
Thermal-Magnetic Circuit Breaker	10,000 AIR	120/240 Vac	70	QOU270 QOU270B	109.00 107.00	1 20					
			10	QOU310 QOU310B	181.00 178.00	1 40					
Thermal-Magnetic Circuit Breaker	10,000 AIR	240 Vac	15	QOU315 QOU315B	181.00 178.00	1 40					
			20	QOU320 QOU320B	181.00 178.00	1 40					
			25	QOU325 QOU325B	181.00 178.00	1 40					
			30	QOU330 QOU330B	181.00 178.00	1 40					
			35	QOU335 QOU335B	181.00 178.00	1 40					
			40	QOU340 QOU340B	181.00 178.00	1 40					
			45	QOU345 QOU345B	181.00 178.00	1 40					
			50	QOU350 QOU350B	181.00 178.00	1 40					
			60	QOU360 QOU360B	181.00 178.00	1 40					
			Non-Auto Switch	N/A	240 Vac	60	QOU300 QOU300B	181.00 178.00	1 40		

□ UL Recognized Component, Supplementary Protector.  
**Note:** See ordering instructions above left, all catalog numbers ending in B must be ordered in bulk package quantities.



# TeSys D-Line Contactors, Enclosed Starters, Overload Relays, and Accessories Resistive Loads

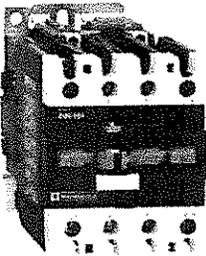


LC1D12004\*\*

NOTE: 3-pole contactors without auxiliary contacts conform to standard EN50012. For further information on auxiliary contact blocks and modules, see pages 106 to 107.

## AC Control Circuit — 3- or 4-pole Contactors with Touch-safe Terminals for Power Cabling (AC-1 category)

Non-inductive loads maximum current ( $\theta \leq 55^\circ\text{C}$ [ $131^\circ\text{F}$ ]) Utilization category AC-1	Number of Poles		Instantaneous Auxiliary Contacts		Catalog Number ◆ ▼	Weight lb (kg)	
	N/O	N/C	N/O	N/C			
25	3	—	1	1	or ▲	LC1D09** LC1D12**	0.75 (0.340) 0.77 (0.345)
	4	—	—	—		LC1D12004**	0.77 (0.350)
	2	2	—	—		LC1D12008**	0.77 (0.350)
32	3	—	1	1	→	LC1D18**	0.79 (0.355)
	3	—	1	1		LC1D25**	0.89 (0.400)
	4	—	—	—		LC1D25004** LC1D25008**	1.18 (0.530) 1.19 (0.535)
40	3	—	1	1	or ▲	LC1D32** or LC1D38 ◆	1.21 (0.545)
	3	—	1	1		LC1D40**	3.11 (1.400)
	4	—	—	—		LC1D40004** LC1D40008**	3.20 (1.440) 3.22 (1.450)
50	2	2	—	—		LC1D50**	3.11 (1.400)
	3	—	1	1	or ▲	LC1D65**	3.11 (1.400)
	4	—	—	—		LC1D65004** LC1D65008**	3.20 (1.440) 3.22 (1.450)
60	3	—	1	1	or ▲	LC1D80**	3.53 (1.590)
	3	—	1	1		LC1D85** ◆	3.58 (1.610)
	4	—	—	—		LC1D80004** LC1D80008**	3.91 (1.760) 4.09 (1.840)
80	2	2	—	—		LC1D115** LC1D150**	5.38 (2.420) 5.42 (2.440)
	3	—	1	1	or ▲	LC1D115004**	6.35 (2.860)
	4	—	—	—			

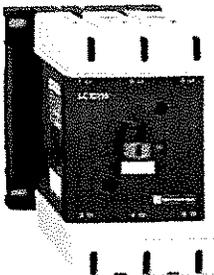


LC1D65004\*\*

- ◆ For LC1D09 to LC1D38: clip-on mounting on 35 mm DIN rail AM1DP or screw mounting.  
For LC1D40 to LC1D95: clip-on mounting on 35 mm DIN rail AM1DE or 75 mm DIN rail AM1DL or screw mounting.  
For LC1D115 and LC1D150: clip-on mounting on 2 x 35 mm DIN rails AM1DP or screw mounting.
- ▲ Select between the two shown based upon the number of operating cycles; see the AC-1 graph on page 22 for further information.
- ▼ Use voltage codes on page 49 "Coil Selection" to complete catalog number.
- ◆ LC1D38 and LC1D95 are UL listed at the same HP rating as 32 and 80 amp devices respectively.

## AC Control Circuit — 3-pole Spring Terminal Connections (AC-1 category)

For contactors LC1D09, LC1D12, and LC1D18 only, add 3 to the last digit. Example: LC1D09\*\* becomes LC1D093\*\*.

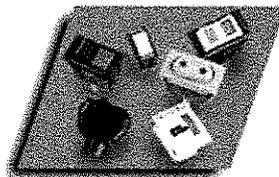


LC1D115004\*\*



## McGill Electric Switches

Cap-action, toggle, rocker and custom switches from the McGill Electric Switch Product Group are widely applied in appliances, power tools, marine and recreational vehicles, and a variety of other industries. McGill electric switches are available for electrical loads to 25A/250V and can be customized for specific applications.



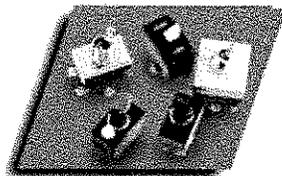
**McGill Rocker Switches.** McGill offers more than a dozen rocker switch lines to meet your application needs.

Choose from our standard rockers or contact your McGill representative for assistance in designing a customized rocker.

Choose from:

- Contemporary "Euro-style" designs
- Standard or miniature sizes
- Lighted, non-lighted, or paddle actuators
- Special lock-out actuators
- One to four poles
- Dual circuits
- Snap-in or screw mounting
- Variety of colors and finishes
- Screw, solder, spade, or leaded terminations
- UV-stabilized constructions
- Environmental barriers
- Matching indicator lights

McGill rocker switches are used in a variety of industries, including major and small appliance, marine, HVAC, automotive, power tool, business equipment and commercial food service.



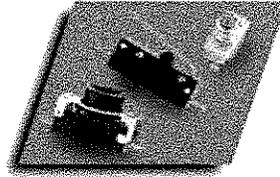
**McGill Toggle Switches.** McGill toggle switches provide you with excellent function and a wide choice of styles. Our wide selection of circuitries and design choices enables you to choose the style that best meets your needs.

Choose from:

- Standard or designer styles
- Lighted or non-lighted indicating plates and bats

- Variety of bat styles in plastic or metal
- One to four poles
- Optional "O" ring in bushing for moisture resistance
- Screw, solder, spade or leaded terminations

McGill toggle switches can be found in industrial, commercial and consumer products, including major appliance, small appliance, marine, power tool and HVAC applications.



**McGill Snap Action and Pushbutton Switches.**

When you specify McGill snap action and pushbutton switches, you are specifying proven cost-effective design solutions. From subminiature single pole, to our large double pole constructions, we can find a solution to meet your application needs.

A variety of design options is available, including:

- Subminiature, miniature, large size and plunger-type switches
- Choice of contacts, terminals and actuators
- Variable plunger lengths
- Levered or non-levered constructions
- Optional moisture and contamination resistance in subminiature switches
- Snap-in mounting capabilities

McGill snap action and pushbutton switches may be found in applications such as timers, float switches, limit switches, garage door openers, vending machines, ice cube makers, instruments and controls, relays, games, vacuum cleaners, floor buffers and office equipment.

## → **N-NLD22GE**

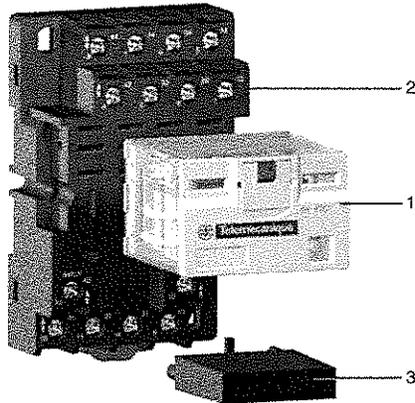
### **Green LED Light**

**DESCRIPTION:** One-piece LED pilot light for direct 120V supply.



### **FEATURES:**

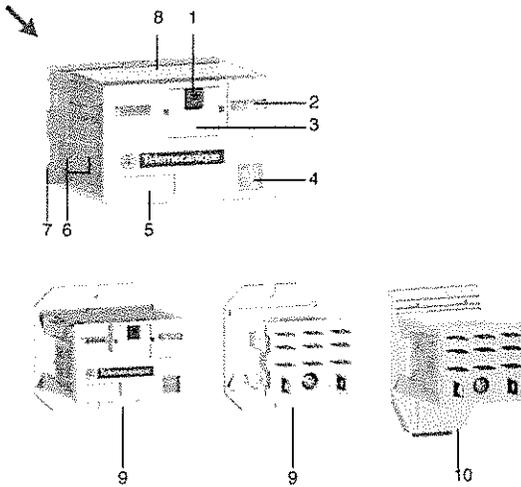
- Fluted lens without marking.
- Rated 100,000 Hour Life
- UL recognized auxiliary device pilot light File I76045(M).
- Rated oiltight & watertight NEMA 4, 4X, 12, and 13.



**Product Description**

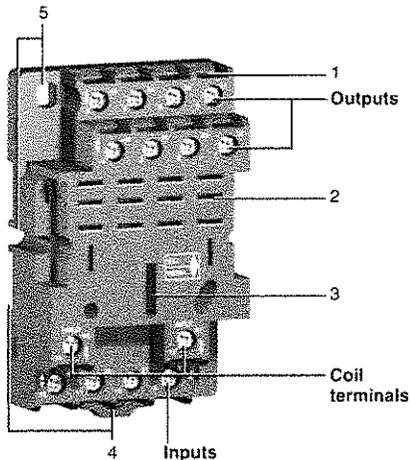
The RPM miniature relay range consists of:

1. 15 A relays with SPDT, DPDT, 3PDT, and 4PDT contacts.
2. Sockets with mixed contact terminals.
3. Protection modules (diode, RC circuit, or varistor) or 1 timer module. All these modules are common to all the sockets except for the timer module, which can only be used on the 3-pole or 4-pole sockets.
4. A metal hold-down clip for SPDT relays.



**Relay Description**

1. Spring return push button for testing the contacts (green: DC, red: AC).
2. Mechanical “relay status” indicator.
3. Optional removable lock-down door and push button, enabling forced maintaining of the contacts for test or maintenance purposes. During operation, this lock-down door must always be in the closed position.
4. Bipolar LED (depending on version) indicating the relay status.
5. Removable legend for relay identification.
6. Four notches for DIN rail mounting adapter or panel mounting adapter.
7. Five, eight, eleven, or fourteen pins.
8. Area by which the product can be easily gripped.
9. Mounting adapter enabling direct mounting of the relay on a panel.
10. Mounting adapter enabling direct mounting of the relay on a DIN rail.



**Socket Description**

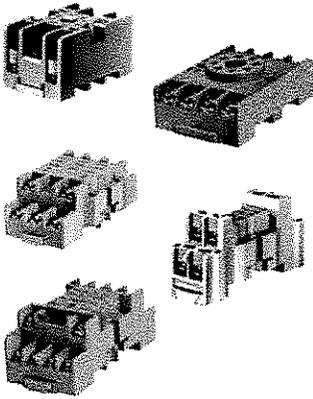
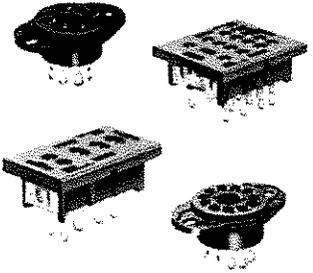
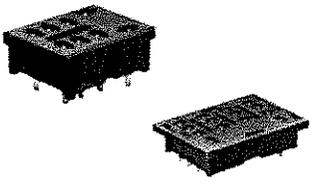
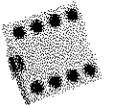
**Sockets with mixed contact terminals**

1. Connection by screw clamp terminals.
2. Five, eight, eleven, or fourteen female contacts for the relay pins.
3. Location for protection modules or the timer module.
4. Locating slot for mounting on DIN rail with mounting clip.
5. Two or four mounting holes for panel mounting.

*NOTE: The inputs are mixed with the relay coil terminals, with the outputs being located on the opposite side of the socket.*

**Relay and Timer Socket Selection Guide**

**Relay and Timer Sockets**

Mounting	Series	Page	Part No.	No. of Poles	Receptacle	Terminal	Compatible IDEC Relay and Timer	
<b>DIN Rail Snap-Mount</b> 	SR	F-6	SR2P-05 SR2P-05C SR2P-06	2	8-Pin	M3.5 Screw	RR2P, GT5P, RTE-P1, GT3 (8-pin)	
			SR3P-05 SR3P-05C SR3P-06	3	11-Pin		RR3PA, RR2KP, RTE-P2 GT3 (11-pin)	
			SR3B-05	3	11-Blade		RR1BA, RR2BA, RR3B, RTE-B	
	SH	F-9	SH1B-05 SH1B-05C	1	5-Blade	M3.5 Screw Coil Terminal: M3	RH1B	
			SH2B-05 SH2B-05C	2	8-Blade		RH2B	
			SH3B-05 SH3B-05C	3	11-Blade		M3.5 Screw	RH3B, RH2LB
			SH4B-05 SH4B-05C	4	14-Blade		RH4B	
	SY	F-13	SY2S-05 SY2S-05C	2	8-Blade	M3 Screw	RY2S, RY22S	
			SY4S-05 SY4S-05C	4	14-Blade		RU4S, RY4S, RY42S, RY2KS, RY2LS, RM2S, GT5Y	
	SM	F-15	SM2S-05 SM2S-05C				RU2S	
	<b>Panel Mount</b> 	SR	F-16	SR2P-51	2	8-Pin	Solder	RR2P, RAPP, RBPP, GT5P, RTE-P1, GT3 (8-pin)
				SR3P-51	3	11-Pin		RR3PA, RR2KP, RTE-P2, GT3 (11-pin)
SR3B-51				3	11-Blade	RR1BA, RR2BA, RR3B		
SH		F-17	SH1B-51	1	5-Blade	RH1B, RAHB, RBHB		
			SH2B-51	2	8-Blade	RH2B, RAMB, RBMB		
			SH3B-51	3	11-Blade	RH3B, RH2LB		
			SH4B-51	4	14-Blade	RH4B		
SY		F-19	SY2S-51	2	8-Blade	RY2S, RY22S		
			SY4S-51	4	14-Blade	RY4S, RY42S, RY2KS, RY2LS, RM2S, GT5Y		
<b>PCB Mount</b> 		SH	F3-20	SH1B-62	1	5-Blade	PC Board	RH1B, RAHB, RBHB
	SH2B-62			2	8-Blade	RH2B, RAMB, RBMB		
	SH3B-62			3	11-Blade	RH3B, RH2LB		
	SH4B-62			4	14-Blade	RH4B		
	SY	F3-21	SY2S-61	2	8-Blade	RY2S, RY22S		
			SY4S-61	4	14-Blade	RY4S, RY42S, RY2KS, RY2LS, RM2S, GT5Y		
			SY4S-62	4	14-Blade	RY4S, RY42S, RY2KS, RY2LS, RM2S, GT5Y		
<b>Surface Mount</b> 	SH	F-23	SH2B-02	2	8-Blade	M3.5 Screw	RH2B, RAMB, RBMB	
<b>For Panel Mounted Timers</b>								
	SR	F-23	SR6P-M08G	2	8-pin	M3.5 Screw	GE1A; RTE-P1; GT3A-1,-2,-3; GT3D-1,-2,-3; GT3W (8-pin); GT3S; GT3F	
			SR6P-M11G		11-pin		RTE-P2; GT3A-4,-5,-6; GT3D-4,-8; GT3W (11-pin)	

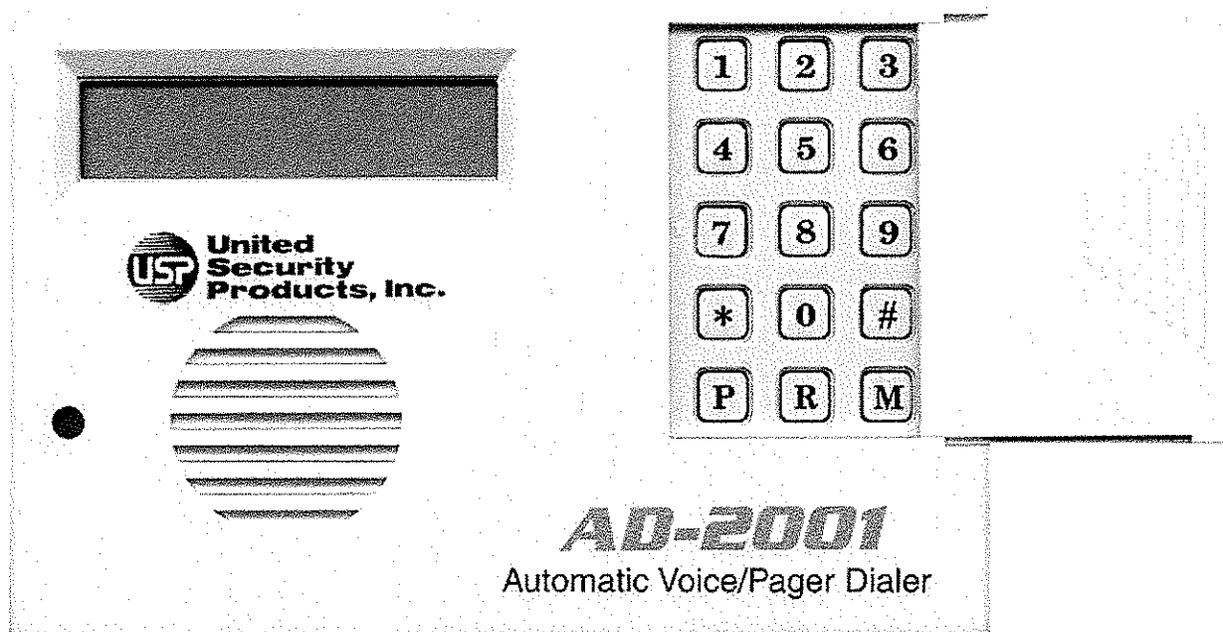


For relay mounting accessories, see page F-24.

**MODEL AD-2001**

# Automatic Voice/Pager Dialer System with Verification

*Not just the next generation...it's the next millennium!*



Versatile \* Full-featured \* Easy to Program

2-way Listen in Verification

Operates with all alarm systems

Ideal stand-alone dialer

Provides reliable emergency notification 24 hours a day



**United  
Security  
Products, Inc.**

**PLEASE READ THIS MANUAL BEFORE PROGRAMMING AND USING THE UNIT.**

**IMPORTANT: SAVE THESE INSTRUCTIONS**

# MODEL AD-2001

## Owner's Manual and Operating Instructions The Automatic Voice/Pager Dialer System *For The Next Millennium*

### *Congratulations!*

Thank you for purchasing United Security Products, Inc.'s Model AD-2001 - the "smartest", most comprehensive automatic voice/pager security dialer available. Representing an exciting new level of achievement, the AD-2001 combines technologically advanced features, ease of programming and reliable operation in a compact, unobtrusive dialer completely compatible with any security alarm system. Installation and hookup are quick and easy, whether installed in conjunction with normally open, normally closed dry contact or voltage activation sensors. The unit can also function as a stand-alone device, by simple connection to an ordinary telephone jack. The keypad cover glides on and off for added attractiveness and security.

### How It Works

The AD2001 dialer features busy-line and no-answer detection to ensure prompt transmission of up to 2 prerecorded messages delivered sequentially to as many as 4 standard telephones, cellular phones, voice and/or numeric pagers. Messages to both local and long-distance calls can be transmitted. When activated, the dialer instantly begins calling the numbers in sequence, delivering each message 1 to 3 times in a row, in accordance with the preselected number of dialing attempts.

The AD-2001 is extensively programmable, offering personalized customization to fulfill virtually any residential or business requirement. Plain-English prompts walk the user through the process in a timely manner.

Programming options abound, allowing the user to:

- Store up to 4 telephone/pager numbers.
- Choose 1-9 calling efforts for the numbers dialed.
- Select 1-3 message repeats.
- Record a variable combination (maximum: 3) of instructional outgoing messages (total elapsed time: 51 seconds).

Program up to 2 separate input channels with individually enable/disable, entry/exit delay and activation options (Normally Open (N.O.), Normally Closed (N.C.)

(dry contact or voltage activation) including momentary and continuous activation for each).

Further individualize each channel by selecting the delay times, telephone/pager numbers to be dialed and the specific outgoing messages to be played.

Please Familiarize Yourself With These Instructions Before Installation/Operation. This guide describes how to program and operate the dialer. We strongly recommend that you read the entire manual before attempting to use the unit.

To enhance ease of programming and operation, this guide includes:

- A Programming Sample/Quick Setup review on page 13 with a corresponding Program Planner.
- A Blank Program Planner on page 14. One copy of this Planner should be kept in a safe place by the end user. A separate copy should also be retained by the installer.

We are happy to provide a full measure of security reassurance and peace of mind with the Model AD-2001. For information about other innovative United Security Products equipment, call (800) 227-1592.

For Technical Service And Support: Call (858) 597-6677 \* Fax (858) 455-0036

E-mail [usp@ix.netcom.com](mailto:usp@ix.netcom.com)

Monday - Friday \* 7:30 AM - 4:00 PM PST

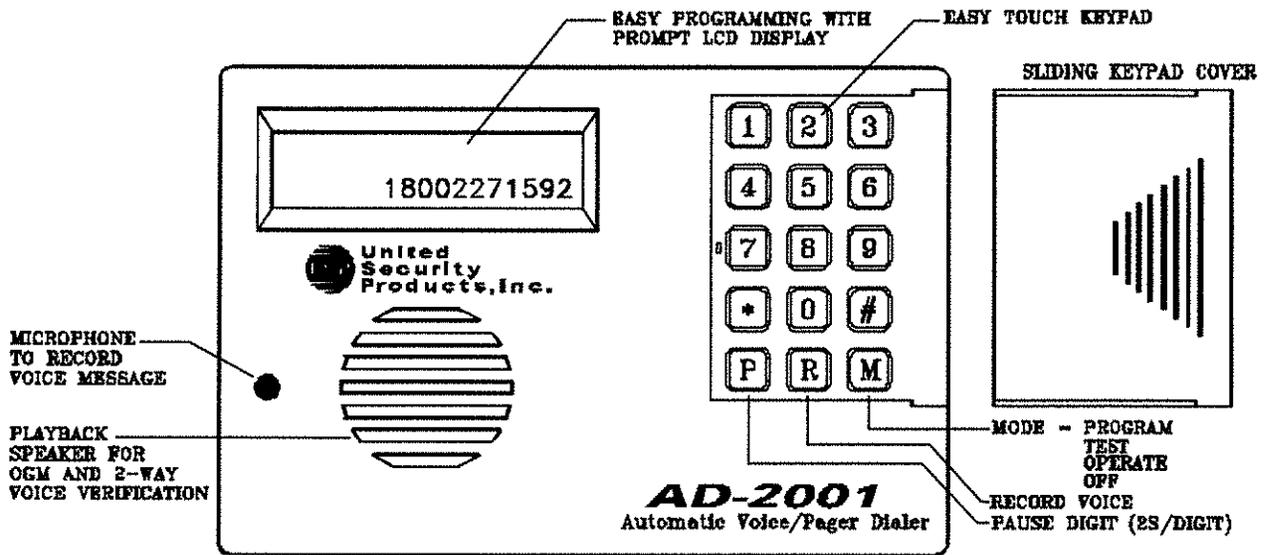
**THIS PACKAGE CONTAINS:**

- 1 ea. MODEL AD-2001
- 1 ea. PHONE CABLE
- 1 ea. INSTRUCTION MANUAL
- 2 ea. 1K RESISTORS

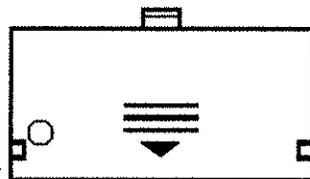
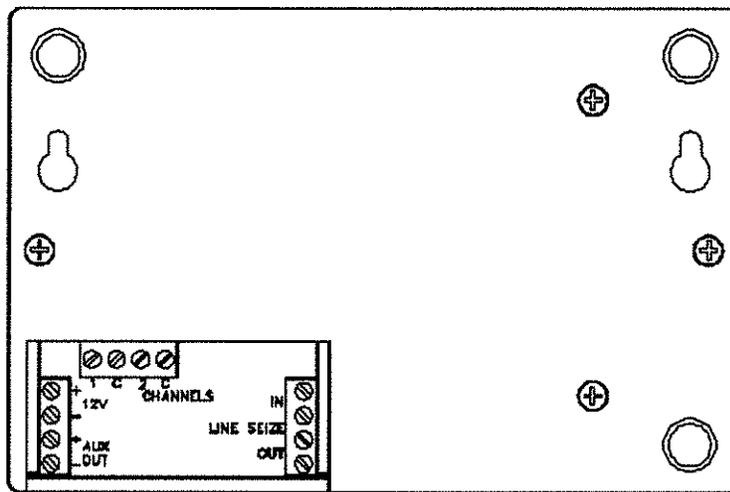
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# PANEL DISPLAYS

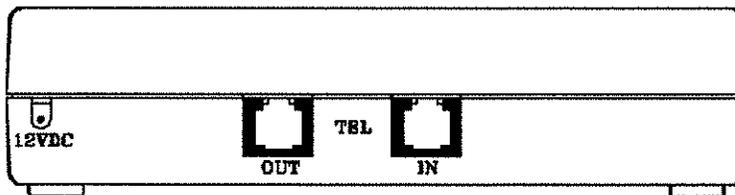


AD-2001 FRONT VIEW



BREAK-OFF PANEL FOR WIRING INPUT

AD-2001 BACK VIEW

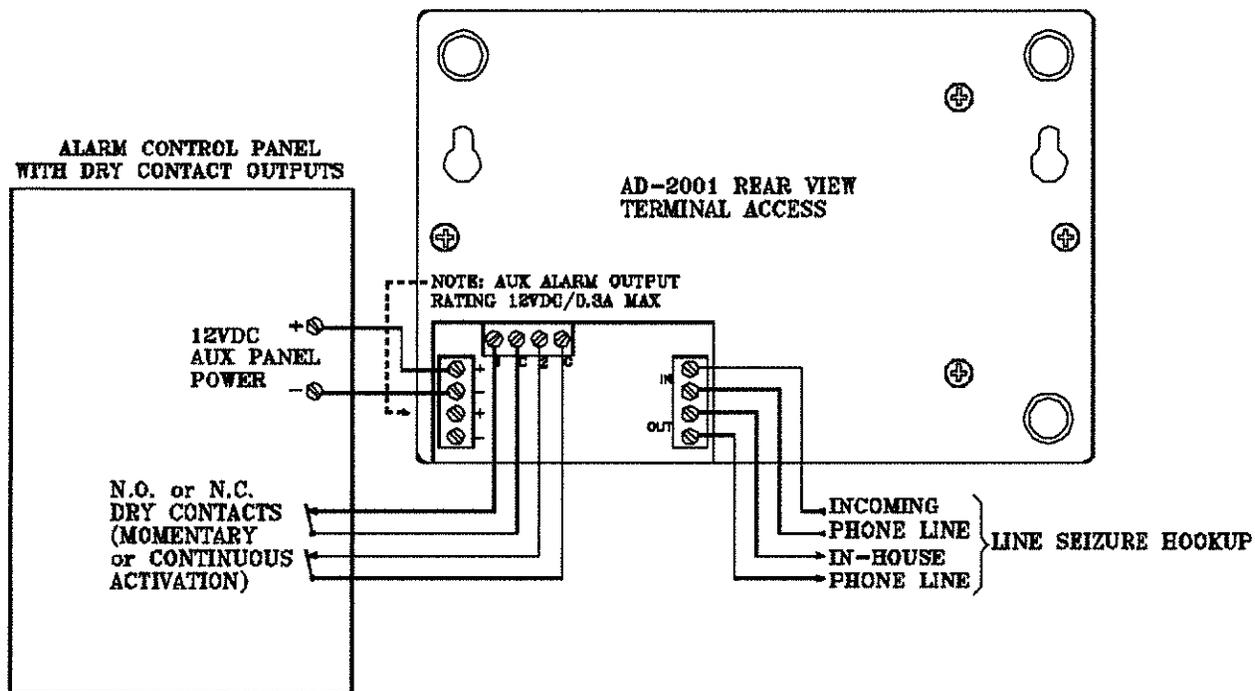


TERMINAL ACCESS ON BACK

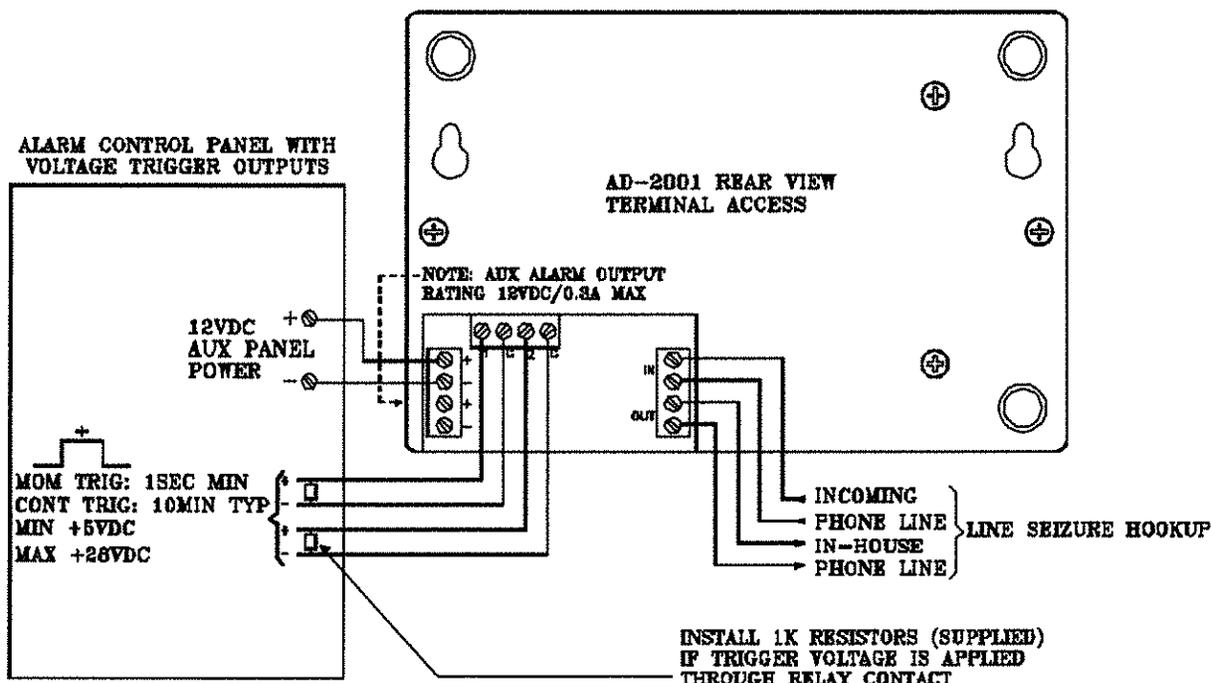
AD-2001 TOP VIEW

# AD-2001 INSTALLATION HOOKUPS

## Alarm Panel



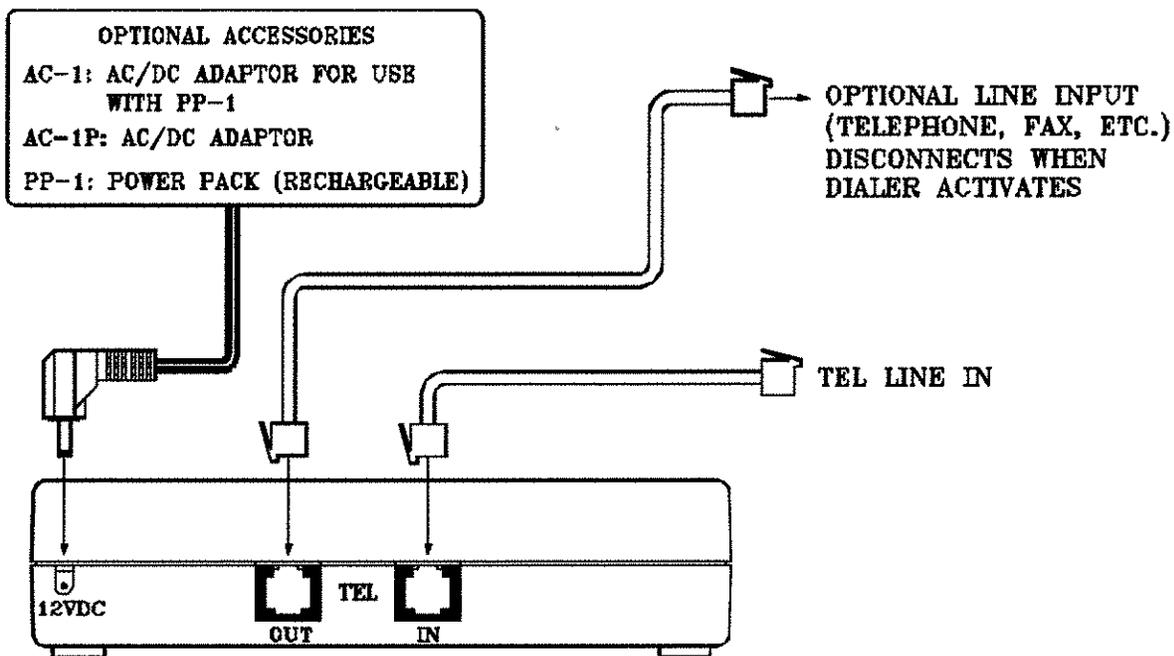
DRY CONTACT ALARM PANEL INTERFACE



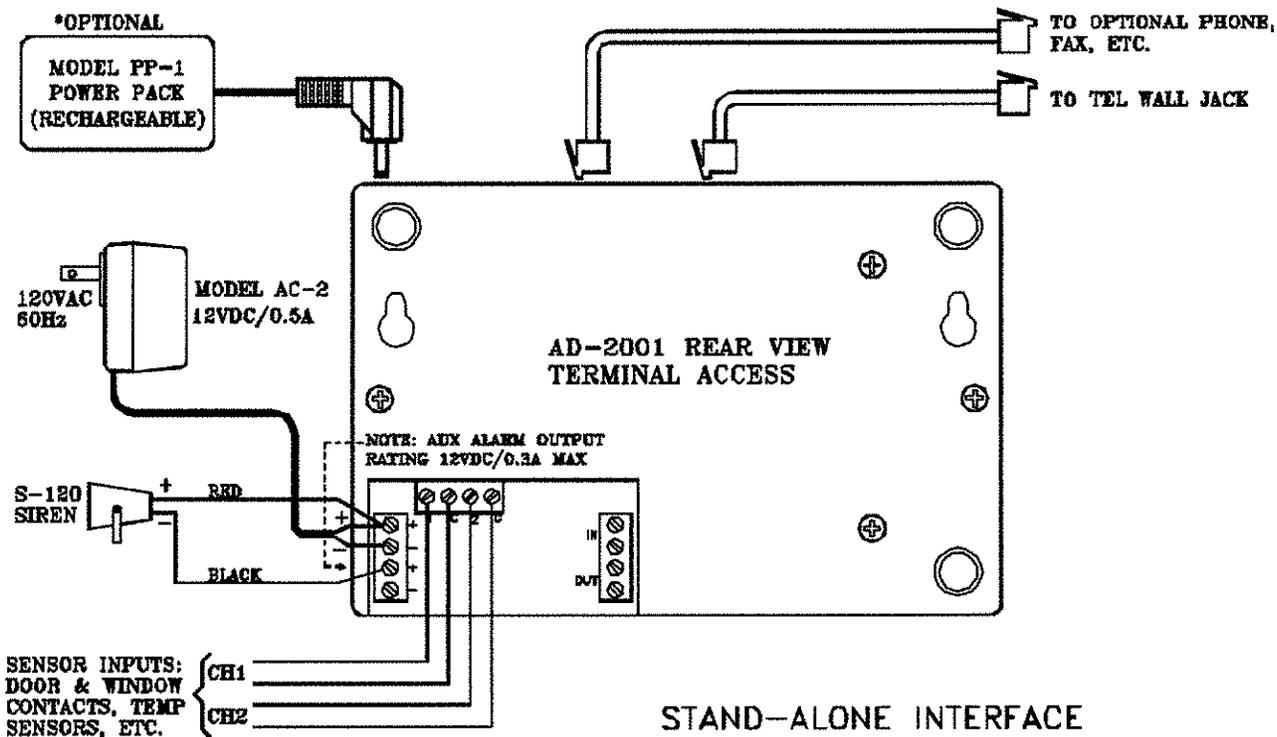
VOLTAGE TRIGGER ALARM PANEL INTERFACE

# AD-2001 INSTALLATION HOOKUPS

## Stand Alone



POWER & TELEPHONE LINE INTERFACE

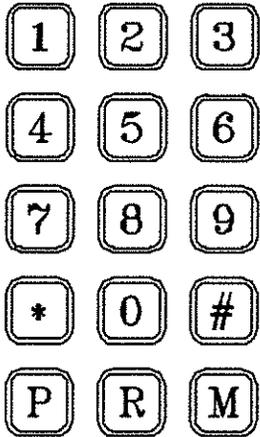


# PROGRAMMING THE DIALER

## Overview

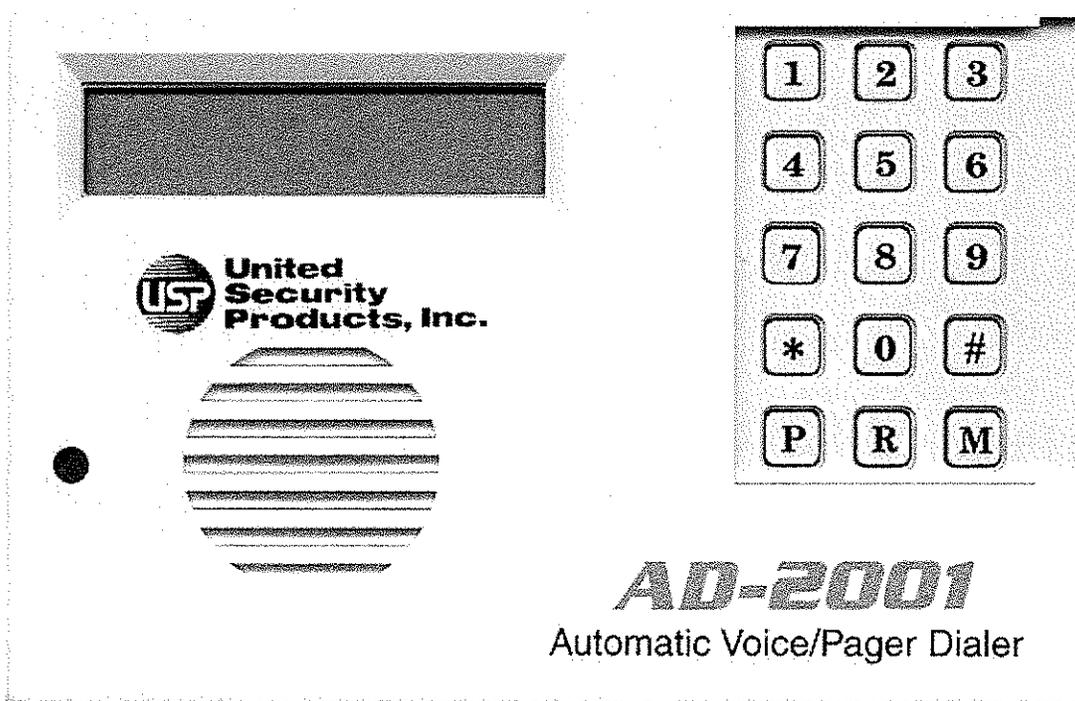
Please study this section thoroughly before beginning to program the dialer, referring to the Sample Program Planner on page 13. Then, select from among the options for each feature, listing each choice in pencil on the blank Program Planner on page 14. Once the dialer is correctly programmed, list each choice in ink. One copy of the Planner should be kept by the installer; one copy should remain with the end user.

## A look At The Keypad



- **CALLOUT FOR NUMERALS:**  
Press these keys to enter telephone numbers and other programming information as specified in this manual. A maximum of 50 digits can be input in each phone/pager location.
- **CALLOUT FOR P:**  
Press this key to program in a pause. Each "P" provides a 2-second pause.
- **CALLOUT FOR R:**  
Press this key to record the combination of identification and directional outgoing messages (OGMs). The total elapsed OGM time cannot exceed 51 seconds.
- **CALLOUT FOR M:**  
Press this key to change the Mode of the dialer, in sequence:  
PROGRAM TEST OPERATE OFF.

Once the unit has been programmed, removing power or placing the dialer in the OFF mode will not affect the programming.



# PROGRAMMING THE DIALER

## First Time Installation to Initialize Dialer Follow Steps 1 & 2.

**STEP 1** Apply power to the unit.  
The LCD will read:  
NOT PROGRAMMED  
PRESS KEYPAD #1

**STEP 2** Press 1.  
The LCD will change to read:  
USP AD2001 X.X  
*then:* PROGRAM: NUMBERS  
*then:* SELECT: 1-4  
0(DONE)

## Programming Telephone And/Or Pager Numbers

You are now ready to begin programming the dialer. All programming can be input before connecting the dialer to a telephone line. Check the unit's LCD as you program numbers in the dialer to ensure accuracy. Please complete all programming instructions before attempting to operate the unit.

Before programming your dialer to call the police, fire department or 9-1-1 directly, you must check with these agencies for their approval.

A maximum of 50 digits (including pauses) can be programmed in at each location.

**\*PROGRAM: NUMBERS      SELECT: 1-4**  
**1(YES) 2(NO)              0(DONE)**

\*This prompt will appear after a number has been programmed and this section has been exited.

**STEP 1** Press location number 1-4 to program the first number. This can be any location 1-4. You do not have to program locations in sequence. For example, you can program numbers in locations 2 and 4. **When you are done programming all the desired telephone and/or pager numbers, press "0" to exit this section.**

The LCD will read: **PAGER**  
**1(YES) 2(NO)**

**STEP 2** Press "1" if you wish to program in a numeric pager number (step 3A). Press "2" if you wish to program in a telephone number (step 3B), cellular phone number (step 3B), or a voice pager (step 3C).

### STEP 3A- NUMERIC PAGERS

**NOTE:** WHEN PROGRAMMING NUMERIC PAGERS, YOU MUST PROGRAM IN ONE OR MORE PAUSES. EACH "P" PROVIDES A 2-SECOND PAUSE. BEFORE PROGRAMMING IN A PAGER, CALL THE NUMBER TO DETERMINE THE NUMBER OF 2-SECOND PAUSES TO BE PROGRAMMED IN.

If you pressed "1" to program in a numeric pager... Press the digits of the pager to be called. The numbers will appear on the LCD, as will the following key designations. Press "P" one or more times in accordance with the number of seconds needed to accommodate the pager. **(Remember, each "P" provides a 2-second pause).**

Press the digits of the numeric pager code.  
**NOTE:** SOME PAGER SERVICES REQUIRE A "#" SIGN FOR SEPARATION OF THE NUMERIC CODE OR AT THE END OF THE NUMERIC CODE FOR PROPER TRANSMISSION.

Press "\*" to store the sequence.  
*Example:* To store numeric pager number 555-1212, a 4-second Pause and code 3456:

Press:

**5 5 5 1 2 1 2 P P 3 4 5 6 \***

### STEP 3B – TELEPHONE NUMBERS

If you pressed "2" and wish to program in a telephone number... Press the digits of the number to be dialed. For long-distance numbers, first press "1" followed by the area code and then the number. The number will appear on the LCD. Press "\*" to store the sequence.

*Example:* Store telephone number 1-800-555-1212:

Press:

**1 8 0 0 5 5 5 1 2 1 2 \***

**REMEMBER/NOTE:** Before programming your dialer to call the police, fire department or 9-1-1 directly, you must check with these agencies for their approval.

### STEP 3C – VOICE PAGERS

If you pressed "2" and wish to program in a voice pager...

Press the digits of the pager to be called.

Press "P" one or more times in accordance with the number of seconds needed to accommodate the pager. **(Remember each "P" provides a 2-second pause).**

Press "\*" to store the sequence. The number will appear on the LCD.

*Example:* To store voice pager 555-1212 and a 4-second pause:

Press:

**5 5 5 1 2 1 2 P P \***

**STEP 4** Repeat steps 1-3 for each number to be programmed in each location. Select any of 4 location numbers in Step 1 (SELECT: 1-4) for each number to be programmed.

**STEP 5** When you are done programming all desired telephone and/or pager numbers, press "0" to exit this section.

**NOTE:** IF YOU ENTER THE WRONG CHOICE, PRESS "M" KEY REPEATEDLY AND RETURN TO THE "PROGRAM MODE", THEN SELECT THE SECTION TO CHANGE ("1" ACCEPT SECTION, "2" FOR NEXT SECTION). THEN ENTER CORRECT INFORMATION.

# PROGRAMMING THE DIALER

## Programming Auxiliary Information

The dialer is preset at the factory to typical telephone line (T-LINE), PBX, Dialing Attempts and Message Repeat options. If you choose to accept the following default prompts, simply press "2" to scroll to the next section. **If your phone system requires dialing a digit to get an outside line or dial tone, similar to PBX, then turn PBX on and enter digit to program.**

### PRESETS

T-LINE.....TONE  
PBX.....OFF  
ATTEMPTS.....2  
MESSAGE.....2

To change the presets, follow these steps.

#### T-LINE

The LCD will display: **PROGRAM: T-LINE**  
**1(YES) 2(NO)**

Press "1" to program T-LINE.  
Press "2" to scroll to the next section.

The LCD will display: **PROGRAM: T-LINE**  
**1(TONE) 2(PULSE)**

Press "1" for TONE. Press "2" for PULSE.

#### PBX

The LCD will display: **PROGRAM: PBX**  
**1(ON) 2(OFF)**

**Step 1:** Press "1" for ON. Press "2" for OFF.

**Step 2:** If "1" is entered, the LCD will display:

**PROGRAM: PBX**  
**ENTER PBX NUMBER**

Enter PBX number (1 digit).

#### ATTEMPTS

ATTEMPTS refers to the number of times the dialer will call each designated number. Both successful and unsuccessful (busy or no answer) call are considered attempts.

The LCD will display: **PROGRAM: ATTEMPTS**  
**ENTER 1-9**

**Step 1:** Press the digit (1-9) corresponding to the number of times you wish the dialer to call each number.

#### MESSAGE

MESSAGE refers to the number of times each message will be delivered to each designated number.

The LCD will display: **PROGRAM: MESSAGE**  
**REPEAT ENTER 1-3**

**Step 1:** Press the digits (1-3) corresponding to the number of times you wish the message(s) to be delivered.

After selecting the number of message repeats, the dialer will automatically exit this section.

## Structuring Your Outgoing Messages

The AD-2001 dialer was designed with optimum versatility and functionality in mind. Nowhere is this more apparent than in the matrix of outgoing messages (OGMs). The user's ability to "mix and match" OGMs allows complete system customization and provides ultimate efficiency.

Total OGM time is 51 seconds.

A beginning identification (ID) message of up to 15 seconds can be programmed in (option #4). Your ID message should clearly state your name, address and other pertinent emergency information.

Typically, each OGM will have a specific purpose. For instance, OGM 1 can alert the person notified to contact the fire department while OGM 2 can alert the person to contact the police department. Typically the dialer is programmed to notify family, friends or another responsible party. Before programming your dialer to call the police, fire department or 9-1-1 directly, you must check with these agencies for their approval.

**OPTION #1** No OGM. Select this option if you do not wish to record any outgoing messages.

**OPTION #2** 1 OGM. Select this option if you wish to record one OGM, which may be as long as 51 seconds.

**OPTION #3** 2 OGMs. Select this option if you wish to record two OGMs, each of which may be as long as 25.5 seconds.

**OPTION #4** ID plus 2 OGMs. Select this option if you wish to record one ID of up to 15 seconds in length, and two OGMs, each of which may be as long as 18 seconds. \*

\*If your ID message is less than 15 seconds in length, the remaining time will be evenly divided among the OGMs.

*Example:* OPTION #4: ID plus 2 OGMs.

If the ID is 10 seconds, then each OGM can be (51 minus 10 equals 41 divided by 2 equals) 20.5 seconds in length.

# PROGRAMMING THE DIALER

## Programming And Recording Your Outgoing Messages

Follow these steps to program and record your outgoing messages. Skip this portion if you have programmed in only numeric pagers, which rely on coded DTMF messages. As with all AD-2001 programming, the unit need not be connected to a phone line when information is programmed in. Remember that "OPT" on the LCD stands for option; "OGM" stands for outgoing message.

**NOTE: IF YOU ENTER THE WRONG CHOICE, PRESS "M" KEY REPEATEDLY AND RETURN TO THE "PROGRAM MODE", THEN SELECT THE SECTION TO CHANGE ("1" ACCEPT SECTION, "2" FOR NEXT SECTION). THEN ENTER CORRECT INFORMATION.**

**STEP 1** Decide which of the four options you prefer.

**STEP 2** Before programming in this option, write down all your messages. Time them carefully, changing them if necessary to fit the allotted time frame. Practice saying them, clearly enunciating each message for maximum clarity in case of an emergency. Keep a final recording script.

**STEP 3** Program your option.

- A) The LCD will read: **PROGRAM: OGMS**  
**1(YES) 2(NO)**
- B) Press "1" to program your OGMs. Press "2" to scroll to the next section.
- C) Press "1" to select the option (#1- #4) displayed or press "2" to scroll to the desired option.

**STEP 4** After selecting your option as explained above, record your message.

- A) The word **RECORD** will appear in the upper left corner of the LCD, above the instruction: **PRESS R**. The option selected will appear in the upper right corner. For instance, if you selected option #2, the LCD will read:

**RECORD OGM1**  
**PRESS R**

- B) Speak 6-12 inches away from the microphone. Referring to your script and speaking in a normal voice, press and hold R (the word **RECORDING** will be displayed), releasing the key after you have completed enunciating your messages. The word **DONE** will appear on the LCD when the maximum allotted time has been reached.

- C) The LCD will read: **PLAY OGM(S)**  
**1(YES) 2(NO)**

Press "1" to play back your recording

- D) The LCD will read: **ACCEPT**  
**1(YES) 2(NO)**

Press "1" to accept the recorded OGM(s). Press "2" if you wish to re-record the messages, beginning with Step 4.

### Changing The OGMs

After your system is up and operating, you may change one or more of the recorded OGMs and/or choose a completely different option. To do so, simply scroll to the programming section on your display: **PROGRAM: OGMS**  
**1(YES) 2(NO)**

Select the option, then begin again from Step 3 above to record your new message(s).

## Programming The Channels

The AD-2001 is designed to be adaptable to a complete range of personalized applications. Each of the two input channels can be programmed individually for full system customization. In addition to setting enable/disable options, entry/exit delays and type of activation (N.O., N.C., & momentary or continuous), each user can specify which emergency messages will be delivered and which numbers will be dialed. The first channel activated will be the priority channel. Numbers programmed to that channel will be completed before the dialer moves on to the next channel.

Although comprehensive in scope, the system is easy to program. Just follow these simple steps.

**NOTE: IF YOU ENTER THE WRONG CHOICE, PRESS "M" KEY REPEATEDLY AND RETURN TO THE "PROGRAM MODE", THEN SELECT THE SECTION TO CHANGE ("1" ACCEPT SECTION, "2" FOR NEXT SECTION). THEN ENTER CORRECT INFORMATION.**

**STEP 1** The LCD will read: **PROGRAM: CHANNELS**  
**1(YES) 2(NO)**

Press "1" to begin programming the channels.

**STEP 2** The LCD will read: **SELECT: 1 OR 2**  
**0(DONE)**

Enter the channel you wish to program (1-2).

### Enable/Disable

**STEP 3** The LCD will read: **CH X: ENABLE**  
**1(YES) 2(NO)**

("CH X" being the channel selected)

Press "1" to enable the channel. Press "2" to disable the channel.

### Exit/Entry Delays

Capable of programming up to a maximum of 3 minutes and 20 seconds each.

**STEP 4** The LCD will read: **CH X: EXIT DELAY**  
**1(YES) 2(NO)**

Proceed with A) if you wish to program an exit delay.

Proceed with B) if you do not.

- A) To program exit delay, press "1".  
The LCD will read: **ENTER 0-199 THEN**  
**PRESS \***

Enter the digits corresponding to the number of seconds you wish to install. (For example, press "120" then press "\*", if you wish to install a 120-second exit delay).

- B) If you do not wish to program an exit delay, press "2".

**STEP 5** The LCD will read: **CH X: ENTRY DELAY**  
**1(YES) 2(NO)**

Proceed with A) if you wish to program an entry delay.

Proceed with B) if you do not.

- A) To program an entry delay, press "1".  
The LCD will read: **ENTER 0-199 THEN**  
**PRESS \***

Press "1" to program a delay. Then enter the digits corresponding to the number of seconds you wish to install. (For example, press "90" then press "\*", if you wish to install a 90-second delay).

- B) If you do not wish to program an entry delay, press "2".

# PROGRAMMING THE DIALER

## Normally Open/Normally Closed

**STEP 6** The LCD will read:

CH X: N.O./N.C.  
1(N.O.) 2(N.C.)

- A) Press "1" to select a normally open channel.
- B) Press "2" to select a normally closed channel.

## Momentary/Continuous Activation

**STEP 7** The LCD will read:

CH X: MOM/CONT  
1(MOM) 2(CONT)

- A) Press "1" to select a momentary trigger.
- B) Press "2" to select continuous activation.

## Numbers Dialed/Outgoing Messages

Following these steps allows you to choose which OGM(s) will be delivered and which numbers will be dialed for each channel. NOTE: Dialer LCD will only show programmed numbers and OGM options.

**STEP 8** The LCD will read:

CH X: DIAL #X  
1(YES) 2(NO)

("Dial #X" being the number in phone/pager location 1-4)

- A) Press "1" to dial phone/pager #X to be dialed when the selected channel is activated. Press "2" if you do not wish this number to be dialed.

- B) Continue the above procedure for each of the up to four phone/pager numbers programmed in.

**STEP 9** The LCD will read:

CH X: OGM X  
1(YES) 2(NO)

("OGM X" being the OGM recorded in OGM options #2 - #4)

- A) Press "1" to deliver OGM X when the channel is activated. Press "2" if you do not wish this OGM to be delivered.
- B) Continue the above procedure for each Channel/OGM. If you have programmed in and recorded an ID message as one of your OGM options, this ID will be delivered to all channels. It will not appear in the Channel display.

**NOTE:** ID AND OGM(S) WILL ONLY BE DELIVERED TO TELEPHONE NUMBERS, CELLULAR NUMBERS, AND VOICE PAGERS.

## Completing The Programming

Once you have programmed in all dialing and OGM options for each channel, the LCD will read:

ACCEPT  
1(YES) 2(NO)

**STEP 10** Press "1" to accept the Channel programming. Press "2" to re-program or to revert to previously programmed setting.

You are now ready to review your programming and test the system.

**PRESS "M" TO EXIT PROGRAMMING MODE.**

# TESTING YOUR SYSTEM

## Test your system before an emergency occurs.

Do not neglect to review programmed information and verify all elements of your system thoroughly before relying on the dialer to deliver the necessary information to the desired parties accurately and completely.

We strongly recommend testing the system in test mode before connecting to a telephone line. The test mode tests the stored information, not the full functionality of the dialer. To test the full functionality of the dialer, the unit must be tested in the operate mode. In the test mode, the dialer will not make more than one attempt per number dialed or play any OGM more than once.

**NOTE: IF YOU ENTER THE WRONG CHOICE, PRESS "M" KEY REPEATEDLY AND RETURN TO THE "PROGRAM MODE", THEN SELECT THE SECTION TO CHANGE ("1" ACCEPT SECTION, "2" FOR NEXT SECTION). THEN ENTER CORRECT INFORMATION.**

**STEP 1** Press the "M" Mode key until the LCD reads:

TEST: T-LINE  
1(YES) 2(NO)

**STEP 2** Press "1" to display the T-Line configuration.

The data will scroll through all selections.  
Press "2" to scroll to the next section.

**STEP 3** The LCD will read:

TEST: CHANNEL(S)  
1(YES) 2(NO)

Press "1" to test channels.

Press "2" to scroll to the next section.

**STEP 4** The LCD will read:

SELECT: 1-2  
3(BOTH) 0(DONE)

Select the channel you wish to test (1-2). Press "3" to test both. Channels. Once a channel is selected (or "all") the programmed channel information will be displayed on the LCD. Verify data accuracy as the LCD scrolls through by comparing the information displayed with that specified on your Program Planner. Listen to your recorded message(s) to ensure that the correct OGM (if programmed) is delivered. Press "0" to exit testing.

**STEP 5** Now connect your dialer to the telephone line you will be using and test the system again, to determine if it functions correctly in an actual emergency situation.

**Make sure you notify the receiving party of your intent to call them, and tell them it is just a test.**

**STEP 6** To test the operation of your entire system, set Mode to OPERATE and proceed as explained in the next section: Operating Your System.

**Test your system on a regular basis, at least once a week.**

# OPERATING YOUR SYSTEM

You are now ready to begin operating your system, relying on the AD-2001 to work in conjunction with your alarm system to provide 24-hour security reassurance and peace of mind.

When in the operating mode, the system will monitor both enabled channels, initiating dialing when a valid alarm condition occurs. Upon activation the dialer will begin calling each phone/pager number selected, in sequence, for the pre-selected number of attempts. During each successful attempt, the voice message will be delivered 1, 2, or 3 times, in accordance with the option selected (**numeric messages will only be delivered one time**). In unsuccessful attempts, the dialer will move on to the next phone/pager number after receiving 8 busy or 8 rings without an answer. The dialer will not allow voice messages to be delivered to programmed numeric pager locations.

If you send a message to a phone attached to an answering machine, it will consider this a successful attempt. Make sure you designate the maximum number of message repeats to be sure that a complete message will be left on the answering machine, because part or all of your emergency message may be "lost" while the answering machine delivers its greeting message.

Placing your system in OPERATE can also be used as a final test of the full functionality of each channel's exit/entry delay, activation, momentary/continuous trigger, phone numbers and OGM. Although serving as a test, this mode reflects actual operation; therefore the OGM(s) will not be heard through your dialer's speaker but only by each party called.

To begin operating your system, simply press the "M" Mode key until the word OPERATE appears on the LCD. To disarm the dialer, switch the mode to OFF by pressing the same key. All programming information will be retained

## System Notations

Here are a few explanations to help you better understand how your AD-2001 dialer operates. For specific information on the AD-2001 unit alone, call United Security Products, Inc.'s Customer Service Department during normal business hours at (858) 597-6677.

## Channel Activation

Each of the dialer's two channels can be activated by any of the following: a normally open dry contact, normally closed dry contact or positive 5-28VDC voltage activation.

Under a momentary activation, a single violation of a channel will cause the dialer to initiate delivering all pre-selected OGMs to all programmed numbers associated with that channel. Under continuous activation, the dialer will initiate the process, terminating it if/when the activated channel is restored to a non-alarm state. Once an alarm has occurred and all attempts satisfied, the dialer will continue to monitor any remaining enabled channel. Once the activated channel has been restored to a non-alarm state, it will then be re-armed and ready for the next alarm.

## Exit/Entry Delays

If a channel is activated during a pre-selected exit delay, the alarm condition will be ignored until the delay has expired. If an alarm occurs, the entry delay will cause the dialer to wait before starting the dialing process. **To de-activate the dialer during the entry wait period, simply press "M" to return to the OFF Mode.** Both exit and entry delay times can be pre-selected to range from 1-199 seconds.

## Additional features

The dialer offers three innovative features that enhance the utility of the entire system.

## Listen-In

While receiving an OGM on a touch-tone phone, the called party can press "1" to listen in to the activity at the other end of the line for one minute. Pressing "1" again restarts the minute increment period and can be repeated indefinitely. When "1" is pressed the OGM will stop playing and the listen in period will start.

## Two-Way

After the called party is listening-in, that party can press "2" to begin a two-way conversation lasting for one minute. This procedure also can be repeated indefinitely by pressing "2" again to restart the minute. Once you are in two-way mode you cannot go back to Listen-In.

## Remote Turn-Off

The called party can remotely terminate the activated channel any time during the OGM by pressing "1" then "#" twice within one second. The dialer will continue to monitor the remaining channel. Once the terminated channel is restored to a non-alarm state, it will re-arm. If in listen-in or two-way, simply press "#" twice in one second, for remote turn-off.

# Sample Program Planner

## AD2001 PROGRAM PLANNER

Date: 11/9/97

**PROGRAM: NUMBERS**

NUMBER	PAGER		TELEPHONE NUMBER (exclude PBX digit, include numeric pager code)	NAME OF PARTY TO BE REACHED
	YES	NO		
1		✓	2345678	John Johnson's house
2				
3	✓		3456789PP4455#	John Johnson's pager - burglary code
4	✓		3456789PP5544#	John Johnson's pager - fire code

**PROGRAM: T-LINE**

TONE	PULSE	PBX		ATTEMPTS	MESSAGE REPEAT
		ON	OFF	1 THROUGH 9	1 THROUGH 3
✓		NUMBER	✓	2	2

SAMPLE

**PROGRAM: OGMs**

OPTION	STYLE	BRIEFLY DESCRIBE TYPE OF VOICE MESSAGE(S)
1	NO OGM	
2	1 OGM	
3	2 OGMs	
✓ 4	ID + 2 OGMs	ID: My name is Mary Smith and I need help. OGM1: Call the police department. OGM2: Call the fire department.

**PROGRAM: CHANNELS**

CH	ENABLE		EXIT DELAY(SEC)			ENTRY DELAY(SEC)			ACTIVATION				DIAL NUMBER				PLAY OGM	
	YES	NO	YES	NO	0-199	YES	NO	0-199	NO	NC	MOM	CONT	1	2	3	4	1	2
1	✓		✓		30	✓		15		✓	✓		✓				✓	
2	✓		✓		0	✓		0	✓			✓	✓				✓	

**Programming Example for Quick Setup**

Before programming the dialer, study the example shown on this page. This "quick setup" example programs in one telephone number, two numeric pager numbers, two attempts, two repeats, an ID plus two additional OGMs, and channels 1 and 2.

Once you understand the setup, use the blank Program Planner on page 14 to begin programming your dialer. We recommend making several blank copies of the Planner before beginning the process. It also is advisable to fill in the Planner in pencil initially.

**STEP 1** Press "1".

**STEP 2** When the LCD reads SELECT 1-4, press "1" to install the first phone number in location 1 press "2" to indicate no pager; then press, in sequence, (fictitious) phone number "2345678" followed by the "\*" sign to store the programming process for that number.

**STEP 3** Press "3" to install the second phone number in location 3; press "1" to indicate numeric pager; then press in sequence, "3456789PP4455#" followed by the "\*" sign. The first seven digits represent the pager number dialed; each P stands for a 2-second pause; the next four digits followed by the # sign represent the pager code and the \* stores the programming process for that number.

Now press "4" to install the third phone number in location 4; press "1" to indicate numeric pager; then press, in sequence, "3456789PP5544#" followed by the "\*" sign.

**STEP 4** Press "0" to exit PROGRAM NUMBERS.

**STEP 5** At the PROGRAM: T-LINE prompt, press "1" to choose tone; press "2" to indicate no PBX; press "2" to program in two dialing attempts per emergency number called; press "2" to program in two message repeats for each call.

**STEP 6** Press "1" to PROGRAM OGM(S). Press "2" three times to Scroll to option #4; press "1" to program in an ID message and two

specific outgoing messages (OGMs).

**STEP 7** Using a prepared script and speaking six-to-eight inches from the dialer's microphone on the front of the unit, press "R" when you are ready to enunciate your 15-second identification message and your two 18-second messages. Dialer automatically prompts to next OGM. Make OGM1 a message telling the receiving party to call the police department. Make OGM2 a message to call the fire department.

**STEP 8** Press "1" to play back all recorded messages; press "1" again to accept. (NOTE: DIALER LCD WILL ONLY SHOW PROGRAMMED NUMBERS AND OGM OPTIONS).

**STEP 9** Press "1" to PROGRAM CHANNELS.

**STEP 10** Press "1" to program Channel 1. Press "1" to ENABLE. Press "1" then enter "30" then press "\*" for a 30-second EXIT delay; press "1" then enter "15" then press "\*" for a 15-second entry delay. Now press "2" for NORMALLY CLOSED and then "1" for MOMENTARY activation. Press "1" to select phone/pager number 1 to be dialed. Press "1" again to select phone/pager number 3 to be dialed. Press "2" to not select phone/pager number 4 to be dialed. Press "1" to select OGM1 to be delivered and press "2" to not select OGM2 to be delivered. Press "1" to accept the channel configuration.

**STEP 11** Press "2" to program Channel 2. Press "1" to ENABLE. Press "2" twice to indicate no EXIT or ENTRY delay. Now press "1" for NORMALLY OPEN and the "2" for CONTINUOUS activation. Press "1" to select phone/pager number 1 to be dialed. Press "2" to not select phone/pager 3 to be dialed. Press "1" to select phone/pager number 4 to be dialed. Press "2" to not select OGM1 to be delivered and press "1" to select OGM2 to be delivered. Press "1" to accept the channel configuration.

**STEP 12** Press "0" to exit PROGRAM: CHANNELS. Press "M" to exit programming mode.

Fill out this Program Planner in pencil initially

**AD2001 PROGRAM PLANNER** Date: \_\_\_\_\_

**PROGRAM: NUMBERS**

NUMBER	PAGER		TELEPHONE NUMBER (exclude PBX digit, include numeric pager code)	NAME OF PARTY TO BE REACHED
	YES	NO		
1				
2				
3				
4				

**PROGRAM: T-LINE**

TONE	PULSE	PBX		ATTEMPTS	MESSAGE REPEAT
		ON	OFF	1 THROUGH 9	1 THROUGH 3
		NUMBER _____			

**PROGRAM: OGMs**

OPTION	STYLE	BRIEFLY DESCRIBE TYPE OF VOICE MESSAGE(S)
1	NO OGM	
2	1 OGM	
3	2 OGMs	
4	ID + 2 OGMs	

**PROGRAM: CHANNELS**

CH	ENABLE		EXIT DELAY(SEC)			ENTRY DELAY(SEC)		ACTIVATION				DIAL NUMBER				PLAY OGM		
	YES	NO	YES	NO	0-199	YES	NO	0-199	NO	NC	MDM	CONT	1	2	3	4	1	2
1																		
2																		

**AD2001 PROGRAM PLANNER** Date: \_\_\_\_\_

**PROGRAM: NUMBERS**

NUMBER	PAGER		TELEPHONE NUMBER (exclude PBX digit, include numeric pager code)	NAME OF PARTY TO BE REACHED
	YES	NO		
1				
2				
3				
4				

**PROGRAM: T-LINE**

TONE	PULSE	PBX		ATTEMPTS	MESSAGE REPEAT
		ON	OFF	1 THROUGH 9	1 THROUGH 3
		NUMBER _____			

**PROGRAM: OGMs**

OPTION	STYLE	BRIEFLY DESCRIBE TYPE OF VOICE MESSAGE(S)
1	NO OGM	
2	1 OGM	
3	2 OGMs	
4	ID + 2 OGMs	

**PROGRAM: CHANNELS**

CH	ENABLE		EXIT DELAY(SEC)			ENTRY DELAY(SEC)		ACTIVATION				DIAL NUMBER				PLAY OGM		
	YES	NO	YES	NO	0-199	YES	NO	0-199	NO	NC	MDM	CONT	1	2	3	4	1	2
1																		
2																		

After thoroughly testing your system, redo your Program Planner in ink.  
 One copy should be kept in a safe place by the end user; one copy should be retained by the installer.

# SPECIFICATIONS

## Dimensions

Power source:	9-18VDC
Current (OPERATE mode – standby):	28mA typical.
Current (OPERATE mode – dialing):	100mA max.
Activation:	1) N.C. Activation: dialer activates when an “open” is detected 2) N.O. Activation: dialer activates when a “close” is detected 3) Voltage Activation: N.C. (applied voltage: Min. +5VDC, Max. +28VDC) N.O. (loss of continuous voltage: Min. 0VDC, Max. 0.25VDC)
Max. digits for outgoing numbers:	50
Operating temperature range:	-18 to 55 C (0 to 130 F)
Dimensions (inches):	6 x 4 x 1.5 in
Weight (ounces):	10 oz
Mounting:	Wall or Flat Surface
Case Material:	ABS
Color:	White
Warranty:	1 Year

**Note:** Design and specifications subject to change without notice.

# DIALER ACCESSORIES

## Power Source

### AC-1: AC/DC Adaptor

Plugs into regular 110VAC outlet to provide the dialer with the required primary power.

### AC-2: AC/DC Adaptor

12VDC/0.5A for stand alone with siren use.

### PP-1: Power (Rechargeable)

Provides 24 (est.) hours of backup standby power.

### AC-1P: AC/DC Adaptor For Use With PP-1

Plugs into regular 110VAC outlet to provide the dialer with the required primary power and additional input for PP-1 interface.

### IR-1: Isolation Relay

Converts alarm output voltage to N.C. to provide clean input trigger to dialer.

## Industrial/Residential Sensors

**F20:** Temperature Supervisory Switch <40 F

**HTS:** High Temperature Switch

**LTS:** Low Temperature Switch

**CSS:** Cold Storage Switch

**WLS:** Water Level Sensor

**RTS:** Adjustable Temperature Controller, N.O., N.C.

**PLS:** Power Loss Sensor (110VAC)

## Sensors

Magnetic Contacts – Door and Window

Glass Break Detectors

Hold Up Buttons/Emergency Switches

Pressure Mats – Sealed and Under Carpet

Motion Detectors

## Siren

**S-120:** 2” Mini Siren, 12VDC @ 120 mA typical

## Additional Options

### Data logger: AD-2001-DL

Retains in memory log of alarm events for later retrieval and review.

### Wireless: AD-2001/W

Wireless version AD-2001 dialer includes wireless pendant transmitter.

### 24V Application: AD-2001/F

For this option the dialer is configured to operate at 24VDC to 32VDC max. All other specifications apply.

### Wireless and 24V Applications: AD-2001/W/F

The AD-2001/W/F incorporates both the wireless feature and 24VDC application. See WIRELESS AND 24V APPLICATION for further details.

**NOTE:** CALL UNITED SECURITY PRODUCTS FOR ADDITIONAL INFORMATION AND DEVICES NOT LISTED HERE.

### Wireless Upgrade:

The standard AD-2001 can be upgraded for wireless link-up with RF-activated mag contacts, motion sensors, pendant, etc., by installing a new back cover containing a pre-tested RF assembly and swivel antenna. The receiver is connected to the main board via a 4-pin interface connector already included in the standard configuration. See WIRELESS for further details.

**NOTE:** SYSTEMS ALREADY INSTALLED CAN BE UPGRADED WITHOUT REPLACING OR RE-WIRING THE DIALER.

# IMPORTANT INFORMATION

## Care And Precautions

### LOCATION

Place the dialer on a flat level surface or mount the unit on the wall, away from extreme cold or heat, direct sunlight, excessive humidity and away from equipment that generate strong magnetic fields. Avoid placing near large metal objects and areas that produce smoke, dust and mechanical vibrations.

### CARE

Clean the housing with a soft cloth lightly moistened with water or mild detergent solution. Never use solvents such as alcohol or thinner. Do not allow liquids to spill into the unit.

### OPTIONAL BACKUP

To ensure continuous operation during power outages, hookup to a 12VDC backup battery pack is recommended. (PP-1) Available from United Security Products.

### CAUTION

Do not use the dialer if a gas leak is suspected or during lightning.

### PROBLEMS

If liquid or a foreign object penetrates the unit, disconnect it immediately and contact your installer or other qualified technician.

Before calling USP, please make sure...

- You have read this manual and understand how to operate the dialer.
- Your phone line is working.
- You check out the entire system, including external hookup wiring and sensors attached.

If you still have questions or concerns, call our USP Technical Service Department between the hours of 7:30 AM and 4:00 PM, PST, Monday through Friday.

### Federal Communications Commission Radio And Television Interference Statement For A Class 'B' Device

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance

with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class 'B' computing device in accordance with the specifications in Subpart B of FCC Rules and Regulations (as outlined in the Code of Federal Regulation, Title 47), which are designed to provide reasonable protection against such interference in a residential installation.

### User Instructions

If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off, then on, the user is encouraged to try to correct the interference by one or more of the following measures:

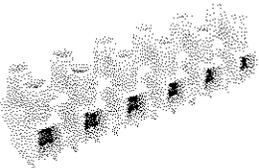
- Reorient or relocate radio or television.
- Increase the separation between the equipment and receiver.
- Connect the equipment into a different outlet so that the equipment and receiver are on different branch circuits.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by United security Products, Inc. could void the user's authority to operate the equipment.

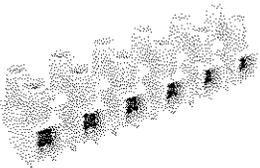
**HE6H**

**HE10H**

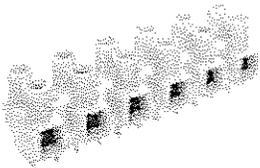
**HE16H**



Standoff feet with wire protector



Standoff feet with wire protector



Standoff feet with wire protector

12 mm

15 mm

15 mm

4.2 mm

4.3/5.7 mm

4.3/5.7 mm

7 mm

8.5 mm

8.5 mm



4-6 mm<sup>2</sup>

20-10 AWG

6-10 mm<sup>2</sup>

18-8 AWG

10-16 mm<sup>2</sup>

18-6 AWG

400 V

600 V

400 V

600 V

400 V

600 V

16 A

40 A

25 A

50 A

35-63 A

63 A

0.8 Nm

7.0 lb-in

1.2 Nm

10.6 lb-in

2.0 Nm

17.7 lb-in

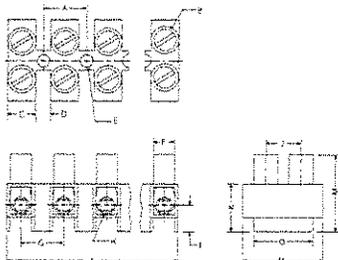


Cat. No.	Std. Pk.
HE6HWPR/02	100
HE6HWPR/03	100
HE6HWPR/04	100
HE6HWPR/05	100
HE6HWPR/06	50
HE6HWPR/07	50
HE6HWPR/08	50
HE6HWPR/09	50
HE6HWPR/10	25
HE6HWPR/11	25
HE6HWPR/12	25



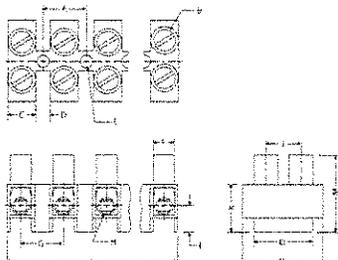
Cat. No.	Std. Pk.
HE10HWPR/02	40
HE10HWPR/03	40
HE10HWPR/04	40
HE10HWPR/05	40
HE10HWPR/06	20
HE10HWPR/07	20
HE10HWPR/08	20
HE10HWPR/09	10
HE10HWPR/10	10
HE10HWPR/11	10
HE10HWPR/12	10

Cat. No.	Std. Pk.
HE16HWPR/02	40
HE16HWPR/03	40
HE16HWPR/04	40
HE16HWPR/05	40
HE16HWPR/06	20
HE16HWPR/07	20
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HE16HWPR/09	10
HE16HWPR/10	10
HE16HWPR/11	10
HE16HWPR/12	10



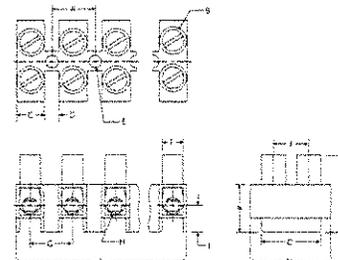
Dimensions mm

- A = 12.0
- B = M3.5
- C = 7.7
- D = 4.3
- E = Ø4.2
- F = Ø6.3
- G = 12.0
- H = Ø4.1
- I = 9
- J = 9.6
- K = 13.9
- L = 140 (12 pole)
- M = 21.8
- N = 22.6
- O = 15



Dimensions mm

- A = 15.0
- B = M4
- C = 9.3
- D = 5.7
- E = Ø4.3/5.7
- F = Ø8.2
- G = 15.0
- H = Ø5.0
- I = 10.7
- J = 11.3
- K = 17.5
- L = 175 (12 pole)
- M = 27.8
- N = 25.1
- O = 16



Dimensions mm

- A = 15.0
- B = M5
- C = 9.3
- D = 5.7
- E = Ø4.3/5.7
- F = Ø8.2
- G = 15.0
- H = Ø5.6
- I = 10.7
- J = 11.3
- K = 17.5
- L = 175 (12 pole)
- M = 27.8
- N = 25.1
- O = 16

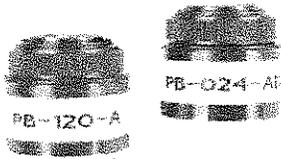
# Panel Components

Buzzers, Flashers and Cord Grips



## FLASHER

- Solid state 120 Vac
- 75 flashes per minute
- 1/4" quick disconnect terminals
- Molded on mounting foot w/single screw attachment for easy installation



## PIEZO BUZZER

- PB-024-AD 5-24 Vac/Vdc
- PB-120-A 40-125 Vac
- Single hole panel mount alarm buzzer
- 95 db @ 2 feet
- Frequency - 2900 +/- 250 hz
- 1/4" quick disconnect terminals
- Type 3, 3R, 4X, 12, 13



## CORD GRIPS - Standard wire

- Available in 1/2", 3/4", and 1" sizes to accommodate different wire sizes
- Ensures liquidtight seal for electrical cables in liquid environments
- Suitable for NEMA Type 4 and 6 enclosures



## CORD GRIPS - Flat wire

- Designed to accommodate flat wire sizes
- Available in 1/2", 3/4", and 1" sizes to accommodate different wire sizes
- Ensures liquidtight seal for electrical cables in liquid environments
- Suitable for NEMA Type 4 and 6 enclosures



SOLID STATE FLASHER		LIST PRICE	WIRE SIZE INFORMATION	(SJOW 300 volt)
→ FI 120v	120v solid state		18/2	0.280"
<b>PIEZO BUZZERS</b>			18/3	0.300"
Pb-024-ad	5-24 Vac/Vdc		18/4	0.325"
Pb-120-a	40-125 Vac		16/2	0.305"
<b>CORD GRIPS</b>			16/3	0.325"
1/2" cg	for 0.170" - 0.470" wire		16/4	0.350"
3/4" cg	for 0.450 - 0.709" wire		14/2	0.335"
1" cg	for 0.710 - 0.100" wire		14/3	0.360"
UF grip	for 12/2 & 12/3 awg flat wire		14/4	0.390"
			12/2	0.405"
			12/3	0.425"
			12/4	0.465"
			10/3	0.565"
			10/4	0.625"

# Alarm Light Lenses

Panel Mount Style

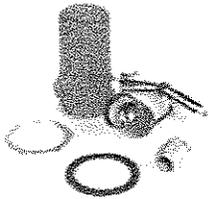


**R10-S-10**

**G10-S-10 B10-S-10**

- 2" diameter x 2" height
- 10 watt appliance bulb
- Light socket with 12" pre-wired leads & mounting hardware as shown

(available in red, amber, green and blue)

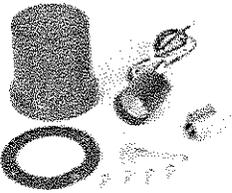


**R15-M-15**

**G15-M-15 B15-M-15**

- 2.25" diameter x 3" height
- 15 watt appliance bulb
- Light socket with 36" pre-wired leads & mounting hardware as shown

(available in red, amber, green and blue)



**R25-L-15**

**G25-L-15 B25-L-15**

- 3" diameter x 3" height
- 15 watt appliance bulb
- Light socket with 36" pre-wired leads & mounting hardware as shown

(available in red, amber, green and blue)



**R40-XL-25 A40-XL-25**

**B40-XL-25**

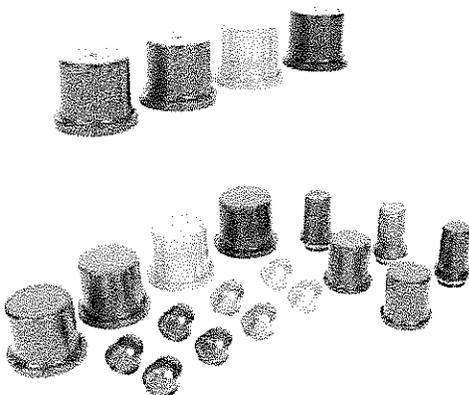
- 4.25" diameter x 3.5" height
- 25 watt appliance bulb
- Light socket with 36" pre-wired leads & mounting hardware as shown

(available in red, amber, green and blue)

**R40-XL-40**

**G40-XL-40 B40-XL-40**

- Same as above except supplied with 40-watt bulb and 120 Vac flasher unit



## SPECIFICATIONS (all lenses)

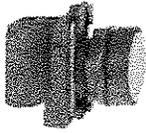
Flame resistant, unstabilized GE Lexan material

NEMA Type 3R, 4, 4X, 12 & 13

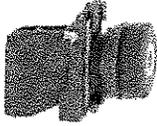
UL508 recognized component



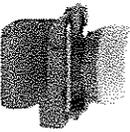
**Non-Illuminated Push Buttons, Momentary (screw clamp terminal connections)**



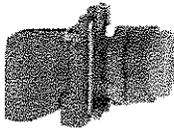
**XB5AA31**



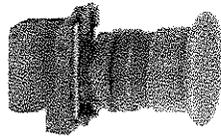
**XB5AA4322**



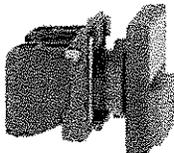
**XB5AP51**



**XB5AL42**



**XB5AC21**



**XB5AL845**

Shape of Head	Type of Push	Type of Contact		Marking	Color of Cap	Catalog Number (Components)	Price	
		N.O.	N.C.					
	Flush	1	...	...	Black	XB5AA21 (ZB5AZ101 + ZB5AA2)	\$17.50	
					Green	XB5AA31 (ZB5AZ101 + ZB5AA3)		
					Yellow	XB5AA51 (ZB5AZ101 + ZB5AA5)		
					Blue	XB5AA61 (ZB5AZ101 + ZB5AA6)		
		...	1	...	...	Red	XB5AA42 (ZB5AZ102 + ZB5AA4)	17.50
						Black	XB5AA25 (ZB5AZ105 + ZB5AA2)	25.60
						Green	XB5AA35 (ZB5AZ105 + ZB5AA3)	
						Red	XB5AA45 (ZB5AZ105 + ZB5AA4)	
	Flush	1	...	"I" (white)	Green	XB5AA3311 (ZB5AZ101 + ZB5AA331)	20.30	
						...	1	"O" (white)
	Flush with clear silicone boot (color of pusher unobscured)	1	...	...				
					Green	XB5AP31 (ZB5AZ101 + ZB5AP3)		
					Yellow	XB5AP51 (ZB5AZ101 + ZB5AP5)		
					Blue	XB5AP61 (ZB5AZ101 + ZB5AP6)		
	...	1	...	...	Red	XB5AP42 (ZB5AZ102 + ZB5AP4)	23.90	
						Extended	1	1
	Extended	1	1	...				
						Mushroom head Ø 40 mm	1	...

**Two Button Push Buttons, Momentary (screw clamp terminal connections)**

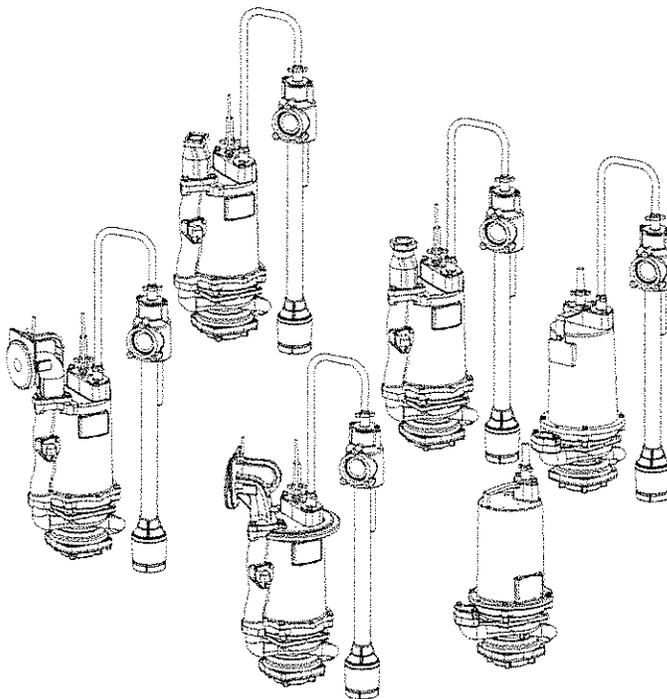
Shape of Head	Type of Push	Type of Contact		Degree of Protection	Catalog Number (Components)	Price
		N.O.	N.C.			
	One flush green push (marked "I") One extended red push (marked "O")	1	1	IP40	XB5AL845 (ZB5AZ105 + ZB5AL8434)	\$31.50

For additional information, reference Catalog #9001CT0001.



## INSTALLATION MANUAL

### Submersible Two-Stage Grinder Pump



**Series: OGP**  
**2 HP, 3450 RPM,**  
**60 Hz.**

*omni*  
**GRIND**<sup>™</sup>  
GRINDER PUMPS *plus*<sup>+</sup>

**IMPORTANT!**

*Read all instructions in this manual before operating pump.  
As a result of Crane Pumps & Systems, Inc., constant product improvement program,  
product changes may occur. As such Crane Pumps & Systems reserves the right to  
change product without prior written notification.*

**CRANE**

A Crane Co. Company

**PUMPS & SYSTEMS**

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Piqua, Ohio 45356  
Phone: (937) 778-8947  
Fax: (937) 773-7157  
www.cranepumps.com

83 West Drive, Bramton  
Ontario, Canada L6T 2J6  
Phone: (905) 457-6223  
Fax: (905) 457-2650



Form No. 119972-Rev. K

# SAFETY FIRST!

Please Read This Before Installing Or Operating Pump. This information is provided for **SAFETY** and to **PREVENT EQUIPMENT PROBLEMS**. To help recognize this information, observe the following symbols:



**IMPORTANT!** Warns about hazards that can result in personal injury or Indicates factors concerned with assembly, installation, operation, or maintenance which could result in damage to the machine or equipment if ignored.

**CAUTION !** Warns about hazards that can or will cause minor personal injury or property damage if ignored. Used with symbols below.

**WARNING !** Warns about hazards that can or will cause serious personal injury, death, or major property damage if ignored. Used with symbols below.



Hazardous fluids can cause fire or explosions, burnes or death could result.



Extremely hot - Severe burnes can occur on contact.



Biohazard can cause serious personal injury.



Hazardous fluids can Hazardous pressure, eruptions or explosions could cause personal injury or property damage.



Rotating machinery Amputation or severe laceration can result.



Hazardous voltage can shock, burn or cause death.

Only qualified personnel should install, operate and repair pump. Any wiring of pumps should be performed by a qualified electrician.



**WARNING !** - To reduce risk of electrical shock, pumps and control panels must be properly grounded in accordance with the National Electric Code (NEC) or the Canadian Electrical Code (CEC) and all applicable state, province, local codes and ordinances.



**WARNING!** - To reduce risk of electrical shock, always disconnect the pump from the power source before handling or servicing. Lock out power and tag.

Prevent large articles of clothing, large amounts of chemicals, other materials or substances such as are uncommon in domestic sewage from entering the system.

During power black-outs, minimize water consumption at the home(s) to prevent sewage from backing up into the house.

Always keep the shut-off valve completely open when system is in operation (unless advised otherwise by the proper authorities). Before removing the pump from the basin, be sure to close the shut-off valve. (This prevents backflow from the pressure sewer.)

Keep the control panel locked or confined to prevent unauthorized access to it.

If the pump is idle for long periods of time, it is advisable to start the pump occasionally by adding water to the basin.



**CAUTION!** Pumps build up heat and pressure during operation-allow time for pumps to cool before handling or servicing.



**WARNING!** - **DO NOT** pump hazardous materials (flammable, caustic, etc.) unless the pump is specifically designed and designated to handle them.

Do not block or restrict discharge hose, as discharge hose may whip under pressure.



**WARNING!** - **DO NOT** wear loose clothing that may become entangled in the impeller or other moving parts.



**WARNING!** - Keep clear of suction and discharge openings. **DO NOT** insert fingers in pump with power connected.

Make sure lifting handles are securely fastened each time before lifting. Do not operate pump without safety devices in place. Always replace safety devices that have been removed during service or repair.

Do not exceed manufacturers recommendation for maximum performance, as this could cause the motor to overheat.

Secure the pump in its operating position so it can not tip over, fall or slide.

Cable should be protected at all times to avoid punctures, cut, bruises and abrasions - inspect frequently.



Never handle connected power cords with wet hands.

To reduce risk of electrical shock, all wiring and junction connections should be made per the NEC or CEC and applicable state or province and local codes. Requirements may vary depending on usage and location.



Submersible Pumps are not approved for use in swimming pools, recreational water installations, decorative fountains or any installation where human contact with the pumped fluid is common.

Do not remove cord and strain relief. Do not connect conduit to pump.



Products Returned Must Be Cleaned, Sanitized, Or Decontaminated As Necessary Prior To Shipment, To Insure That Employees Will Not Be Exposed To Health Hazards In Handling Said Material. All Applicable Laws And Regulations Shall Apply.



Bronze/brass and bronze/brass fitted pumps may contain lead levels higher than considered safe for potable water systems. Lead is known to cause cancer and birth defects or other reproductive harm. Various government agencies have determined that leaded copper alloys should not be used in potable water applications. For non-leaded copper alloy materials of construction, please contact factory.



**IMPORTANT!** - Crane Pumps & Systems, Inc. is not responsible for losses, injury, or death resulting from a failure to observe these safety precautions, misuse or abuse of pumps or equipment.

Other brand and product names are trademarks or registered trademarks of their respective holders.

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2003, 5/04, 4/05, 12/05, 1/06, 9/06, 11/06, 2/07, 4/07

Alteration Rights Reserved

# Replacement Core Unit

200/2000 Series Basins

**BARNES**



## USER GUIDE

Congratulations on your purchase of a Barnes grinder pump system. With proper care and by following a few simple guidelines your grinder pump will give you many years of dependable service.

### Use and Care

The grinder pump station is designed to handle routine, domestic sewage. Solid waste materials should be thrown in the trash. While your station is capable of accepting and pumping a wide range of materials, regulatory agencies advise that the following items should not be introduced into any sewer either directly or through a kitchen waste disposal:

- Glass
- Metal
- Diapers
- Socks, rags or cloth
- Plastic objects (e.g., toys, utensils, etc.)
- Sanitary napkins or tampons

In addition you must **NEVER** introduce into any sewer:

- Explosives
- Flammable Material
- Lubricating Oil and/or Grease
- Strong Chemicals
- Gasoline

### General Information

Your home wastewater disposal service is part of a low pressure sewer system. The key element in this system is the Barnes grinder pump station. The basin collects all wastewater from the house. The solids in the sewage are then ground to a small size suitable for pumping in the slurry.



## GRINDER PUMP SYSTEMS

The grinder pump generates sufficient pressure to pump this slurry from your home to the wastewater plant.

### Power Failure

Your grinder pump cannot dispose of wastewater or provide an alarm signal without electrical power. If electrical power service is interrupted, keep water usage to a minimum.

### Warranty

Your grinder pump is furnished with a warranty against defects in material or workmanship. A properly completed

Start-Up/Warranty Registration form must be on file at the Barnes factory in order to activate your warranty. In addition your pump must be installed in accordance with the installation instructions.

If you have a claim under the provisions of the warranty, contact your local Barnes Distributor.

When contacting your representative for service, please include your station serial number, pump model number, and pump serial number.

For future reference, record the following information:

Station Serial No: \_\_\_\_\_

Pump Model No: \_\_\_\_\_

Pump Serial No: \_\_\_\_\_

Local Distributor: \_\_\_\_\_

Distributor Telephone: \_\_\_\_\_



## PUMP SPECIFICATIONS:

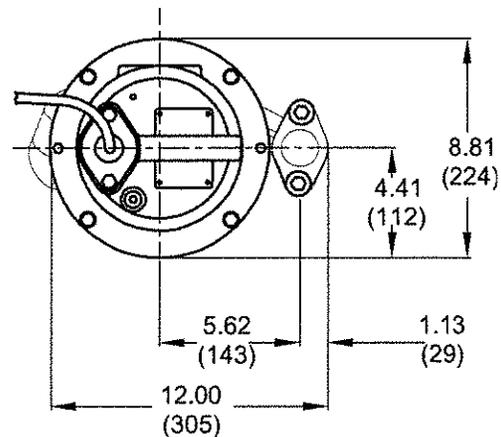
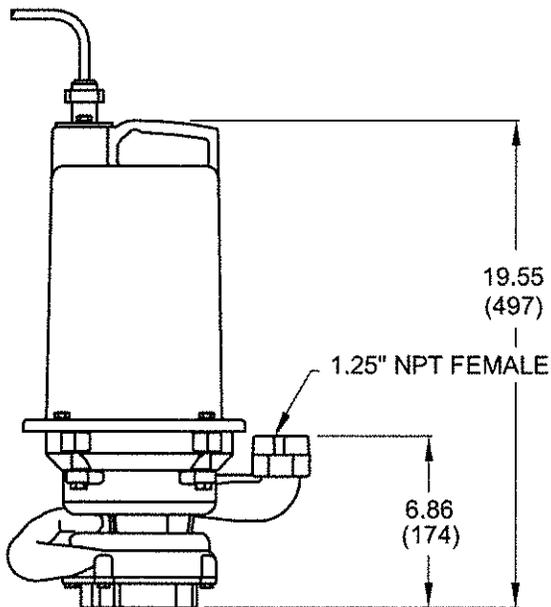
**DISCHARGE** ..... 1½" NPT, Vertical, Bolt-on Flange  
**LIQUID TEMPERATURE** .... 104°F (40°C) Continuous  
**MOTOR HOUSING** ..... Cast Iron ASTM A-48, Class 30  
**VOLUTE** ..... Cast Iron ASTM A-48, Class 30  
**SEAL PLATE** ..... Cast Iron ASTM A-48, Class 30  
**IMPELLERS**  
     *Design* ..... 12 vane, vortex, with pump out vanes on back side. Dynamically balanced, ISO G6.3  
     *Material* ..... 85-5-5-5 Bronze  
**SHREDDING RING** ..... Hardened 440C Stainless Steel  
     Rockwell® C-55  
**CUTTER** ..... Hardened 440C Stainless Steel  
     Rockwell® C-55  
**SHAFT** ..... 416 Stainless Steel  
**SQUARE RING** ..... Buna-N  
**HARDWARE** ..... 300 Series Stainless Steel  
**PAINT** ..... Air dry enamel, top coat  
**SEAL**     *Design* ..... Single Mechanical, oil filled reservoir  
     *Material* ..... Rotating Faces - Silicon-Carbide  
     Stationary Faces - Silicon-Carbide  
     Elastomer - Buna-N  
     Hardware - 300 series stainless steel  
**CORD ENTRY** ..... 30 Ft. (9.1m); 15 Ft. (4.5m) Cord on, Compact series (CC, CE, CO, CT)  
     Custom Molded Quick Connected for sealing and strain relief  
**CORD** ..... CSA/UL Approved 12/3 and 12/5 Type SOW

**SPEED** ..... 3450 RPM, 60Hz  
**UPPER BEARING:**  
     *Design* ..... Single Row, Angular Contact Ball  
     *Lubrication* ..... Oil  
     *Load* ..... Radial & Thrust  
**LOWER BEARING**  
     *Design* ..... Single Row, Angular Contact Ball  
     *Lubrication* ..... Oil  
     *Load* ..... Radia & Thrust  
**MOTOR**     *Design* ..... NEMA L, Oil Filled, Squirrel Cage Induction  
     *Insulation* ..... Class F  
**SINGLE PHASE** ..... Capacitor start/capacitor run  
**LEVEL CONTROLS: AUE, CE, CO, CC & CT**  
     *Series* ..... **SOLD SEPARATELY**, Model ESPS-150™ or ESPS-150ε™, Environmentally sealed pressure switch with CPVC housing, Buna diaphragm, Custom Molded Quick Connect for Sealing and Strain Relief  
**OPTIONAL EQUIPMENT** .... Additional Cord, Moveable Fitting

**ESPS Level Control Sold Separately**

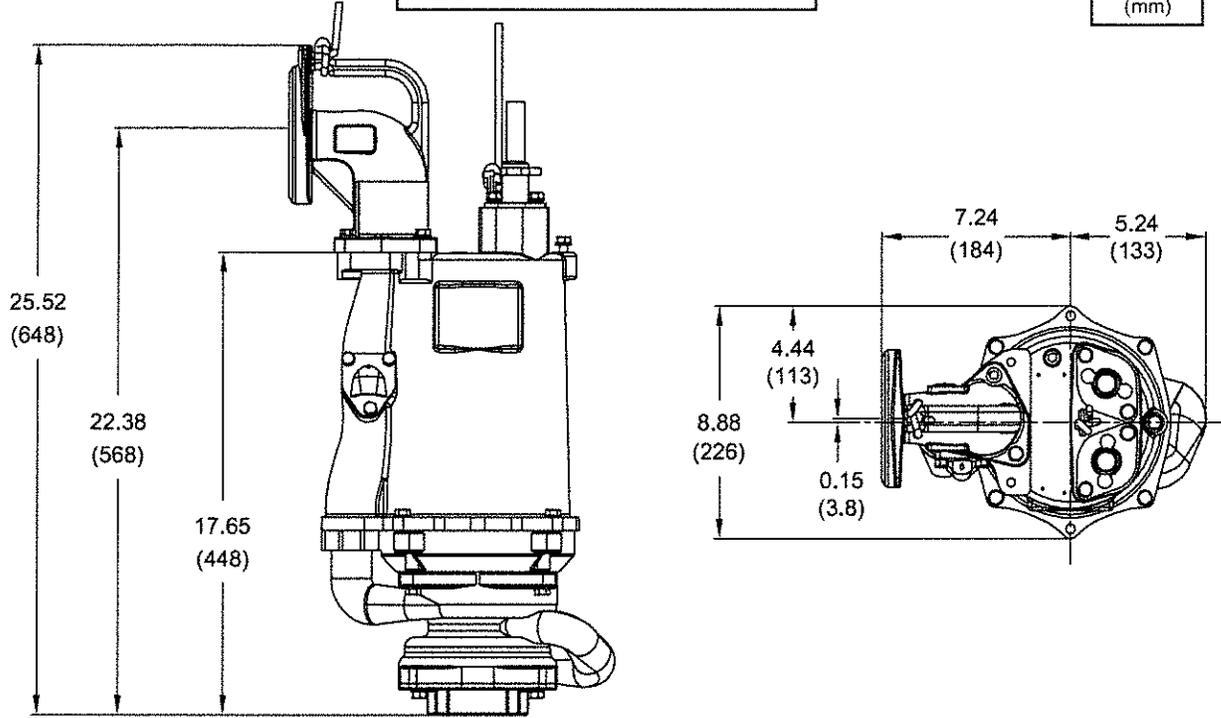
**OGP2022L**

inches  
(mm)

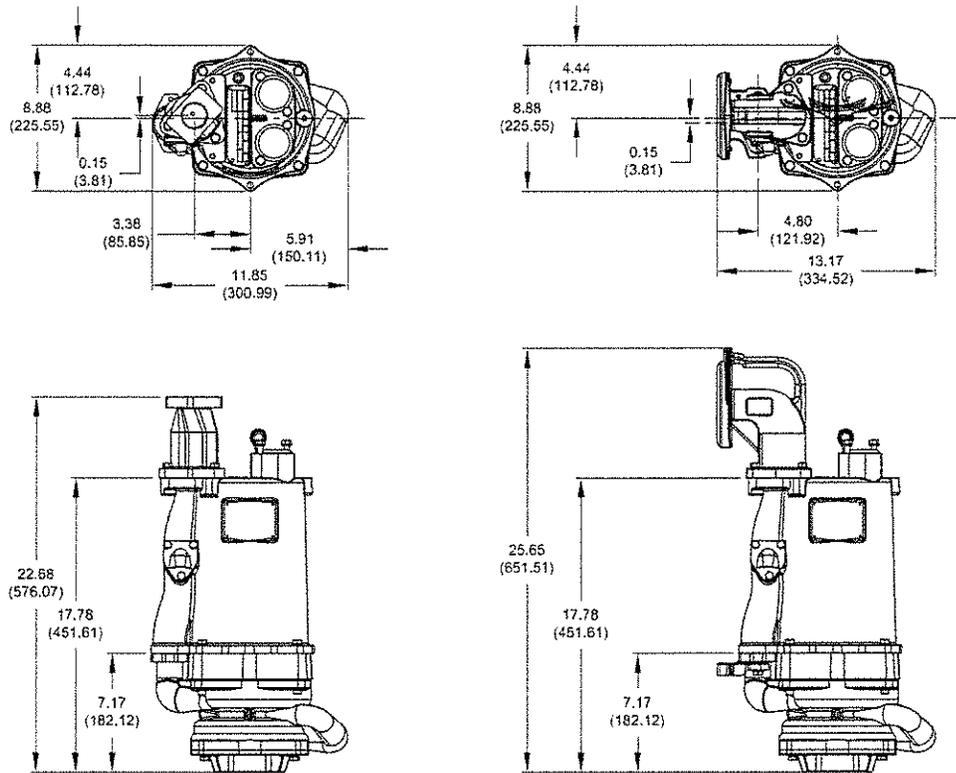


OGP2022CC - For "C" Channel

inches  
(mm)

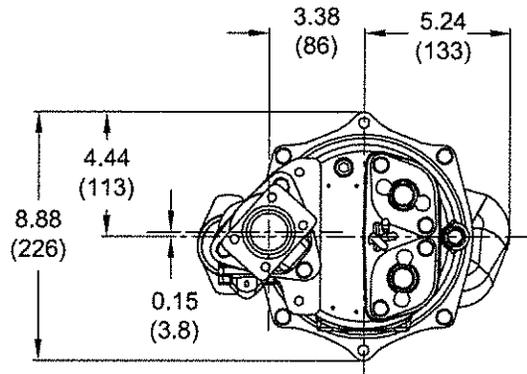
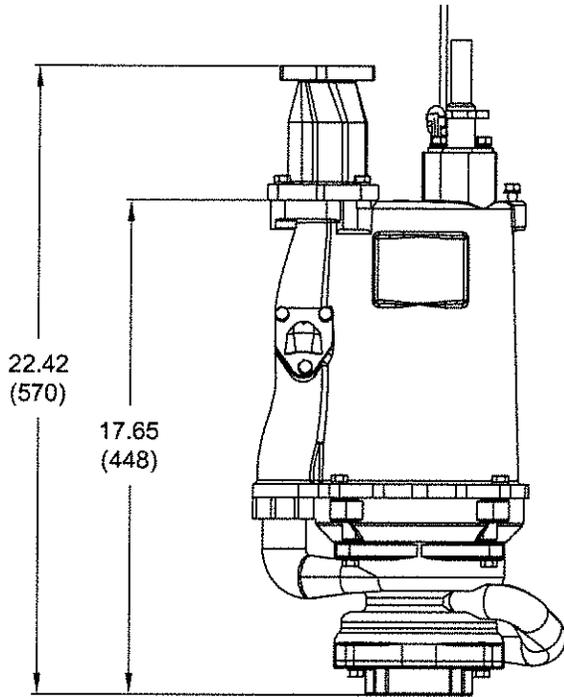


OGP2022CE - For EcoTRAN™

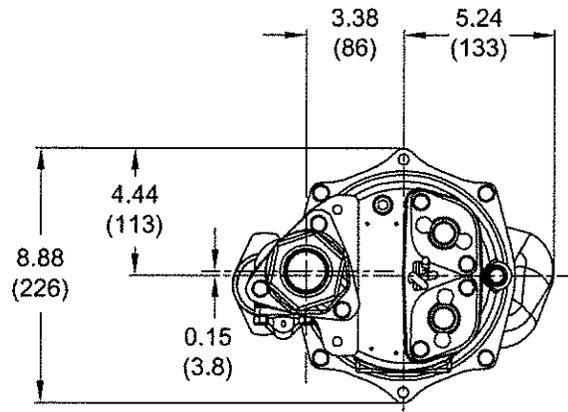
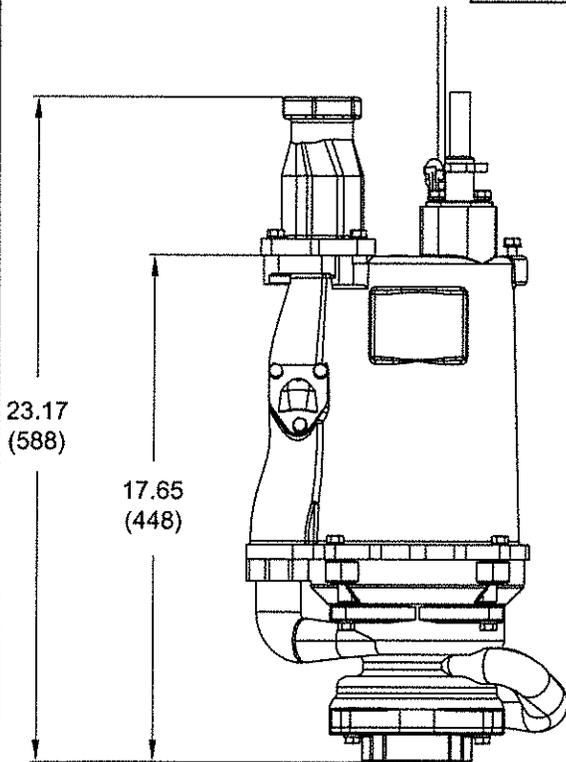


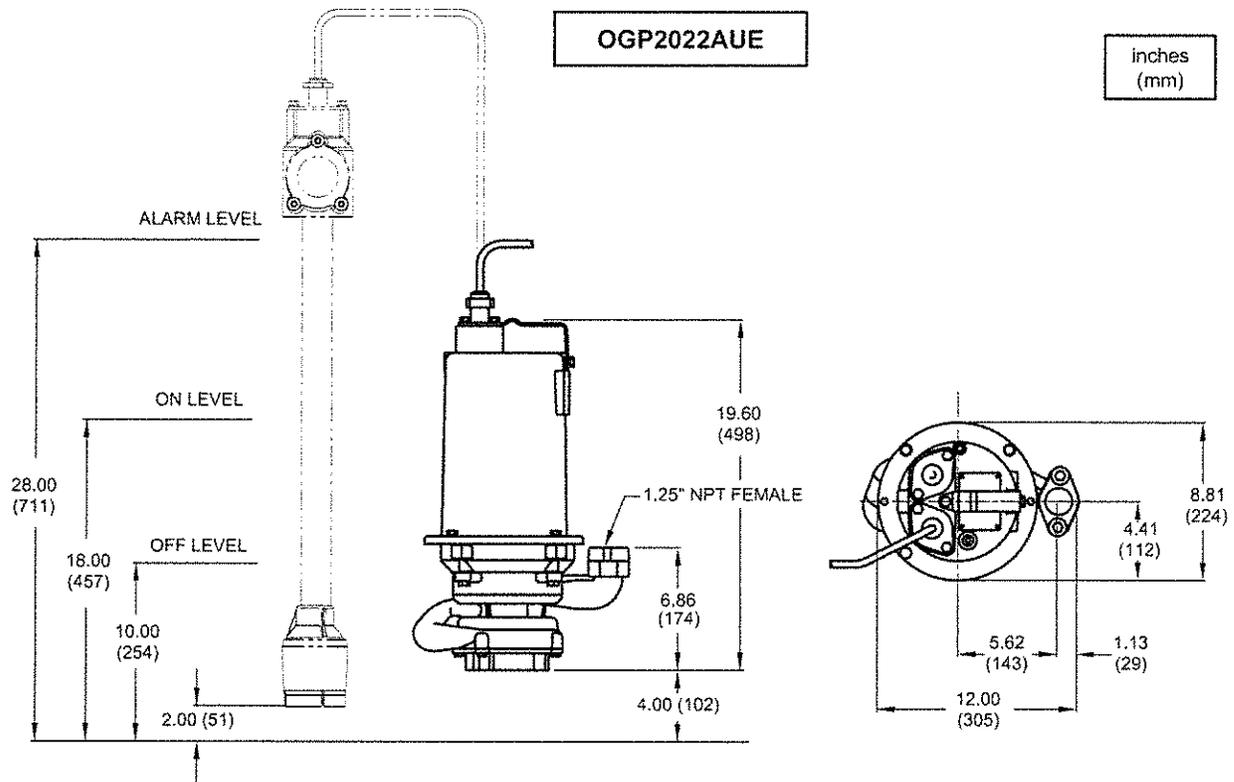
OGP2022CO - For Replacement Core Unit

inches  
(mm)



OGP2022CT - Threaded



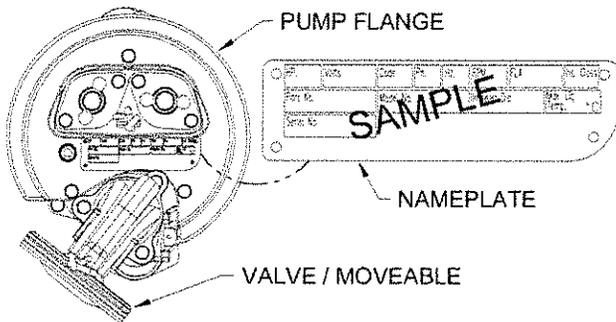


MODEL NO	HP	VOLT	PH	NEMA START CODE	FULL LOAD AMPS	LOCKED ROTOR AMPS	CORD SIZE	CODE TYPE	CORD O.D. ± .02 (.5) in (mm)	CORD LENGTH Ft. (m)	WINDING RESISTANCE MAIN - START
OGP2022L	2	240	1	H	16.5	53.8	12/3	SOW	.61 (15.5)	15 (4.6)	1.06 -- 3.60
OGP2022AUE	2	240	1	H	16.5	53.8	12/5	SOW	.71 (15.5)	15 (4.6)	1.06 -- 3.60
OGP2022CC	2	240	1	H	16.5	53.8	12/5	SOW	.71 (15.5)	15 (4.6)	1.06 -- 3.60
OGP2022CE	2	240	1	H	16.5	53.8	12/5	SOW	.71 (15.5)	15 (4.6)	1.06 -- 3.60
OGP2022CO	2	240	1	H	16.5	53.8	12/5	SOW	.71 (15.5)	15 (4.6)	1.06 -- 3.60
OGP2022CT	2	240	1	H	16.5	53.8	12/5	SOW	.71 (15.5)	15 (4.6)	1.06 -- 3.60

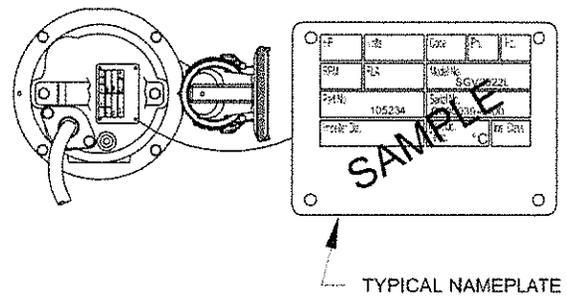
Winding Resistance ± 5%, measured from terminal block.  
 Pump rated for operation at ± 10% voltage at motor.

Recommended Breaker Sizes				
Pump Model	HP	Phase	Volts	Breaker Size
OGP2022L	2	1	240	25 AMP
OGP2022AUE	2	1	240	25 AMP
OGP2022CC	2	1	240	25 AMP
OGP2022CE	2	1	240	25 AMP
OGP2022CO	2	1	240	25 AMP
OGP2022CT	2	1	240	25 AMP

The nameplate is located on top of the pump. This contains the pumps part number, horsepower voltage, phase, and serial number, as well as other information. The start-up form located in the back of this manual contains a place to record this data. The information should be recorded now so the pump does not have to be pulled again later. The start-up form can be left in the control panel until station start-up is completed later.

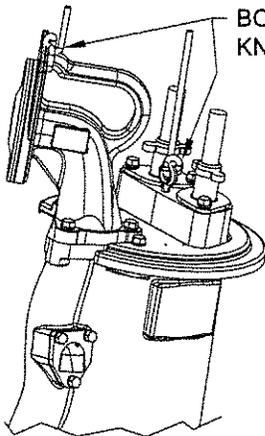


**OGP2022CC, CE, CO, CT**

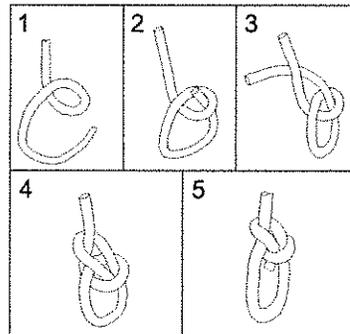


**OGP2022L**

**NOTE:** For any reason the Flange Support on the OGP2022CE units is removed or replaced, be shure not to loose Name plate, or re-attached to new support.



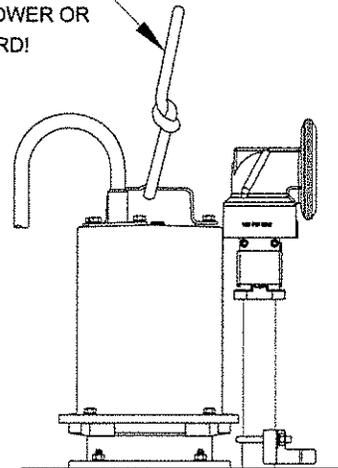
**BOWLINE KNOTS**



**FIGURE 1**

Tie the bowline knot where shown per the directions provided (Steps 1 through 5).  
 On the CC and CE series, tie one bowline knot on the handle of the moveable fitting and one bowline knot in the eyebolt on the pump (See Fig 1).  
 On the CO and CT (Not Shown) series tie bowline knot on the eyebolt.  
 On the L series tie bowline knot on the lifting handle. (See Fig 2).

**ATTACH LIFTING DEVICE**  
**CAUTION: NEVER LOWER OR RAISE PUMP BY CORD!**



**FIGURE 2**

### RECEIVING/UNPACKING:

Upon receiving the pump, it should be inspected for damage or shortages. If damage has occurred, file a claim immediately with the company that delivered the pump. Unpack pump and record pump serial and model number before installing. If the manual is removed from the packaging, do not lose or misplace.

### STORAGE:

**Short Term-** For best results, pumps can be retained in storage, as factory assembled, in a dry atmosphere with constant temperatures for up to six (6) months.

**Long Term-** Any length of time exceeding six (6) months, but not more than twenty-four (24) months. The units should be stored in a temperature controlled area, a roofed over walled enclosure that provides protection from the elements (rain, snow, wind-blown dust, etc.), and whose temperature can be maintained between +40 deg. F and +120 deg. F. If extended high humidity is expected to be a problem, all exposed parts should be inspected before storage and all surfaces that have the paint scratched, damaged, or worn should be recoated with a air dry enamel paint. All surfaces should then be sprayed with a rust-inhibiting oil.

Pump should be stored in its original shipping container. On initial start up, rotate impeller by hand to assure seal and impeller rotate freely. If it is required that the pump be installed and tested before the long term storage begins, such installation will be allowed provided:

- 1.) The pump is not installed under water for more than one (1) month.
- 2.) Immediately upon satisfactory completion of the test, the pump is removed, thoroughly dried, repacked in the original shipping container, and placed in a temperature controlled storage area.
- 3.) Before placing pump into service, pump should be brought to operational temperature range. Excessive or direct heating or cooling should **NOT** be used.

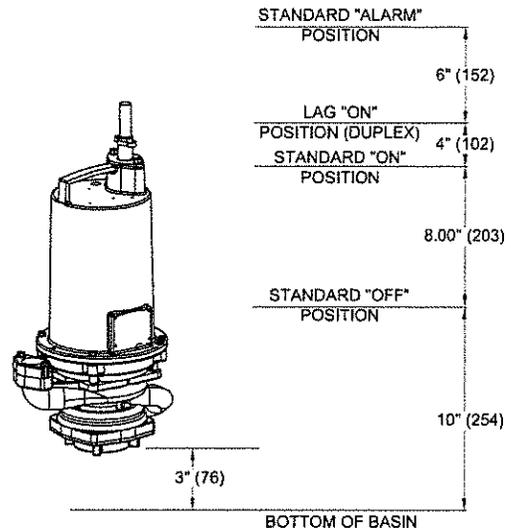
**OPERATION TEMPERATURE RANGE:** +35°F (2°C) to 104°F (40°C).

### SERVICE CENTERS:

For the location of the nearest Barnes Service Center, check your Barnes representative or Crane Pumps & Systems, Inc., Service Department in Piqua, Ohio, telephone (937) 778-8947 or in Brampton, Ontario, Canada (905) 457-6223.

### INSTALLATION:

**Location** - The pump is designed to fit into your basin either by sliding down the rail assembly, suspended from the cover or by being mounted on a pump base. **THIS PUMP MUST BE INSTALLED WITH A MINIMUM OF 3 INCHES AND A MAXIMUM OF 4.5 INCHES OF CLEARANCE UNDER THE PUMP FOR THE ENTRANCE OF SEWAGE SOLIDS.**



**FIGURE 3 - L Series (For Automatic see Level Control manual)**

**Discharge** - Assemble discharge piping or hose assembly (whichever is required by your application), to the pump. Discharge piping should be as short as possible. Both a check valve and a shut-off valve are required for each pump being used. The check valve is used to prevent backflow into the sump. Excessive backflow can cause flooding and/or damage to the pump. The shut-off valve is used to stop system flow during pump or check valve servicing.

**Package Systems**- Refer to manual supplied with basin package system.

### ELECTRICAL CONNECTIONS:

**Pump Cables** - The cord assembly mounted to the pump must **NOT** be modified in any way except for shortening to a specific application. Any splice between the pump and the control panel must be made in accordance with the National Electric Code or the Canadian Electric Code and all applicable state, province and local electric codes. It is recommended that a junction box, be mounted outside the sump or be of at least Nema 4 (EEMAC-4) construction if located within the wet well. **DO NOT USE THE POWER OR CONTROL CABLES TO LIFT PUMP!**

**Overload Protection** - The type of in-winding overload protector used is referred to as an inherent overheating protector and operates on the combined effect of temperature and current. This means that the overload protector will trip out and shut the pump off if the windings become too hot, or the load current becomes too high. It will then automatically reset and start the pump after the motor cools to a safe temperature. In the event of an overload, the source of this condition should be determined and rectified immediately. **DO NOT LET THE PUMP CYCLE OR RUN IF AN OVERLOAD CONDITION OCCURS !**

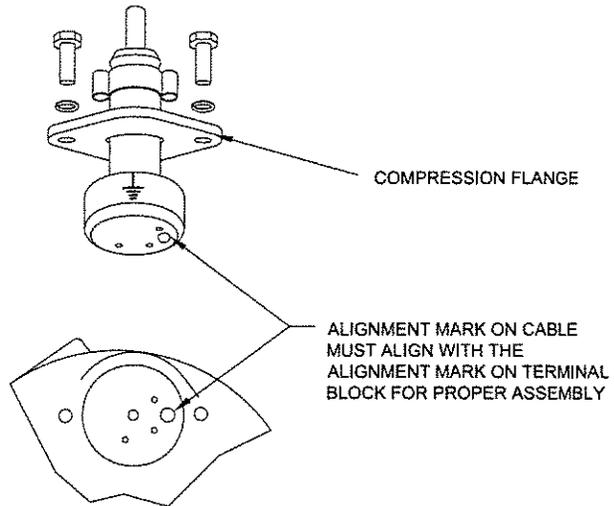
**Wire Size** - If additional cable is required consult a qualified electrician for proper wire size.

**CABLE CONNECTIONS:**

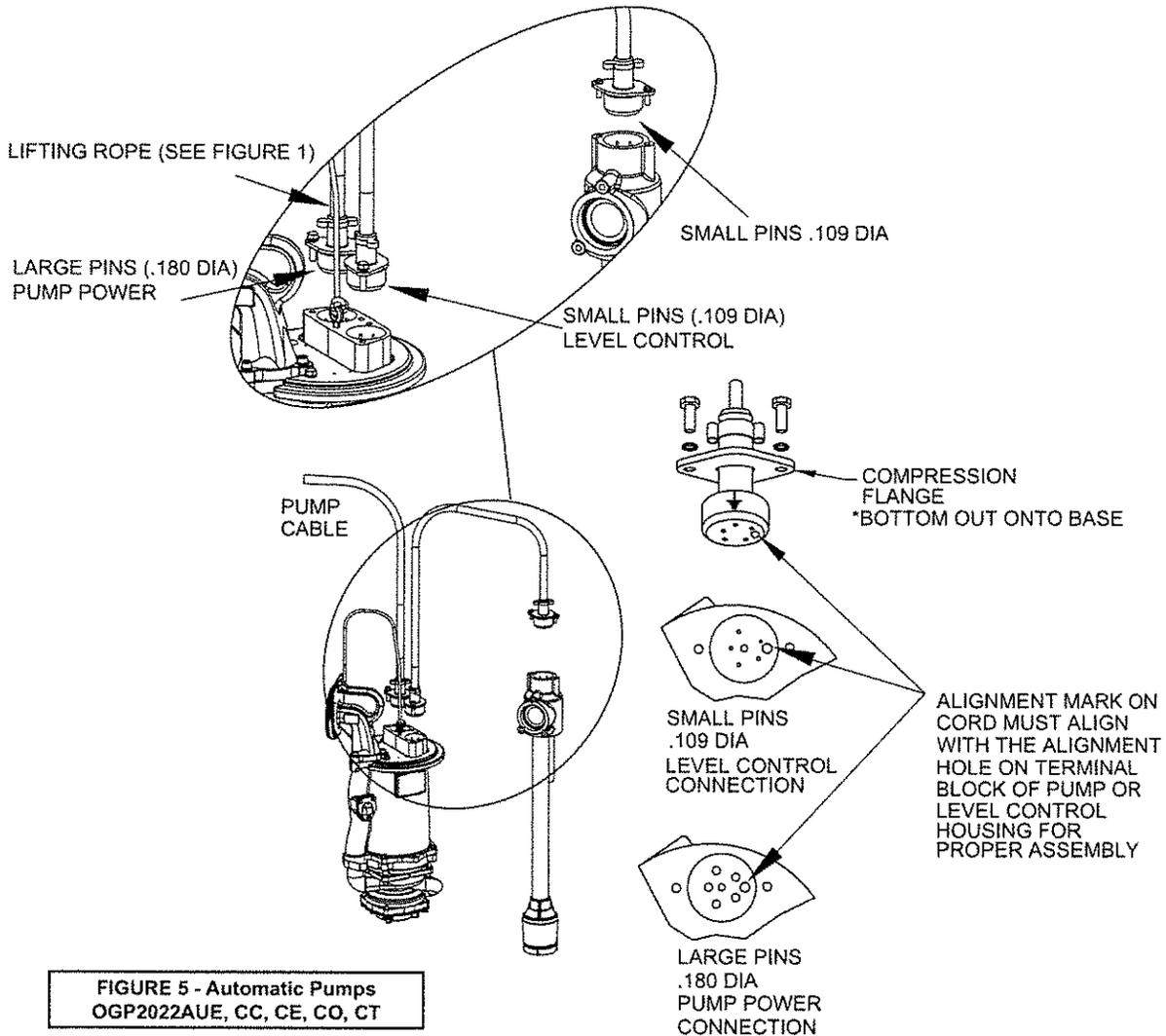
**Power/Control Cable**- Insert female end of cable plug into housing bore aligning alignment mark with hole in terminal block see Figures 4 & 5. Tighten bolts on compression flange until flush with motor housing.

Pump Power - Large Pin  
Level Control - Small Pin

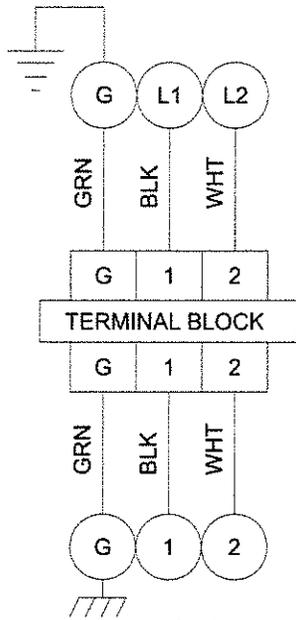
Level control cord has molded fitting at both ends of the cord. Install one end to the Pump and the other end to the Level Control.



**FIGURE 4 -OGP2022L**

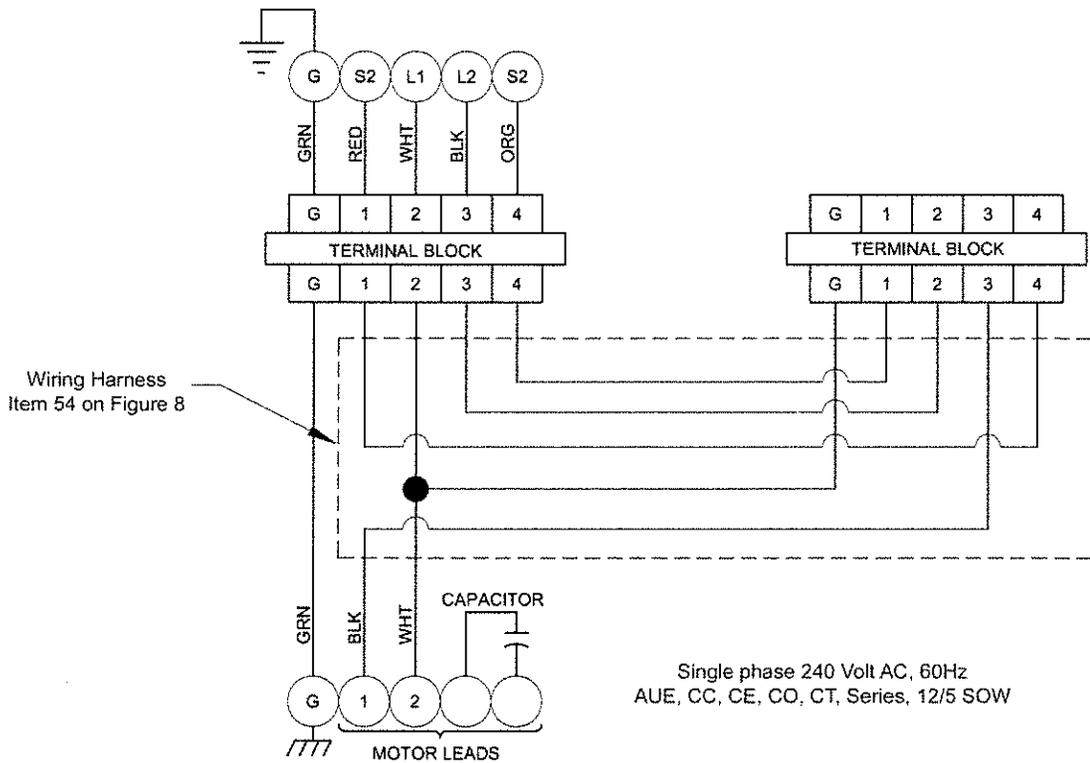


**FIGURE 5 - Automatic Pumps  
OGP2022AUE, CC, CE, CO, CT**



**FIGURE 6**

Single phase 240 Volt AC, 60Hz  
"L" Series, 12/3 SOW



**FIGURE 7**

Single phase 240 Volt AC, 60Hz  
AUE, CC, CE, CO, CT, Series, 12/5 SOW

## TROUBLE SHOOTING

**CAUTION!** Always disconnect the pump from the electrical power source before handling. If the system fails to operate properly, carefully read instructions and perform maintenance recommendations. If operating problems persist, the following chart may be of assistance in identifying and correcting them:

**MATCH "CAUSE" NUMBER WITH CORRELATING "CORRECTION" NUMBER.**

**NOTE:** Not all problems and corrections will apply to each pump model.

PROBLEM	CAUSE	CORRECTION
Pump will not run	<ol style="list-style-type: none"> <li>1. Poor electrical connection, blown fuse, tripped breaker or other interruption of power, improper power supply.</li> <li>2. Motor or switch inoperative (to isolate cause, go to manual operation of pump).</li> <li>2a. Float movement restricted.</li> <li>2b. Switch will not activate pump or is defective.</li> <li>3a. Insufficient liquid level.</li> <li>3b. Switch is unable to activate</li> </ol>	<ol style="list-style-type: none"> <li>1. Check all electrical connections for security. Have electrician measure current in motor leads, if current is within <math>\pm 20\%</math> of locked rotor Amps, impeller is probably locked. If current is 0, overload may be tripped. Remove power, allow pump to cool, then recheck current.</li> <li>2a. Reposition pump or clean basin as required to provide adequate clearance for float.</li> </ol>
Pump will not turn off	<ol style="list-style-type: none"> <li>2a. Float movement restricted.</li> <li>2b. Switch will not activate pump or is defective.</li> <li>4. Excessive inflow or pump not properly sized for application.</li> <li>9. Pump may be airlocked.</li> <li>14. H-O-A switch on panel is in "HAND" position</li> </ol>	<ol style="list-style-type: none"> <li>2b. Disconnect level control. Set ohmmeter for a low range, such as 100 ohms full scale and connect to level control leads. Actuate level control manually and check to see that ohmmeter shows zero ohms for closed switch and full scale for open switch. (Float Switch).</li> <li>3a. Make sure liquid level is at least equal to suggested turn-on point.</li> <li>3b. Rotate ESPS level control in horizontal position.</li> </ol>
Pump hums but does not run	<ol style="list-style-type: none"> <li>1. Incorrect voltage</li> <li>8. Cutter jammed or loose on shaft, worn or damaged, inlet plugged.</li> </ol>	<ol style="list-style-type: none"> <li>4. Recheck all sizing calculations to determine proper pump size.</li> </ol>
Pump delivers insufficient capacity	<ol style="list-style-type: none"> <li>1. Incorrect voltage.</li> <li>4. Excessive inflow or pump not properly sized for application.</li> <li>5. Discharge restricted.</li> <li>6. Check valve stuck closed or installed backwards.</li> <li>7. Shut-off valve closed.</li> <li>8. Cutter jammed or loose on shaft, worn or damaged, inlet plugged.</li> <li>9. Pump may be airlocked.</li> <li>10. Pump stator damaged/torn.</li> </ol>	<ol style="list-style-type: none"> <li>5. Check discharge line for restrictions, including ice if line passes through or into cold areas.</li> <li>6. Remove and examine check valve for proper installation and freedom of operation.</li> <li>7. Open valve.</li> <li>8. Check cutter for freedom of operation, security and condition. Clean cutter and inlet of any obstruction.</li> <li>9. Loosen union slightly to allow trapped air to escape. Verify that turn-off level of switch is set so that the suction is always flooded. Clean vent hole.</li> </ol>
Pump cycles too frequently or runs periodically when fixtures are not in use	<ol style="list-style-type: none"> <li>6. Check valve stuck closed or installed backwards.</li> <li>11. Fixtures are leaking.</li> <li>15. Ground water entering basin.</li> </ol>	<ol style="list-style-type: none"> <li>10. Remove &amp; examine for damage. Replace pump stator if required.</li> <li>11. Repair fixtures as required to eliminate leakage.</li> </ol>
Pump shuts off and turns on independent of switch, (trips thermal overload protector). <b>CAUTION!</b> Pump may start unexpectedly. Disconnect power supply.	<ol style="list-style-type: none"> <li>1. Incorrect voltage.</li> <li>4. Excessive inflow or pump not properly sized for application.</li> <li>8. Cutter jammed, loose on shaft, worn or damaged, inlet plugged.</li> <li>12. Excessive water temperature.</li> </ol>	<ol style="list-style-type: none"> <li>12. Check pump temperature limits &amp; fluid temperature.</li> <li>13. Replace portion of discharge pipe with flexible connector.</li> <li>14. Turn to automatic position.</li> </ol>
Pump operates noisily or vibrates excessively	<ol style="list-style-type: none"> <li>4. Operating at too high a pressure.</li> <li>5. Discharge restricted.</li> <li>8. Cutter broken.</li> <li>13. Piping attachments to building structure too rigid or too loose.</li> </ol>	<ol style="list-style-type: none"> <li>15. Check for leaks around basin inlet and outlets.</li> </ol>

# Compact Series - CC, CE, CO, CT

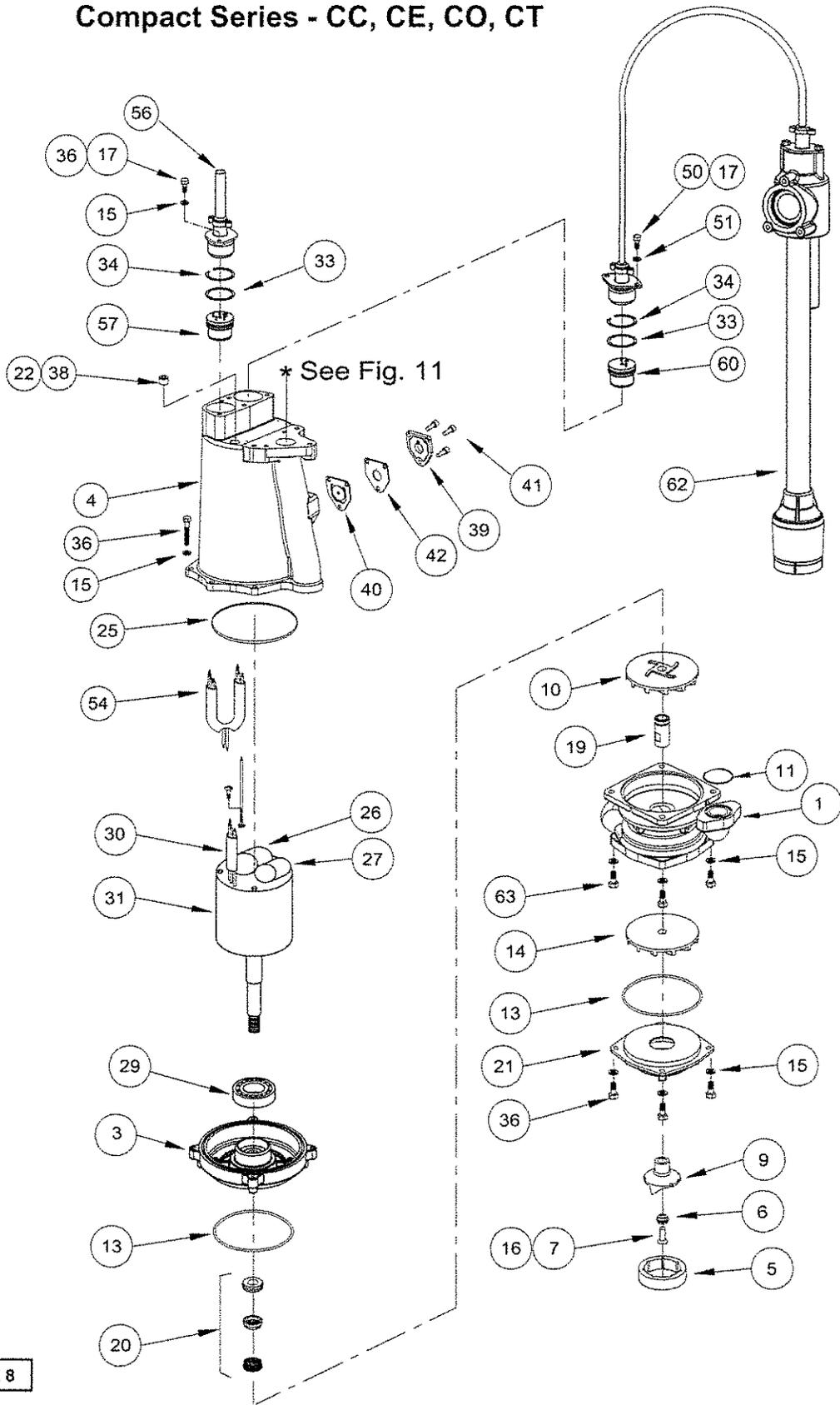


FIGURE 8

# Standard Series - L & AUE

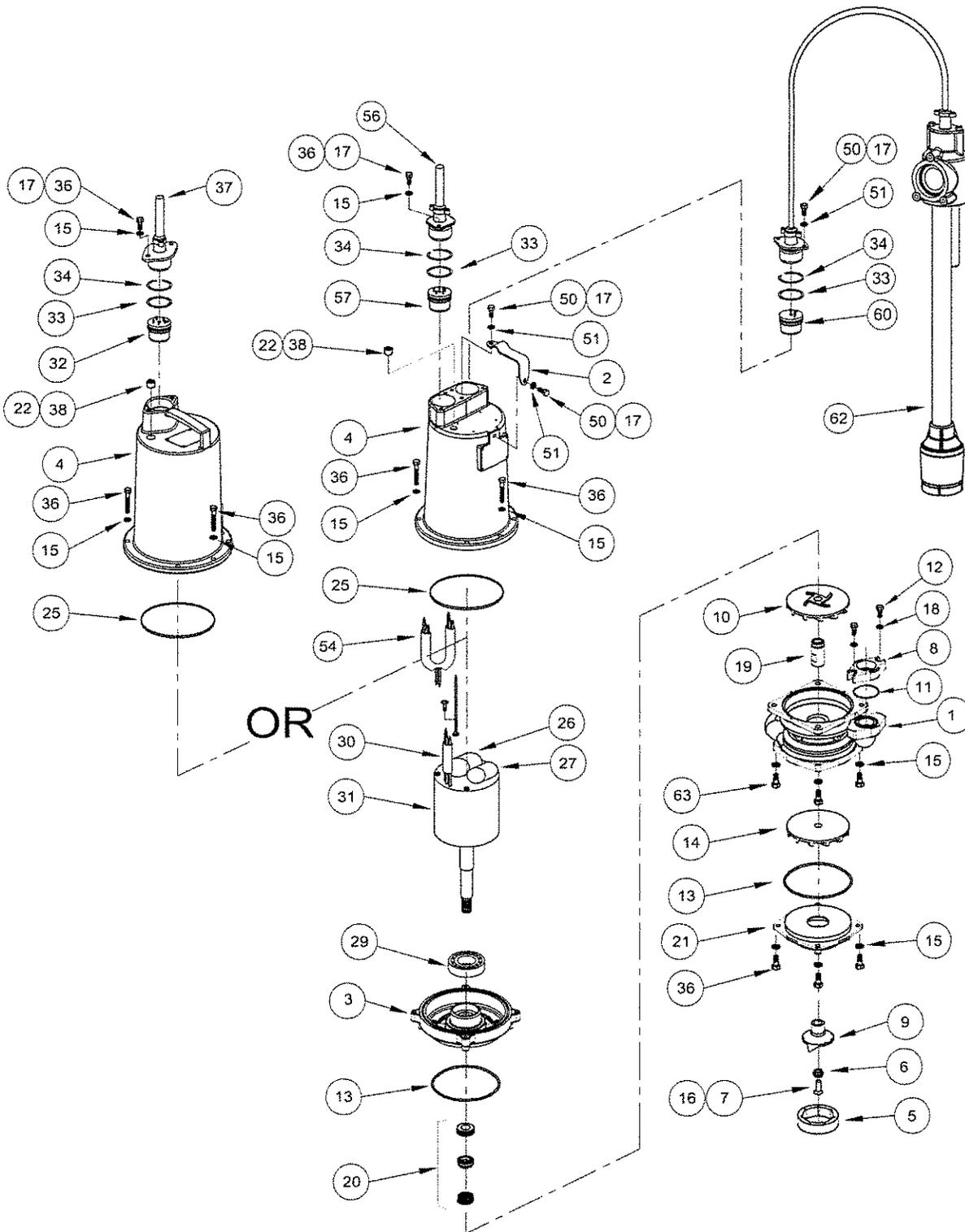


FIGURE 9

## PARTS KITS

**Seal Repair Kit .....P/N: 116664** Item #'s: 6, 7, 13, 15, 20, 25, 33, 36, 38

**Overhaul Kit ..... P/N: 116665** 116664 Item #'s: 9, 26, 27, 28, 29, 34

**Cutter Kit .....P/N: 116666** Item #'s: 5, 6, 7, 9, 13, 15, 36

## PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION
1	1	115321 115321A	Volute (L & AU) Volute (CC, CE, CO, CT)
2	1	110331	Handle (AUE)
3	1	115322	Seal Plate
4	1	108342 110328 118256	Motor Housing (L) Motor Housing (AUE) Motor Housing (CC, CE, CO, CT)
5	1	082085B	Shredding Ring
6	1	067556	Washer
7	1	070704	Skhd Screw, 1/4-20 x .75" SS
8	1	108369 †	Discharge Flange 1-1/4" NPT
9	1	082088	Radial Cutter
10	1	115324	Impeller, Second Stage
11	1	625-01558	O-Ring (-223)
12	2	1-131-1 †	Screw, 5/16-18 x 1.25" SS
13	2	067567	Square Ring
14	1	115323	Impeller, First Stage
15	14	026322	Lockwasher, 5/16" SS
16	A/R	-----	LOCTITE™ RC609
17	A/R	-----	LOCTITE 242
18	2	062941 †	5/16" Flatwasher
19	1	115325	Spacer Sleeve
20	1	110395SD	Seal, Silicon-Carbide (STD)
21	1	115326	Suction Cover
22	A/R	-----	Permatex Sealent 2C
24	90 oz	029034	Cooling Oil - Mtr. Housing
25	1	095368	Square Ring
26	1	036391	Capacitor, Run
27	1	099198	Capacitor, Start
28	1	116658	Ball Bearing, Upper (Not Shown)
29	1	116659	Ball Bearing, Lower
30	1 or 2	625-02117	Sleeve
31	1	115327A	Motor, 2HP, 240 Volt, 1 Phase (Includes items 26 thru 29)
32	1	103760	Terminal Block, Power, Manual
33	1 or 2	2-31051-224	O-Ring
34	1 or 2	105197	Retaining Ring
36	14	1-156-1	Screw, 5/16-18 x 1.00" SS
37	1	109498XC 109498	12/3 Cord Set, 30Ft (STD) 12/3 Cord Set, 15Ft (Compact)
38	1	014270	Pipe Plug, C'sunk, 3/8" NPT
39	1	119104B	Anti-Siphon Cover

ITEM	QTY	PART NO.	DESCRIPTION
40	1	112422	Gasket
41	3	03121-B	HXHD Screw 1/4-20 x .75" SS
42	1	105377B	Anti-Siphon Cover Plate
* Models with ESPS Level Control			
50	4	1-156-1	Screw, 5/16-18 x .1" SS
51	4	026322	Lockwasher, 5/16" SS
54	2	113287	Wiring Harness Assy
56	1	113274XC 113274 EcoTRAN	Cord Set (AUE), 30 Ft Cord Set (CC, CT, CE), 15 Ft Cord Set (CE-See man.119061)
57	1	113271	Terminal Block, Power
60	1	113272	Terminal Block, Level Control (AU - series)
62	1	121676-M 119068	ESPS-150 Level Control CE Only
63	4	2-23030-50	SkHd Screw 5/16-18 x 1.25"

Contact your local Distributor or the Factory for other cord lengths and other optional equipment.

(\*) Automatic - ESPS Level Control

(†) L Series ONLY. NOT USED ON CC, CE, CO, CT

**MOVEABLE ASSEMBLY P/N: 116596\* (OGP-L) & 116597\* (OGP-AU) PARTS LIST  
For Grinder, "C" Channel Basin Package**

ITEM	QTY.	PART No.	DESCRIPTION
1	1	112354	Check Valve/Upper Moveable
2	1	116605 116606	Upper Pump Bracket Assy - OGP Upper Pump Bracket Assy - OGP-AU
3	1	102174	Pipe Nipple
4	1	107360	Lower Guide Bracket Assy

(\* ) Pump **NOT** included under this part number. The Moveable Assembly will be factory assembled to pump when a Basin Package System is ordered.

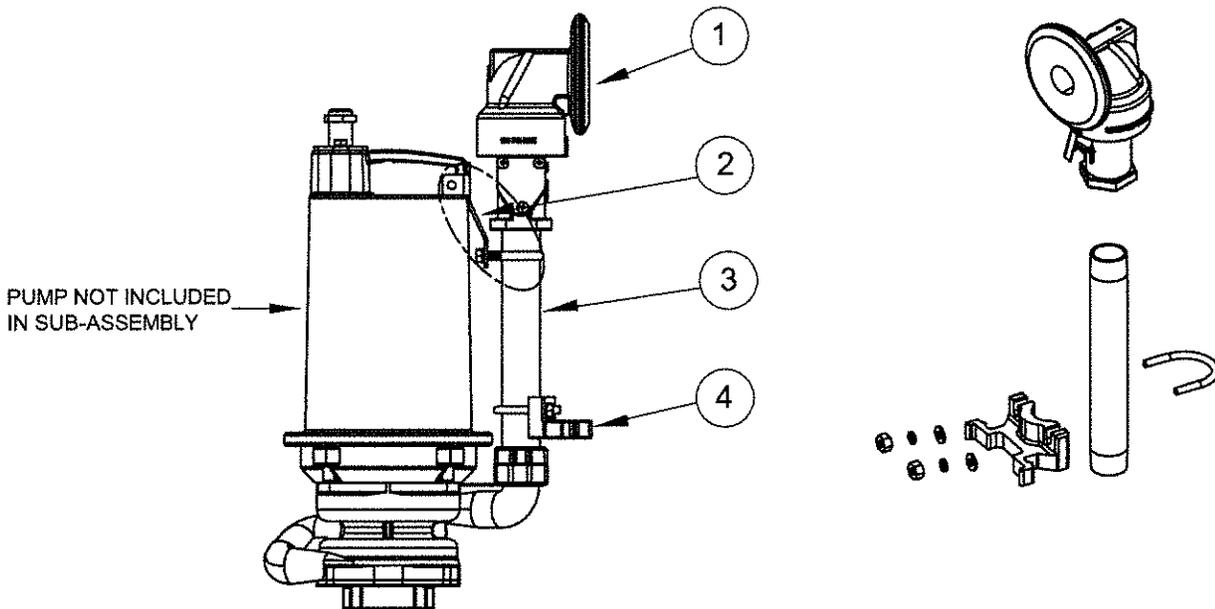
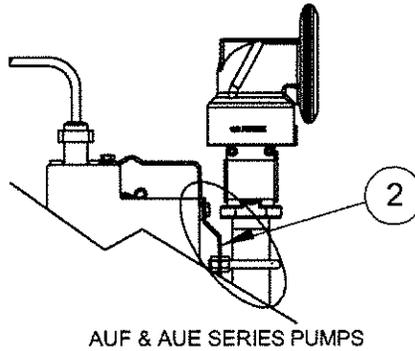
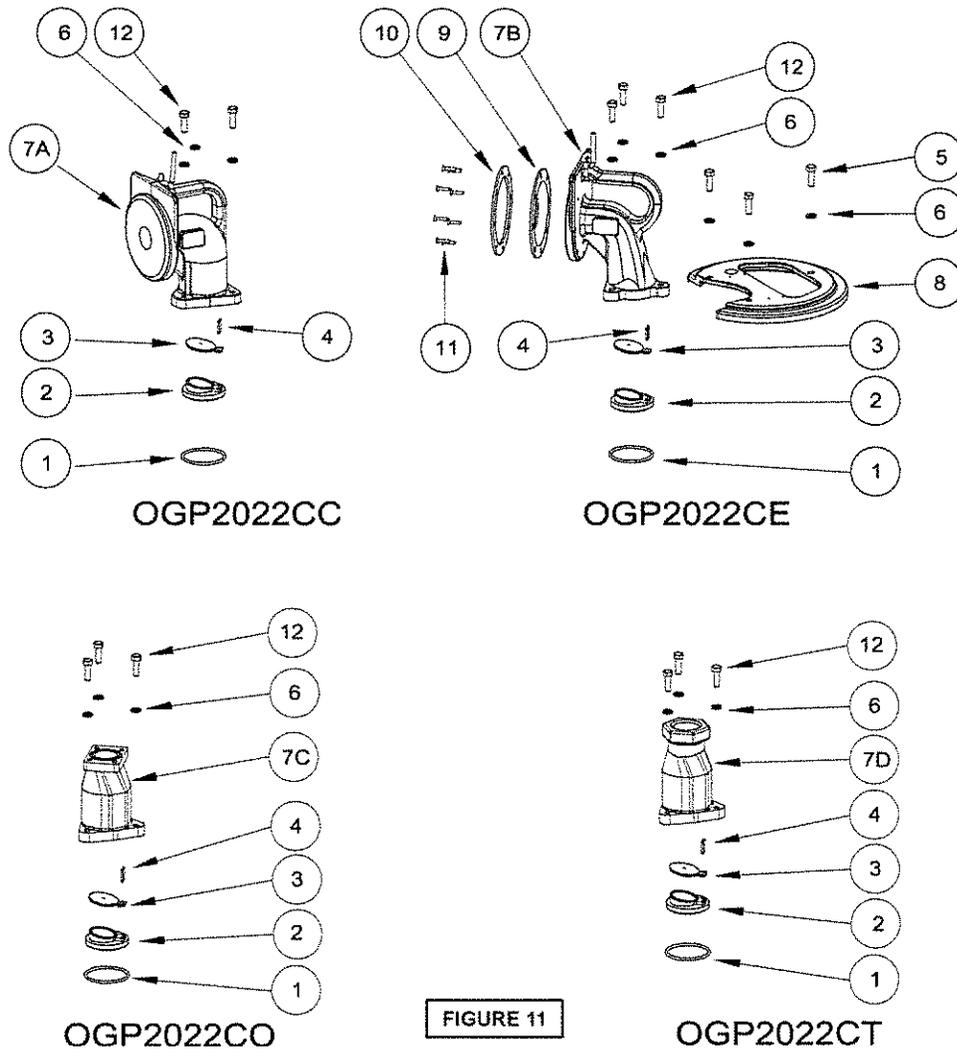


FIGURE 10

## DISCHARGE ASSEMBLIES for CC, CE, CO & CT Grinder Pumps

ITEM	QTY.	PART No.	DESCRIPTION
1	1	121225	O-ring, 4mm
2	1	118251	Valve Seat Flapper, Brz
3	1	118252	Gasket
4	2	120825	Pin .125 x .75 SS
5	3	1-156-1	HXHD Screw 5/16-18 x 1.00" SS
6	3 or 6	026322	Lock Washer 5/16 SS
7A	1	TBD	Valve Body (CC)
7B	1	118250	Valve Body (CE)
7C	1	118794	Valve Body (CO)
7D	1	TBD	Valve Body (CT)
8	1	118253	Pump Support Plate
9	1	119854	Diaphragm
10	1	118248	Diaphragm Retaining Plate
11	8	118267	FHHS Screw #10-32 x .75" SS
12	3	2-23030-50	SkHd Screw 5/16-18 x 1.25"

The Discharge Assembly will be factory assembled to pump.



**BARNES**

**BARNES**  
PRESSURE **PS** SYSTEMS

**CROWN**

**burks**

**WEINMAN**

**DEMING**

**PROSSER**

## Limited 24 Month Warranty

Crane Pumps & Systems warrants that products of our manufacture will be free of defects in material and workmanship under normal use and service for twenty-four (24) months after manufacture date, when installed and maintained in accordance with our instructions. This warranty gives you specific legal rights, and there may also be other rights which vary from state to state. In the event the product is covered by the Federal Consumer Product Warranties Law (1) the duration of any implied warranties associated with the product by virtue of said law is limited to the same duration as stated herein, (2) this warranty is a LIMITED WARRANTY, and (3) no claims of any nature whatsoever shall be made against us, until the ultimate consumer, his successor, or assigns, notifies us in writing of the defect, and delivers the product and/or defective part(s) freight prepaid to our factory or nearest authorized service station. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply. **THE SOLE AND EXCLUSIVE REMEDY FOR BREACH OF ANY AND ALL WARRANTIES WITH RESPECT TO ANY PRODUCT SHALL BE TO REPLACE OR REPAIR AT OUR ELECTION, F.O.B. POINT OF MANUFACTURE OR AUTHORIZED REPAIR STATION, SUCH PRODUCTS AND/OR PARTS AS PROVEN DEFECTIVE. THERE SHALL BE NO FURTHER LIABILITY, WHETHER BASED ON WARRANTY, NEGLIGENCE OR OTHERWISE.** Unless expressly stated otherwise, guarantees in the nature of performance specifications furnished in addition to the foregoing material and workmanship warranties on a product manufactured by us, if any, are subject to laboratory tests corrected for field performance. Any additional guarantees, in the nature of performance specifications must be in writing and such writing must be signed by our authorized representative. Due to inaccuracies in field testing if a conflict arises between the results of field testing conducted by or for user, and laboratory tests corrected for field performance, the latter shall control. **RECOMMENDATIONS FOR SPECIAL APPLICATIONS OR THOSE RESULTING FROM SYSTEMS ANALYSES AND EVALUATIONS WE CONDUCT WILL BE BASED ON OUR BEST AVAILABLE EXPERIENCE AND PUBLISHED INDUSTRY INFORMATION. SUCH RECOMMENDATIONS DO NOT CONSTITUTE A WARRANTY OF SATISFACTORY PERFORMANCE AND NO SUCH WARRANTY IS GIVEN.**

This warranty shall not apply when damage is caused by (a) improper installation, (b) improper voltage (c) lightning (d) excessive sand or other abrasive material (e) scale or corrosion build-up due to excessive chemical content. Any modification of the original equipment will also void the warranty. We will not be responsible for loss, damage or labor cost due to interruption of service caused by defective parts. Neither will we accept charges incurred by others without our prior written approval.

This warranty is void if our inspection reveals the product was used in a manner inconsistent with normal industry practice and/or our specific recommendations. The purchaser is responsible for communication of all necessary information regarding the application and use of the product. **UNDER NO CIRCUMSTANCES WILL WE BE RESPONSIBLE FOR ANY OTHER DIRECT OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO TRAVEL EXPENSES, RENTED EQUIPMENT, OUTSIDE CONTRACTOR FEES, UNAUTHORIZED REPAIR SHOP EXPENSES, LOST PROFITS, LOST INCOME, LABOR CHARGES, DELAYS IN PRODUCTION, IDLE PRODUCTION, WHICH DAMAGES ARE CAUSED BY ANY DEFECTS IN MATERIAL AND/OR WORKMANSHIP AND/OR DAMAGE OR DELAYS IN SHIPMENT. THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER EXPRESS OR IMPLIED WARRANTY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.**

No rights extended under this warranty shall be assigned to any other person, whether by operation of law or otherwise, without our prior written approval.

**CRANE**

A Crane Co. Company

### PUMPS & SYSTEMS

420 Third Street  
Piqua, Ohio 45356  
Phone: (937) 778-8947  
Fax: (937) 773-7157  
www.cranepumps.com

83 West Drive, Brampton  
Ontario, Canada L6T 2J6  
Phone: (905) 457-6223  
Fax: (905) 457-2650

**IMPORTANT!  
WARRANTY REGISTRATION**

Your product is covered by the enclosed Warranty.  
To complete the Warranty Registration Form go to:

<http://www.cranepumps.com/ProductRegistration/>

If you have a claim under the provision of the warranty, contact your local  
Crane Pumps & Systems, Inc. Distributor.

**RETURNED GOODS**

**RETURN OF MERCHANDISE REQUIRES A "RETURNED GOODS AUTHORIZATION".  
CONTACT YOUR LOCAL CRANE PUMPS & SYSTEMS, INC. DISTRIBUTOR.**



**Products Returned Must Be Cleaned, Sanitized,  
Or Decontaminated As Necessary Prior To Shipment,  
To Insure That Employees Will Not Be Exposed To Health  
Hazards In Handling Said Material. All Applicable Laws  
And Regulations Shall Apply.**

## START-UP / WARRANTY REGISTRATION FORM

This form is designed to provide assurance that customer service and a quality product are the number one priority with Crane Pumps & Systems, Inc. Please fill out the following questions as completely and accurately as possible.  
When complete, mail this form to:

Crane Pumps & Systems, Inc  
Warranty Service Group  
420 Third Street  
Piqua, Ohio 45356

### REPORTS THAT ARE NOT RETURNED CAN DELAY OR VOID WARRANTY.

Pump Owner's Name: \_\_\_\_\_

Address: \_\_\_\_\_

Location of Installation \_\_\_\_\_

Phone \_\_\_\_\_

Purchased From (Crane Pumps & Systems Representative/Distributor) \_\_\_\_\_

Pump Model \_\_\_\_\_ Serial No. \_\_\_\_\_

Part Number \_\_\_\_\_

Voltage \_\_\_\_\_ Phase \_\_\_\_\_ Hertz \_\_\_\_\_ Horespower \_\_\_\_\_

Condition of Cable Jacket Good \_\_\_\_\_ Fair \_\_\_\_\_ Poor \_\_\_\_\_

Resistance of Cable and Pump Motor (measured at pump control) **NOTE: Can't check on Automatic units**

White-Black \_\_\_\_\_ Ohms

Resistance of Ground Circuit between Control Panel and outside of pump \_\_\_\_\_ Ohms

MEG Ohms check of insulation: White to Ground \_\_\_\_\_ Black to Ground \_\_\_\_\_

Was Equipment Stored? \_\_\_\_\_ Length of Storage \_\_\_\_\_

Liquid Being Pumped \_\_\_\_\_

Debris in bottom of station? \_\_\_\_\_ Was debris removed in your presence? \_\_\_\_\_

For ESPS level control, consult manual for diagnostic tips.

If Floats used for level control:

Tip bottom two floats (All pumps should remain off).

Tip third float, (and Off float) one pump comes on.

Tip fourth float (and Off float), high level alarm on (on simplex) (both pumps On).

Is the control panel used a Barnes' control panel? Yes \_\_\_\_\_ No \_\_\_\_\_

Barnes Pumps control panel part number \_\_\_\_\_

### ELECTRICAL READINGS:

Single Phase:

Voltage supply at panel line connection, Pump Off, L1, L2 \_\_\_\_\_

Voltage supply at panel line connection, Pump On, L1, L2 \_\_\_\_\_

Amperage: Load connection, Pump On L1 \_\_\_\_\_ L2 \_\_\_\_\_

### FINAL CHECK:

Flow; Does station appear to operate at proper rate? \_\_\_\_\_ Pump down time \_\_\_\_\_

Comments: \_\_\_\_\_

Equipment difficulties during start-up \_\_\_\_\_

### MANUALS:

Has operator received pump instructions and part manual? \_\_\_\_\_

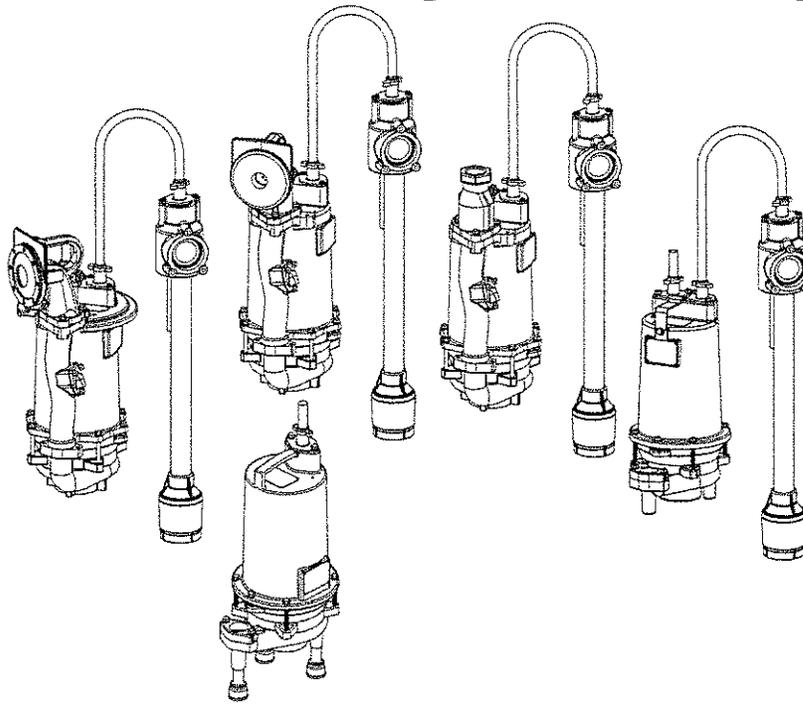
I Certify this report to be accurate (Name of Start-Up person) \_\_\_\_\_

Employed By: \_\_\_\_\_ Date: \_\_\_\_\_



## INSTALLATION MANUAL Submersible Grinder Pump

### Series: OGVF & OGVH 2 HP, 3450 RPM, 60 Hz. High-Flow and High-Head



**omni**  
**GRIND**<sup>TM</sup>  
CENTRIFUGAL GRINDER PUMPS

**IMPORTANT!**

*Read all instructions in this manual before operating pump.  
As a result of Crane Pumps & Systems, Inc., constant product improvement program,  
product changes may occur. As such Crane Pumps & Systems reserves the right to  
change product without prior written notification.*

**CRANE**

A Crane Co. Company

PUMPS & SYSTEMS

420 Third Street  
Piqua, Ohio 45356  
Phone: (937) 778-8947  
Fax: (937) 773-7157  
www.cranepumps.com

83 West Drive, Bramton  
Ontario, Canada L6T 2J6  
Phone: (905) 457-6223  
Fax: (905) 457-2650



Form No. 120138-Rev. J

# SAFETY FIRST!

Please Read This Before Installing Or Operating Pump. This information is provided for **SAFETY** and to **PREVENT EQUIPMENT PROBLEMS**. To help recognize this information, observe the following symbols:



**IMPORTANT!** Warns about hazards that can result in personal injury or indicates factors concerned with assembly, installation, operation, or maintenance which could result in damage to the machine or equipment if ignored.

**CAUTION !** Warns about hazards that can or will cause minor personal injury or property damage if ignored. Used with symbols below.

**WARNING !** Warns about hazards that can or will cause serious personal injury, death, or major property damage if ignored. Used with symbols below.



Hazardous fluids can cause fire or explosions, burns or death could result.



Extremely hot - Severe burns can occur on contact.



Biohazard can cause serious personal injury.



Hazardous fluids can Hazardous pressure, eruptions or explosions could cause personal injury or property damage.



Rotating machinery Amputation or severe laceration can result.



Hazardous voltage can shock, burn or cause death.

Only qualified personnel should install, operate and repair pump. Any wiring of pumps should be performed by a qualified electrician.



**WARNING !** - To reduce risk of electrical shock, pumps and control panels must be properly grounded in accordance with the National Electric Code (NEC) or the Canadian Electrical Code (CEC) and all applicable state, province, local codes and ordinances.

**WARNING!** - To reduce risk of electrical shock, always disconnect the pump from the power source before handling or servicing. Lock out power and tag.

Prevent large articles of clothing, large amounts of chemicals, other materials or substances such as are uncommon in domestic sewage from entering the system.

During power black-outs, minimize water consumption at the home(s) to prevent sewage from backing up into the house.

Always keep the shut-off valve completely open when system is in operation (unless advised otherwise by the proper authorities). Before removing the pump from the basin, be sure to close the shut-off valve. (This prevents backflow from the pressure sewer.)

Keep the control panel locked or confined to prevent unauthorized access to it.

If the pump is idle for long periods of time, it is advisable to start the pump occasionally by adding water to the basin.



**CAUTION!** Pumps build up heat and pressure during operation-allow time for pumps to cool before handling or servicing.



**WARNING!** - **DO NOT** pump hazardous materials (flammable, caustic, etc.) unless the pump is specifically designed and designated to handle them.

Do not block or restrict discharge hose, as discharge hose may whip under pressure.



**WARNING!** - **DO NOT** wear loose clothing that may become entangled in the impeller or other moving parts.

**WARNING!** - Keep clear of suction and discharge openings. **DO NOT** insert fingers in pump with power connected.

Make sure lifting handles are securely fastened each time before lifting. Do not operate pump without safety devices in place. Always replace safety devices that have been removed during service or repair.

Do not exceed manufacturers recommendation for maximum performance, as this could cause the motor to overheat.

Secure the pump in its operating position so it can not tip over, fall or slide.

Cable should be protected at all times to avoid punctures, cut, bruises and abrasions - inspect frequently.



Never handle connected power cords with wet hands.

To reduce risk of electrical shock, all wiring and junction connections should be made per the NEC or CEC and applicable state or province and local codes. Requirements may vary depending on usage and location.



Submersible Pumps are not approved for use in swimming pools, recreational water installations, decorative fountains or any installation where human contact with the pumped fluid is common.

Do not remove cord and strain relief. Do not connect conduit to pump.



Products Returned Must Be Cleaned, Sanitized, Or Decontaminated As Necessary Prior To Shipment, To Insure That Employees Will Not Be Exposed To Health Hazards In Handling Said Material. All Applicable Laws And Regulations Shall Apply.

Bronze/brass and bronze/brass fitted pumps may contain lead levels higher than considered safe for potable water systems. Lead is known to cause cancer and birth defects or other reproductive harm. Various government agencies have determined that leaded copper alloys should not be used in potable water applications. For non-leaded copper alloy materials of construction, please contact factory.



**IMPORTANT!** - Crane Pumps & Systems, Inc. is not responsible for losses, injury, or death resulting from a failure to observe these safety precautions, misuse or abuse of pumps or equipment.

Other brand and product names are trademarks or registered trademarks of their respective holders.

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2002, 2003, 4/04, 5/04, 4/05, 12/05, 1/06, 9/06, 11/06, 2/07

Alteration Rights Reserved

**BARNES**



**USER GUIDE**

Congratulations on your purchase of a Barnes grinder pump system. With proper care and by following a few simple guidelines your grinder pump will give you many years of dependable service.

**Use and Care**

The grinder pump station is designed to handle routine, domestic sewage. Solid waste materials should be thrown in the trash. While your station is capable of accepting and pumping a wide range of materials, regulatory agencies advise that the following items should not be introduced into any sewer either directly or through a kitchen waste disposal:

- Glass
- Metal
- Diapers
- Socks, rags or cloth
- Plastic objects (e.g., toys, utensils, etc.)
- Sanitary napkins or tampons

In addition you must **NEVER** introduce into any sewer:

- Explosives
- Flammable Material
- Lubricating Oil and/or Grease
- Strong Chemicals
- Gasoline

**General Information**

Your home wastewater disposal service is part of a low pressure sewer system. The key element in this system is the Barnes grinder pump station. The basin collects all wastewater from the house. The solids in the sewage are then ground to a small size suitable for pumping in the slurry.



**GRINDER PUMP SYSTEMS** The

grinder pump generates sufficient pressure to pump this slurry from your home to the wastewater plant.

**Power Failure**

Your grinder pump cannot dispose of wastewater or provide an alarm signal without electrical power. If electrical power service is interrupted, keep water usage to a minimum.

**Warranty**

Your grinder pump is furnished with a warranty against defects in material or workmanship. A properly completed

Start-Up/Warranty Registration form must be on file at the Barnes factory in order to activate your warranty. In addition your pump must be installed in accordance with the installation instructions.

If you have a claim under the provisions of the warranty, contact your local Barnes Distributor.

When contacting your representative for service, please include your station serial number, pump model number, and pump serial number.

For future reference, record the following information:

Station Serial No: \_\_\_\_\_

Pump Model No: \_\_\_\_\_

Pump Serial No: \_\_\_\_\_

Local Distributor: \_\_\_\_\_

Distributor Telephone: \_\_\_\_\_



# PUMP SPECIFICATIONS:

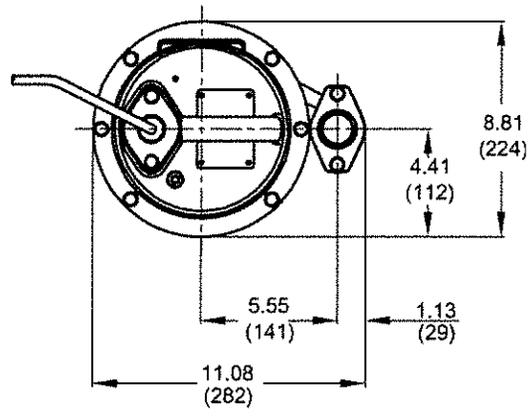
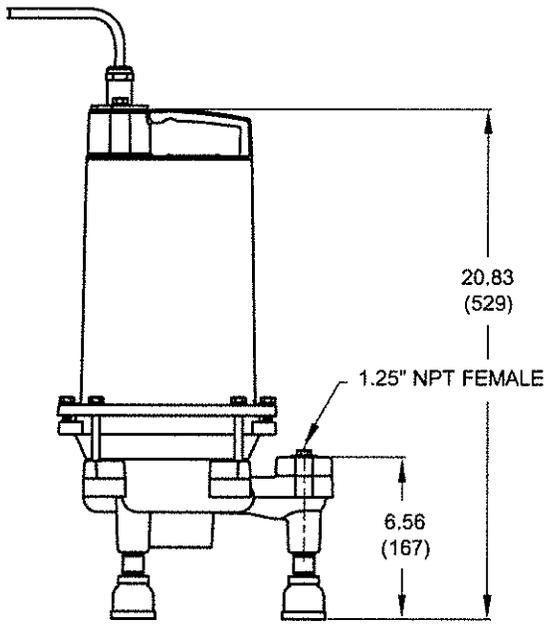
**DISCHARGE** ..... 1½" NPT, Vertical, Bolt-on Flange  
**LIQUID TEMPERATURE** .... 160°F (71°C) Intermittent  
**MOTOR HOUSING** ..... Cast Iron ASTM A-48, Class 30  
**VOLUTE** ..... Cast Iron ASTM A-48, Class 30  
**SEAL PLATE** ..... Cast Iron ASTM A-48, Class 30  
**IMPELLER:**  
     *Design* ..... 12 vane, vortex, with pump out vanes on back side. Dynamically balanced, ISO G6.3  
     *Material* ..... 85-5-5-5 Bronze  
**SHREDDING RING** ..... Hardened 440C Stainless Steel Rockwell® C-55  
**CUTTER** ..... Hardened 440C Stainless Steel Rockwell® C-55  
**SHAFT** ..... 416 Stainless Steel  
**SQUARE RINGS** ..... Buna-N  
**HARDWARE** ..... 300 Series Stainless Steel  
**PAINT** ..... Air dry enamel, top coat  
**SEAL**      *Design* ..... Single Mechanical, oil filled reservoir  
             *Material* ..... Rotating Faces - Silicon-Carbide  
                                 Stationary Faces - Silicon-Carbide  
                                 Elastomer - Buna-N  
                                 Hardware - 300 series stainless steel  
**CORD ENTRY** ..... 30 Ft. (9.1m); 15 Ft. (4.5m) Cord on, Compact series (CC, CE, CT), Custom Molded Quick Connected for sealing and strain relief.  
**CORD** ..... CSA/UL Approved 12/3 & 12/5 Type SOW

**SPEED** ..... 3450 RPM, 60Hz (nominal)  
**UPPER BEARING:**  
     *Design* ..... Single Row, Ball, Oil Lubricated  
     *Load* ..... Radial  
**LOWER BEARING:**  
     *Design* ..... Single Row, Ball, Oil Lubricated  
     *Load* ..... Radial & Thrust  
**MOTOR:**    *Design* ..... NEMA L, Single phase, includes overload protection in the motor)  
                                 Oil Filled, Squirrel Cage Induction  
                     *Insulation* ..... Class F  
**SINGLE PHASE** ..... Capacitor start/capacitor run.  
**LEVEL CONTROLS:** *AUE, CE, CC, CO, CT*  
     *Series* ..... **SOLD SEPARATELY**, Model ESPS-150™ or ESPS-150E™  
                                 Environmentally sealed pressure switch with CPVC housing, Buna diaphragm, Custom molded Quick connect for sealing and strain relief.  
**OPTIONAL EQUIPMENT** .... Seal Material, Additional Cord, Impeller trims, Moveable Fitting

**ESPS Level Control Sold Separately**

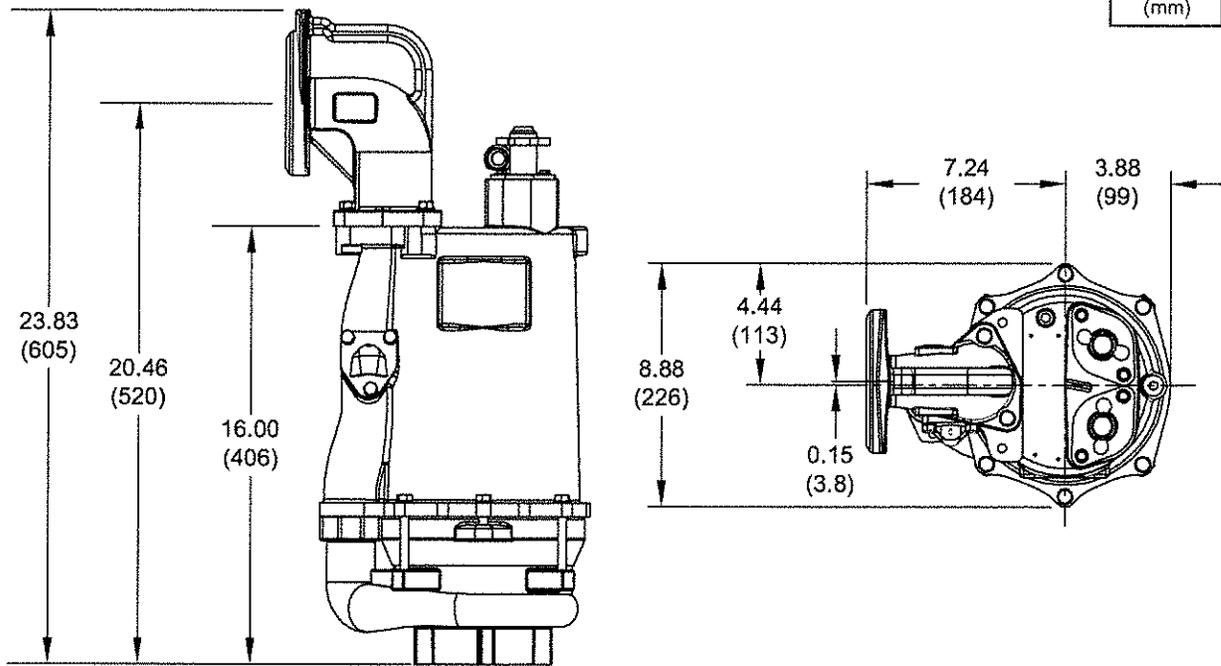
**OGV-L**

inches  
(mm)

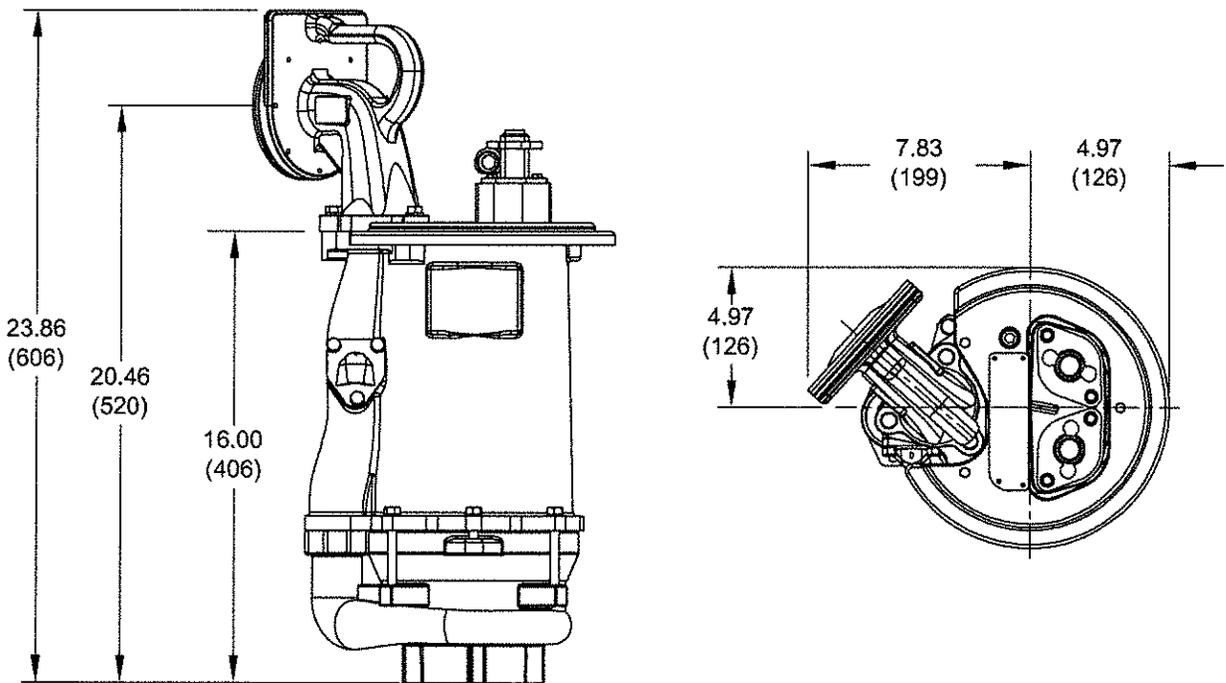


OGV-CC - For "C" Channel

inches  
(mm)



OGV-CE - For EcoTRAN™





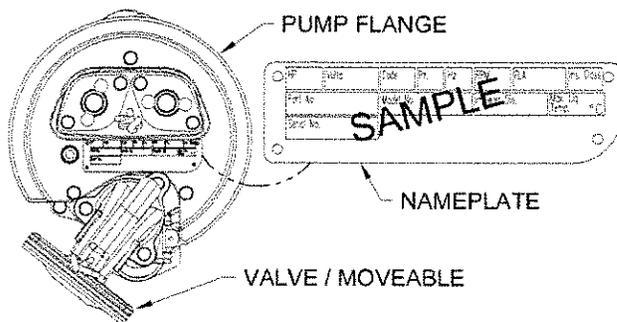
MODEL NO	HP	VOLT	PH/Hz	RPM (Nom)	NEMA START CODE	FULL LOAD AMPS	LOCKED ROTOR AMPS	CORD SIZE	CODE TYPE	CORD O.D. ± .02 (.5) in (mm)	WINDING RESISTANCE MAIN -- START
OGVH2022L	2	240	1 / 60	3450	H	15.0	53.8	12/3	SOW	.61 (15.5)	1.5 -- 5.1
OGVH2022AUE	2	240	1 / 60	3450	H	15.0	53.8	12/3	SOW	.61 (15.5)	1.5 -- 5.1
OGVH2022CE	2	240	1 / 60	3450	H	15.0	53.8	12/3	SOW	.61 (15.5)	1.5 -- 5.1
OGVH2022CC	2	240	1 / 60	3450	H	15.0	53.8	12/3	SOW	.61 (15.5)	1.5 -- 5.1
OGVH2022CT	2	240	1 / 60	3450	H	15.0	53.8	12/3	SOW	.61 (15.5)	1.5 -- 5.1
OGVF2022L	2	240	1 / 60	3450	H	15.0	53.8	12/3	SOW	.61 (15.5)	1.5 -- 5.1
OGVF2022AUE	2	240	1 / 60	3450	H	15.0	53.8	12/3	SOW	.61 (15.5)	1.5 -- 5.1
OGVF2022CE	2	240	1 / 60	3450	H	15.0	53.8	12/3	SOW	.61 (15.5)	1.5 -- 5.1
OGVF2022CC	2	240	1 / 60	3450	H	15.0	53.8	12/3	SOW	.61 (15.5)	1.5 -- 5.1
OGVF2022CT	2	240	1 / 60	3450	H	15.0	53.8	12/3	SOW	.61 (15.5)	1.5 -- 5.1

Winding Resistance ± 5%, measured from terminal block. Pump rated for operation at ± 10% voltage at motor.

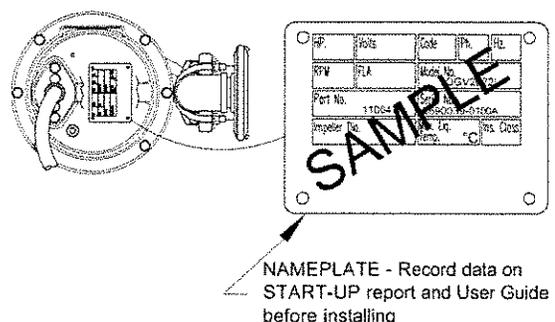
Recommended Breaker & Heater Sizes				
Pump Model	HP	Phase	Volts	Breaker Size
All OGV Series Pumps	2	1	240	25 AMP

(\*) = F for High-Flow or H for High-Head.

The nameplate is located on top of the pump. This contains the pumps part number, horsepower, voltage, phase, and serial number, as well as other information. The start-up form located in the back of this manual contains a place to record this data. The information should be recorded now so the pump does not have to be pulled again later. The start-up form can be left in the control panel until station start-up is completed later.



OGV-CC, CE, CT



OGV-L & AUE

NAMEPLATE - Record data on START-UP report and User Guide before installing

Tie the bowline knot where shown per the directions provided (Steps 1 through 5). On the CC and CE series, tie one bowline knot on the handle of the moveable fitting and one bowline knot in the eyebolt on the pump (See Fig 1). On the CT (Not Shown) series tie bowline knot on the eyebolt. On the L and AUE series tie bowline knot on the lifting handle. (See Fig 2).

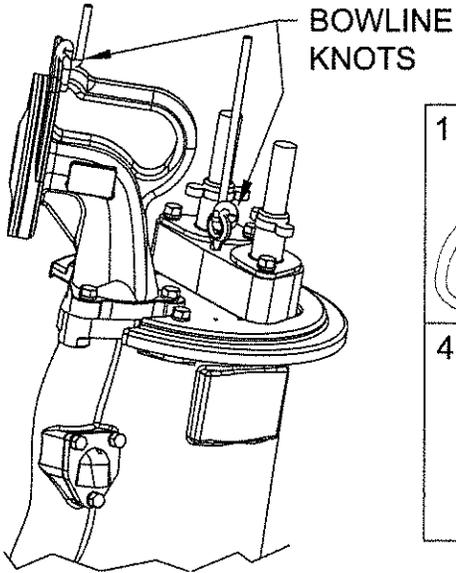
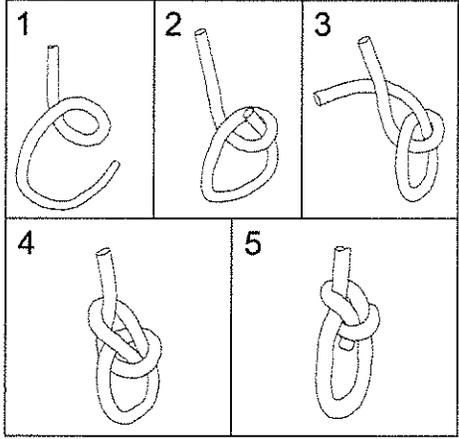


FIGURE 1



**LIFTING DEVICE !**  
Attach lifting device.  
**CAUTION! NEVER LOWER OR RAISE PUMP BY CORD.**

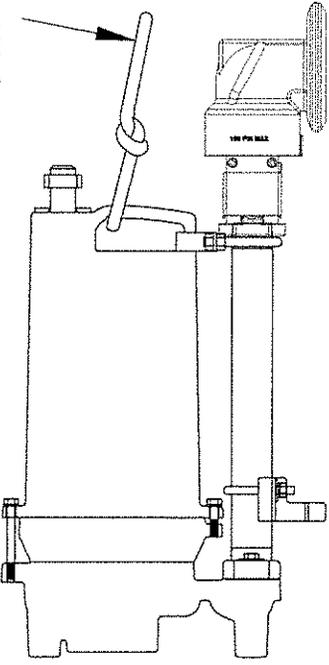


FIGURE 2

### RECEIVING/UNPACKING:

Upon receiving the pump, it should be inspected for damage or shortages. If damage has occurred, file a claim immediately with the company that delivered the pump. Unpack pump and record pump serial and model number before installing. If the manual is removed from the packaging, do not lose or misplace.

### STORAGE:

**Short Term-** For best results, pumps can be retained in storage, as factory assembled, in a dry atmosphere with constant temperatures for up to six (6) months.

**Long Term-** Any length of time exceeding six (6) months, but not more than twenty-four (24) months. The units should be stored in a temperature controlled area, a roofed over walled enclosure that provides protection from the elements (rain, snow, wind-blown dust, etc.), and whose temperature can be maintained between +40 deg. F and +120 deg. F. If extended high humidity is expected to be a problem, all exposed parts should be inspected before storage and all surfaces that have the paint scratched, damaged, or worn should be recoated with a air dry enamel paint. All surfaces should then be sprayed with a rust-inhibiting oil.

Pump should be stored in its original shipping container. On initial start up, rotate shaft by hand to assure seal and motor rotate freely. If it is required that the pump be installed and tested before the long term storage begins, such installation will be allowed provided:

- 1.) The pump is not installed under water for more than one (1) month.
- 2.) Immediately upon satisfactory completion of the test, the pump is removed, thoroughly dried, repacked in the original shipping container, and placed in a temperature controlled storage area.
- 3.) Before placing pump into service, pump should be brought to operational temperature range. Excessive or direct heating or cooling should **NOT** be used.

**OPERATION TEMPERATURE RANGE:** +35°F (2°C) to 104°F (40°C).

### SERVICE CENTERS:

For the location of the nearest Barnes Service Center, check your Barnes representative or Crane Pumps & Systems, Inc., Service Department in Piqua, Ohio, telephone (937) 778-8947 or in Brampton, Ontario, Canada (905) 457-6223.

### INSTALLATION:

**Location** - The pump is designed with pipe legs to keep a minimum of 3 inch clearance. **THIS PUMP MUST BE INSTALLED WITH A MINIMUM OF 3 INCHES CLEARANCE UNDER THE PUMP FOR THE ENTRANCE OF SEWAGE SOLIDS.**

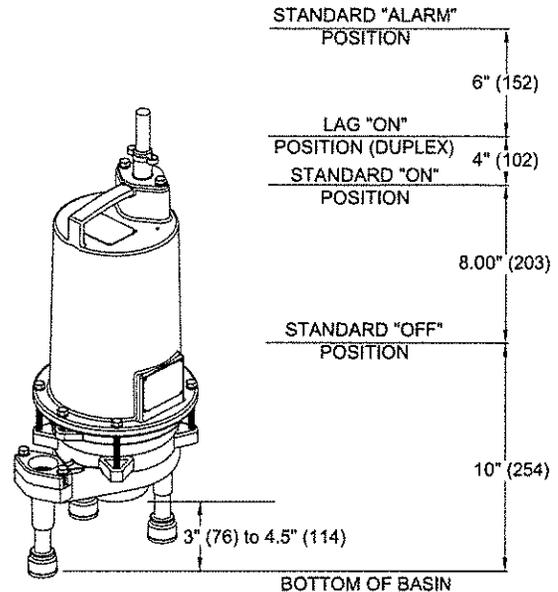


FIGURE 3 - L Series (For Automatic see Level Control manual)

**Discharge** - Assemble discharge piping or hose assembly (whichever is required by your application), to the pump. Discharge piping should be as short as possible. Both a check valve and a shut-off valve are required for each pump being used. The check valve is used to prevent backflow into the sump. Excessive backflow can cause flooding and/or damage to the pump. The shut-off valve is used to stop system flow during pump or check valve servicing. If pump is installed with a discharge hose rather than a moveable fitting assembly, make sure the discharge pipe has a 1/8" dia. hole approx. 5" from end nearest volute and oriented towards the pump body.

### ELECTRICAL CONNECTIONS:

**Pump Cords** - The quick connect cord assembly mounted to the pump must **NOT** be modified in any way except for shortening to a specific application. Any supply cables connections between the pump and the control panel must be made in accordance with the National Electric Code or the Canadian Electric Code and all applicable state, province and local electric codes. It is recommended that a junction box, be mounted outside the sump or be of at least Nema 4 (EEMAC-4) construction if located within the wet well. **DO NOT USE THE POWER OR CONTROL CABLES TO LIFT PUMP!**

**Overload Protection** - The type of in-winding overload protector used is referred to as an inherent overheating protector and operates on the combined effect of temperature and current. This means that the overload protector will trip out and shut the pump off if the windings become too hot, or the load current passing through them becomes too high. It will then automatically reset and start the pump up after the motor cools to a safe temperature. In the event of an overload, the source of this condition should be determined and rectified immediately. **DO NOT LET THE PUMP CYCLE OR RUN IF AN OVERLOAD CONDITION OCCURS !**

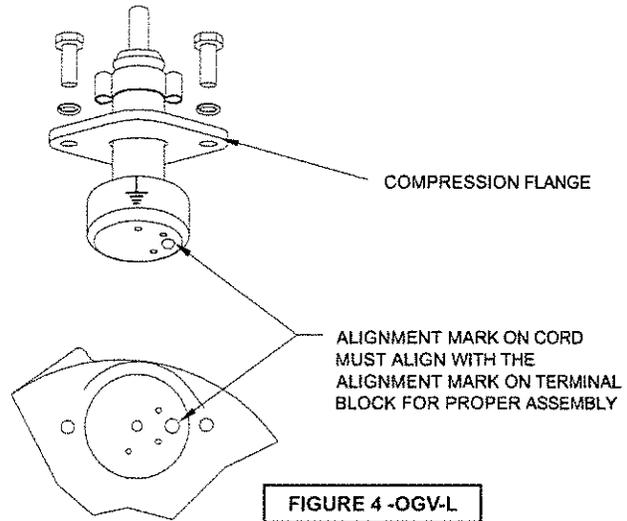
**Wire Size** - If additional cord is required consult a qualified electrician for proper wire size.

**CORD CONNECTIONS:**

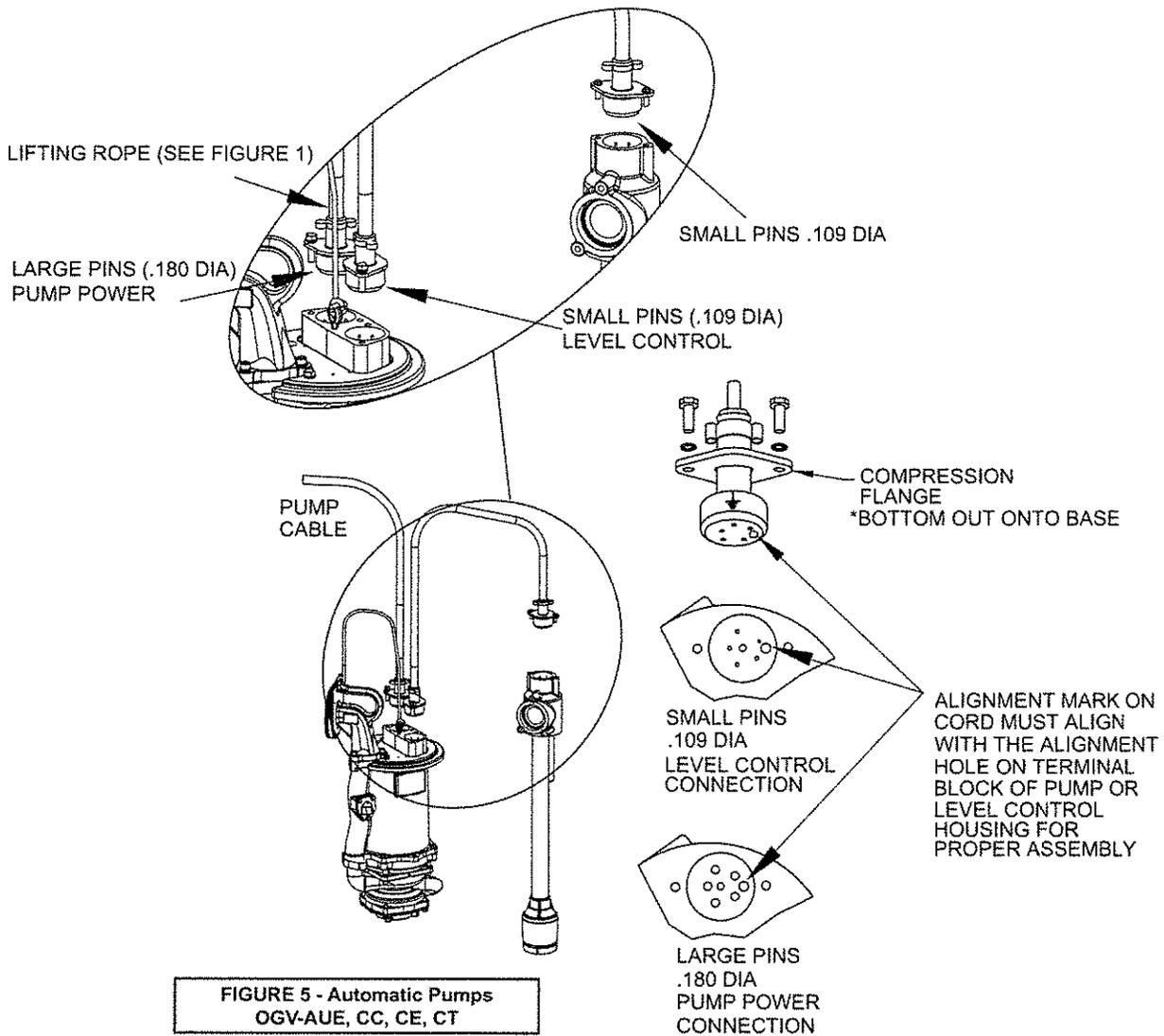
**Power/Control Cord**- Insert female end of cord plug into housing bore aligning alignment mark with hole in terminal block see Figures 4 and 5. Tighten bolts on compression flange until flush with motor housing.

Pump Power - Large Pin  
Level Control - Small Pin

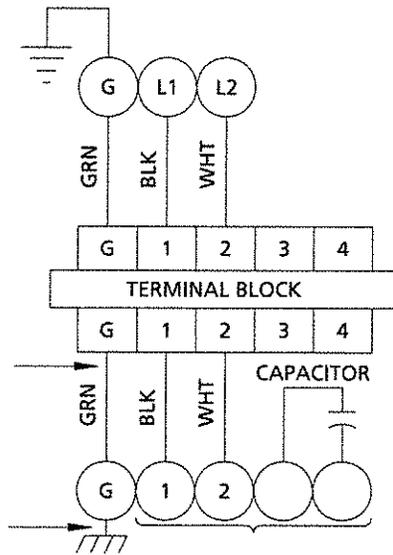
Level control cord has molded fitting at both ends of the cord. Install one end to the Pump and the other end to the Level Control.



**FIGURE 4 -OGV-L**

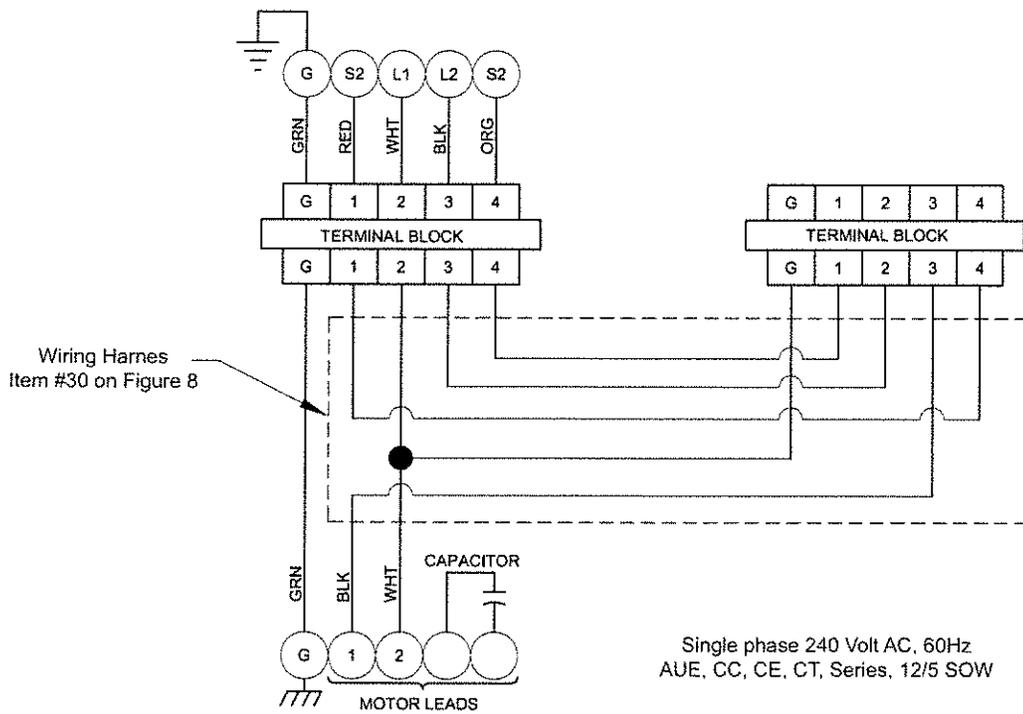


**FIGURE 5 - Automatic Pumps  
OGV-AUE, CC, CE, CT**



**FIGURE 6**

Single phase 240 Volt AC, 60Hz  
"L" Series, 12/3 SOW



**FIGURE 7**

Single phase 240 Volt AC, 60Hz  
AUE, CC, CE, CT, Series, 12/5 SOW

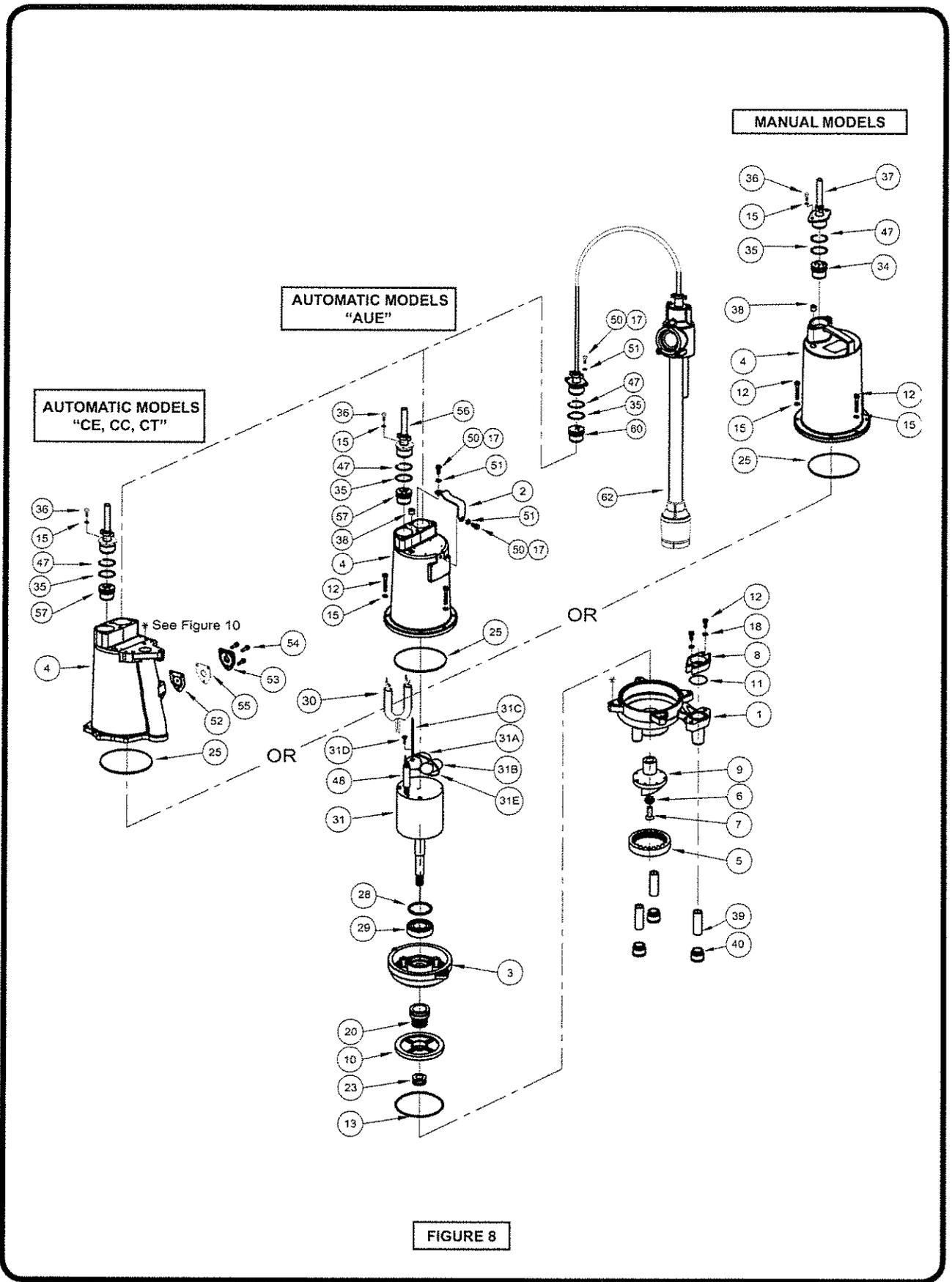
## TROUBLE SHOOTING

**CAUTION !** Always disconnect the pump from the electrical power source before handling.  
If the system fails to operate properly, carefully read instructions and perform maintenance recommendations.  
If operating problems persist, the following chart may be of assistance in identifying and correcting them:

**MATCH "CAUSE" NUMBER WITH CORRELATING "CORRECTION" NUMBER.**

**NOTE:** Not all problems and corrections will apply to each pump model.

PROBLEM	CAUSE	CORRECTION
Pump will not run	<ol style="list-style-type: none"> <li>1. Poor electrical connection, blown fuse, tripped breaker or other interruption of power, improper power supply.</li> <li>2. Motor or switch inoperative (to isolate cause, go to manual operation of pump).                             <ol style="list-style-type: none"> <li>2a. Float movement restricted.</li> <li>2b. Switch will not activate pump or is defective.</li> <li>3a. Insufficient liquid level.</li> <li>3b. Switch is unable to activate</li> </ol> </li> </ol>	<ol style="list-style-type: none"> <li>1. Check all electrical connections for security. Have electrician measure current in motor leads, if current is within <math>\pm 20\%</math> of locked rotor Amps, impeller is probably locked. If current is 0, overload may be tripped. Remove power, allow pump to cool, then recheck current.</li> <li>2a. Reposition pump or clean basin as required to provide adequate clearance for float.</li> <li>2b. Disconnect level control. Set ohmmeter for a low range, such as 100 ohms full scale and connect to level control leads. Actuate level control manually and check to see that ohmmeter shows zero ohms for closed switch and full scale for open switch. (Float Switch).</li> <li>3a. Make sure liquid level is at least equal to suggested turn-on point.</li> <li>3b. Rotate ESPS level control in horizontal position.</li> </ol>
Pump will not turn off	<ol style="list-style-type: none"> <li>2a. Float movement restricted.</li> <li>2b. Switch will not activate pump or is defective.</li> <li>4. Excessive inflow or pump not properly sized for application.</li> <li>9. Pump may be airlocked.</li> <li>14. H-O-A switch on panel is in "HAND" position</li> </ol>	<ol style="list-style-type: none"> <li>4. Recheck all sizing calculations to determine proper pump size.</li> <li>5. Check discharge line for restrictions, including ice if line passes through or into cold areas.</li> <li>6. Remove and examine check valve for proper installation and freedom of operation.</li> <li>7. Open valve.</li> <li>8. Check cutter for freedom of operation, security and condition. Clean cutter and inlet of any obstruction.</li> <li>9. Loosen union slightly to allow trapped air to escape. Verify that turn-off level of switch is set so that the suction is always flooded. Clean vent hole.</li> <li>10. Remove &amp; examine for damage. Replace pump stator if required.</li> <li>11. Repair fixtures as required to eliminate leakage.</li> </ol>
Pump hums but does not run	<ol style="list-style-type: none"> <li>1. Incorrect voltage</li> <li>8. Cutter jammed or loose on shaft, worn or damaged, inlet plugged.</li> </ol>	<ol style="list-style-type: none"> <li>4. Recheck all sizing calculations to determine proper pump size.</li> </ol>
Pump delivers insufficient capacity	<ol style="list-style-type: none"> <li>1. Incorrect voltage.</li> <li>4. Excessive inflow or pump not properly sized for application.</li> <li>5. Discharge restricted.</li> <li>6. Check valve stuck closed or installed backwards.</li> <li>7. Shut-off valve closed.</li> <li>8. Cutter jammed or loose on shaft, worn or damaged, inlet plugged.</li> <li>9. Pump may be airlocked.</li> <li>10. Pump stator damaged/torn.</li> </ol>	<ol style="list-style-type: none"> <li>5. Check discharge line for restrictions, including ice if line passes through or into cold areas.</li> <li>6. Remove and examine check valve for proper installation and freedom of operation.</li> <li>7. Open valve.</li> <li>8. Check cutter for freedom of operation, security and condition. Clean cutter and inlet of any obstruction.</li> <li>9. Loosen union slightly to allow trapped air to escape. Verify that turn-off level of switch is set so that the suction is always flooded. Clean vent hole.</li> <li>10. Remove &amp; examine for damage. Replace pump stator if required.</li> <li>11. Repair fixtures as required to eliminate leakage.</li> <li>12. Check pump temperature limits &amp; fluid temperature.</li> <li>13. Replace portion of discharge pipe with flexible connector.</li> <li>14. Turn to automatic position.</li> <li>15. Check for leaks around basin inlet and outlets.</li> </ol>
Pump cycles too frequently or runs periodically when fixtures are not in use	<ol style="list-style-type: none"> <li>6. Check valve stuck closed or installed backwards.</li> <li>11. Fixtures are leaking.</li> <li>15. Ground water entering basin.</li> </ol>	<ol style="list-style-type: none"> <li>10. Remove &amp; examine for damage. Replace pump stator if required.</li> <li>11. Repair fixtures as required to eliminate leakage.</li> <li>12. Check pump temperature limits &amp; fluid temperature.</li> <li>13. Replace portion of discharge pipe with flexible connector.</li> <li>14. Turn to automatic position.</li> <li>15. Check for leaks around basin inlet and outlets.</li> </ol>
Pump shuts off and turns on independent of switch, (trips thermal overload protector). <b>CAUTION!</b> Pump may start unexpectedly. Disconnect power supply.	<ol style="list-style-type: none"> <li>1. Incorrect voltage.</li> <li>4. Excessive inflow or pump not properly sized for application.</li> <li>8. Cutter jammed, loose on shaft, worn or damaged, inlet plugged.</li> <li>12. Excessive water temperature.</li> </ol>	<ol style="list-style-type: none"> <li>12. Check pump temperature limits &amp; fluid temperature.</li> <li>13. Replace portion of discharge pipe with flexible connector.</li> <li>14. Turn to automatic position.</li> <li>15. Check for leaks around basin inlet and outlets.</li> </ol>
Pump operates noisily or vibrates excessively	<ol style="list-style-type: none"> <li>4. Operating at too high a pressure.</li> <li>5. Discharge restricted.</li> <li>8. Cutter broken.</li> <li>13. Piping attachments to building structure too rigid or too loose.</li> </ol>	



## PARTS KITS

**Seal Repair Kit.....P/N: 108303**

**Overhaul Kit ..... P/N: 127238**

**Cutter Kit .....P/N: 108330**

Item #'s 6,7,12,13,15,20,25,26,35,36,47

108303 & Item #'s 9, 18, 28, 29, 31A, 31B, 31C, 31D, 38

Item #'s 5,6,7,9,15,19,23

## PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION
1	1	108344 118246	Volute Volute (CE, CC, CT)
2	1	110331	Handle (AU model)
3	1	108343	Seal Plate
4	1	108342 110328 118256	Motor Housing (STD) Motor Housing (AU model) Motor Housing (CE, CC, CT)
5	1	082085A 082085B	Shredding Ring (OGVF) Shredding Ring (OGVH)
6	1	067556	Washer
7	1	070704	Skhd Screw, 1/4-20 x .75" SS
8	1	108369 †	Discharge Flange 1-1/4" NPT
9	1	082088	Radial Cutter
10	1	109026B 109026BTD	Impeller, 5.62" Dia. (OGVH) Impeller, 5.13" Dia. (OGVF)
11	1	625-01558	O-Ring (-223)
12	4	1-131-1 †	Screw, 5/16-18 x 1.25" SS
13	1	067564	Square Ring
15	14	026322	Lockwasher, 5/16" SS
16	A/R	-----	LOCTITE™ RC609
17	A/R	-----	LOCTITE 242
18	2	062941 †	5/16" Flatwasher
20	1	110395SD	Seal, outer Silicon-Carbide (STD)
22	A/R	-----	Permatex Sealent 2C
23	1	016079	Shim set
24	3 Qts.	029034	Cooling Oil - Mtr. Housing
25	1	095368	Square Ring
26	4	1-300-1	Screw, 5/16-18 x 1.25", SS
28	1	061143	Retaining Ring
29	1	Q10-36-E4	Ball Bearing, Lower
30	1	113287	Wiring Harnes (Automatic)
31	1	108368**	Motor, 2HP, 240 Volt, 1 Phase w/capacitors & Ground wire (Supplied with Upper Bearing)
31A	1	112470	Capacitor, Run
31B	1	099198	Capacitor, Start
31C	1	105111B	Ground wire
31D	1	016660	Screw, Self-Tap #8-32 x .31"
31E	6	039462	Cable tie strap
34	1	103760	Terminal Block, Power, Manual
35	1 or 2	2-31051-224	O-Ring
36	2	1-156-1	Screw, 5/16-18 x 1.00" SS

ITEM	QTY	PART NO.	DESCRIPTION
37	1	109498XC 109498	12/3 Cord Set, 30 Ft 15Ft Cord on CC, CE,CT
38	1	014270	Pipe Plug, C'sunk, 3/8" NPT
39	3	110660	1/2" x 2-1/2" Nipple
40	3	111328	1/2" x 1" Reducer
47	1 or 2	105197	Retaining Ring
48	1 or 2	625-02117	Sleeving
* Models with ESPS Level Control			
50	4	1-156-1	Screw, 5/16-18 x .1" SS
51	4	026322	Lockwasher, 5/16" SS
52	1	119104B	Gasket
53	1	112422	Anti-Siphon Cover
54	3	03121-B	HxHd Screw 1/4-20 x .75" SS
55	1	105377B	Anti-Siphon Cover Plate
56	1	113274XC 113274 EcoTRAN	12/5 Cord Set 30Ft.- (AU) 15 FT on CC, CE, CT Cord Set (CE - See manual 119061)
57	1	113271	Terminal Block, Power
60	1	113272	Terminal Block, Level Control
62	1	121676-M 119068	ESPS-150 Level Control (AUE) CE Only

Contact your local Distributor or the Factory for other impeller sizes, seal materials, cord lengths and other optional equipment.

(\*) AUE - ESPS Level Control

(\*\*) Items 31A thru 31E are included with item 31 motor.

(†) L Series Only. NOT USED ON CC, CE, CT.

**MOVEABLE ASSEMBLY P/N: 116594\* & 116595\* PARTS LIST**  
**For 2HP OGV-L & AUE Grinder, "C" Channel Basin Package**

ITEM	QTY.	PART No.	DESCRIPTION
1	1	112354	Check Valve/Upper Moveable
2	1	116603 116604	Upper Pump Bracket Assy - 116594 OGV Upper Pump Bracket Assy - 116595 OGV-AU
3	1	075589	Pipe Nipple
4	1	107360	Lower Guide Bracket Assy

(\* ) Pump **NOT** included under this part number. The Moveable Assembly will be factory assembled to pump when a Basin Package Sytem is ordered.

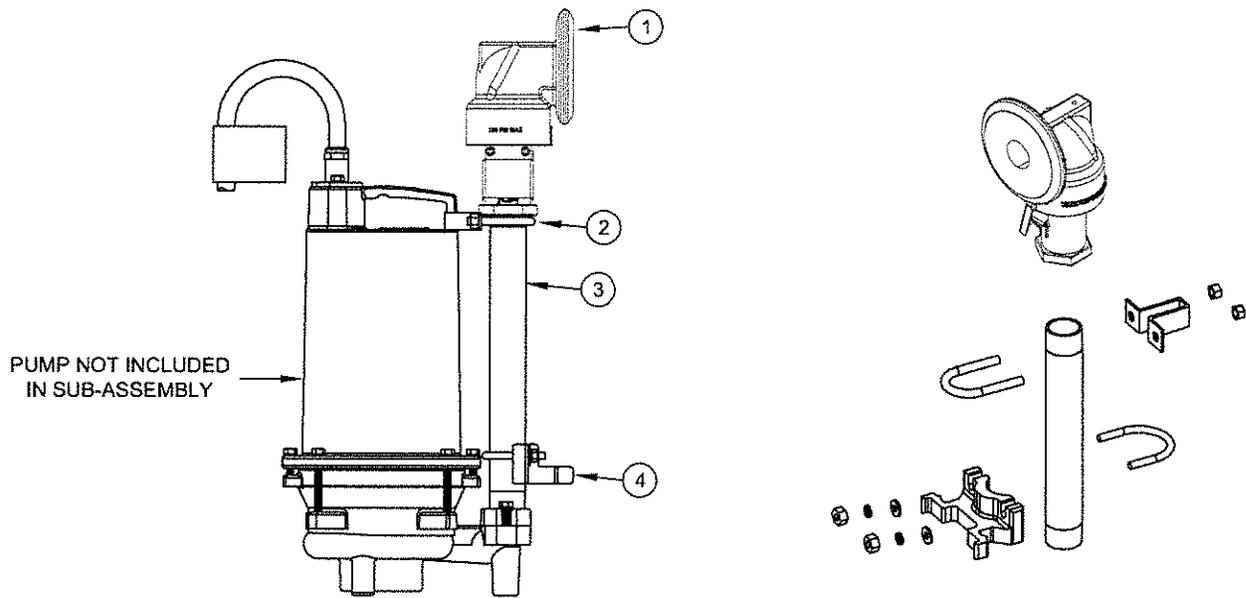


FIGURE 9

### DISCHARGE ASSEMBLIES for CC, CE & CT Grinder Pumps

ITEM	QTY.	PART No.	DESCRIPTION
1	1	121225	O-ring, 4mm
2	1	118251	Valve Seat Flapper, Brz
3	1	118252	Gasket
4	2	112725	Pin .125 x .75 SS
5	3	1-156-1	HXHD Screw 5/16-18 x 1.00" SS
6	3 or 6	026322	Lock Washer 5/16 SS
7A	1	TBD	Valve Body (CC)
7B	1	118250	Valve Body (CE)
7D	1	TBD	Valve Body (CT)
8	1	118253	Pump Support Plate
9	1	119854	Diaphragm
10	1	118248	Diaphragm Retaining Plate
11	8	118267	FHHS Screw #10-32 x .75" SS
12	3	2-23030-50	SkHd Screw 5/16-18 x 1.25" Lg

The Discharge Assembly will be factory assembled to pump.

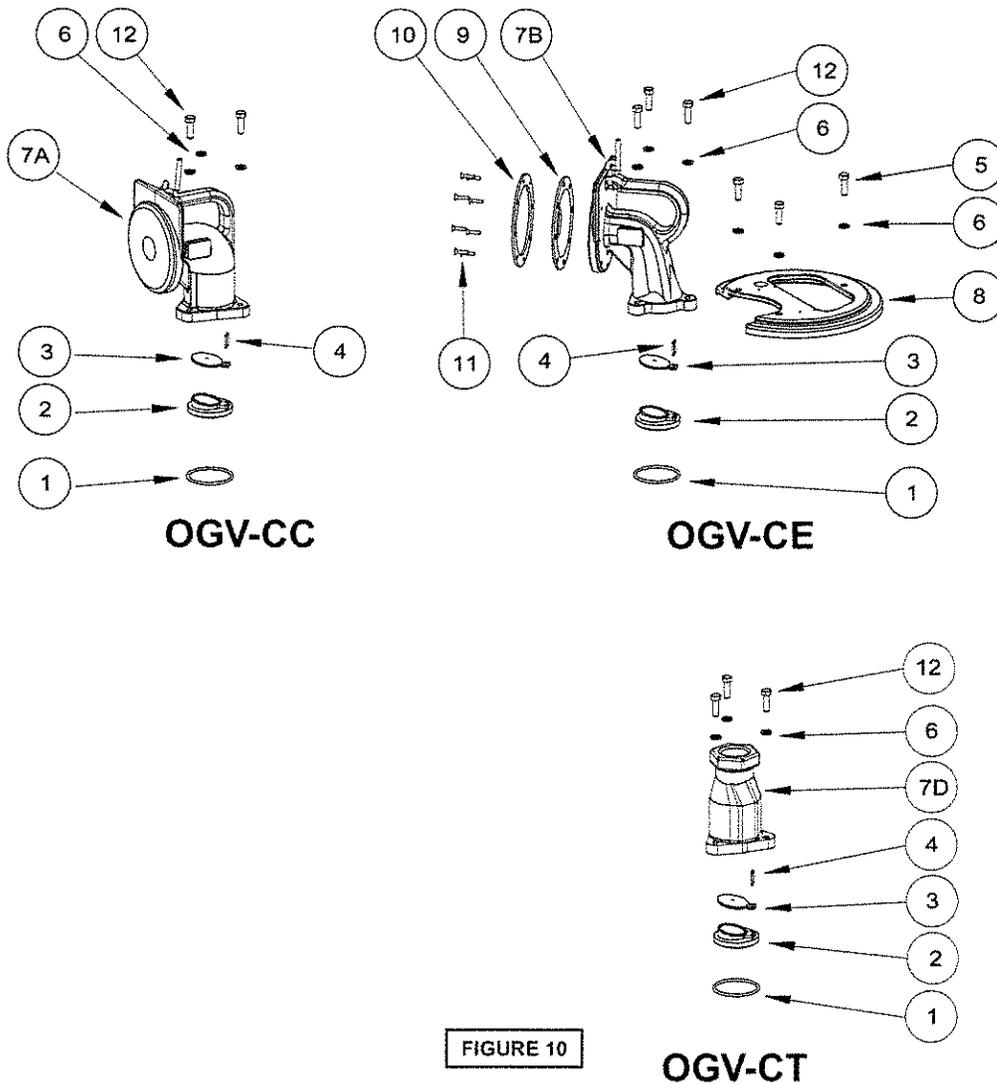


FIGURE 10

**BARNES**



**burks**

**WEINMAN**

**DEMING**

**PROSSER**

## Limited 24 Month Warranty

Crane Pumps & Systems warrants that products of our manufacture will be free of defects in material and workmanship under normal use and service for twenty-four (24) months after manufacture date, when installed and maintained in accordance with our instructions. This warranty gives you specific legal rights, and there may also be other rights which vary from state to state. In the event the product is covered by the Federal Consumer Product Warranties Law (1) the duration of any implied warranties associated with the product by virtue of said law is limited to the same duration as stated herein, (2) this warranty is a LIMITED WARRANTY, and (3) no claims of any nature whatsoever shall be made against us, until the ultimate consumer, his successor, or assigns, notifies us in writing of the defect, and delivers the product and/or defective part(s) freight prepaid to our factory or nearest authorized service station. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply. **THE SOLE AND EXCLUSIVE REMEDY FOR BREACH OF ANY AND ALL WARRANTIES WITH RESPECT TO ANY PRODUCT SHALL BE TO REPLACE OR REPAIR AT OUR ELECTION, F.O.B. POINT OF MANUFACTURE OR AUTHORIZED REPAIR STATION, SUCH PRODUCTS AND/OR PARTS AS PROVEN DEFECTIVE. THERE SHALL BE NO FURTHER LIABILITY, WHETHER BASED ON WARRANTY, NEGLIGENCE OR OTHERWISE.** Unless expressly stated otherwise, guarantees in the nature of performance specifications furnished in addition to the foregoing material and workmanship warranties on a product manufactured by us, if any, are subject to laboratory tests corrected for field performance. Any additional guarantees, in the nature of performance specifications must be in writing and such writing must be signed by our authorized representative. Due to inaccuracies in field testing if a conflict arises between the results of field testing conducted by or for user, and laboratory tests corrected for field performance, the latter shall control. **RECOMMENDATIONS FOR SPECIAL APPLICATIONS OR THOSE RESULTING FROM SYSTEMS ANALYSES AND EVALUATIONS WE CONDUCT WILL BE BASED ON OUR BEST AVAILABLE EXPERIENCE AND PUBLISHED INDUSTRY INFORMATION. SUCH RECOMMENDATIONS DO NOT CONSTITUTE A WARRANTY OF SATISFACTORY PERFORMANCE AND NO SUCH WARRANTY IS GIVEN.**

This warranty shall not apply when damage is caused by (a) improper installation, (b) improper voltage (c) lightning (d) excessive sand or other abrasive material (e) scale or corrosion build-up due to excessive chemical content. Any modification of the original equipment will also void the warranty. We will not be responsible for loss, damage or labor cost due to interruption of service caused by defective parts. Neither will we accept charges incurred by others without our prior written approval.

This warranty is void if our inspection reveals the product was used in a manner inconsistent with normal industry practice and/or our specific recommendations. The purchaser is responsible for communication of all necessary information regarding the application and use of the product. **UNDER NO CIRCUMSTANCES WILL WE BE RESPONSIBLE FOR ANY OTHER DIRECT OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO TRAVEL EXPENSES, RENTED EQUIPMENT, OUTSIDE CONTRACTOR FEES, UNAUTHORIZED REPAIR SHOP EXPENSES, LOST PROFITS, LOST INCOME, LABOR CHARGES, DELAYS IN PRODUCTION, IDLE PRODUCTION, WHICH DAMAGES ARE CAUSED BY ANY DEFECTS IN MATERIAL AND/OR WORKMANSHIP AND/OR DAMAGE OR DELAYS IN SHIPMENT. THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER EXPRESS OR IMPLIED WARRANTY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.**

No rights extended under this warranty shall be assigned to any other person, whether by operation of law or otherwise, without our prior written approval.

**CRANE**

A Crane Co. Company

**PUMPS & SYSTEMS**

420 Third Street  
Piqua, Ohio 45356  
Phone: (937) 778-8947  
Fax: (937) 773-7157  
[www.cranepumps.com](http://www.cranepumps.com)

83 West Drive, Brampton  
Ontario, Canada L6T 2J6  
Phone: (905) 457-6223  
Fax: (905) 457-2650

**IMPORTANT!  
WARRANTY REGISTRATION**

Your product is covered by the enclosed Warranty.  
To complete the Warranty Registration Form go to:

<http://www.cranepumps.com/ProductRegistration/>

If you have a claim under the provision of the warranty, contact your local  
Crane Pumps & Systems, Inc. Distributor.

**RETURNED GOODS**

**RETURN OF MERCHANDISE REQUIRES A "RETURNED GOODS AUTHORIZATION".  
CONTACT YOUR LOCAL CRANE PUMPS & SYSTEMS, INC. DISTRIBUTOR.**



**Products Returned Must Be Cleaned, Sanitized,  
Or Decontaminated As Necessary Prior To Shipment,  
To Insure That Employees Will Not Be Exposed To Health  
Hazards In Handling Said Material. All Applicable Laws  
And Regulations Shall Apply.**

## START-UP REPORT/WARRANTY REGISTRATION FORM

This form is designed to provide assurance that customer service and a quality product are the number one priority with Crane Pumps & Systems, Inc (CP&S). Please fill out the following questions as completely and accurately as possible. When complete, mail this form to:

**In U.S.A Send To:**  
Crane Pumps & Systems, Inc  
Attn: Warranty Service Group  
420 Third Street  
Piqua, Ohio 45356

**In Canada Send To:**  
Crane Pumps & Systems, Inc.  
Attn: Service Manager  
83 West Drive, Brampton  
Ontario, Canada L6T 2J6

### REPORTS THAT ARE NOT RETURNED CAN DELAY OR VOID WARRANTY.

Pump Owner's Name: \_\_\_\_\_

Address: \_\_\_\_\_

Location of Installation \_\_\_\_\_

Person in Charge \_\_\_\_\_ Phone \_\_\_\_\_

Purchased From (Crane Pumps & Systems Representative/Distributor) \_\_\_\_\_

Pump Model \_\_\_\_\_ Serial No. \_\_\_\_\_

Part Number \_\_\_\_\_

Voltage \_\_\_\_\_ Phase \_\_\_\_\_ Hertz \_\_\_\_\_ Horespower \_\_\_\_\_

Rotation: Direction of impeller rotation (Use C/W for clockwise, CC/W for counter-clockwise) \_\_\_\_\_

Method used to check rotation (viewed from bottom) \_\_\_\_\_

Does impeller turn freely by hand: Yes \_\_\_\_\_ No \_\_\_\_\_

Condition of cord jacket Good \_\_\_\_\_ Fair \_\_\_\_\_ Poor \_\_\_\_\_

Resistance of cord and pump motor (measured at pump control) **NOTE: Can't check on automatic units.**

White-Black \_\_\_\_\_ Ohms

Resistance of Ground Circuit between Control Panel and outside of pump \_\_\_\_\_ Ohms

MEG Ohms check of insulation: White to Ground \_\_\_\_\_ Black to Ground \_\_\_\_\_

Was Equipment Stored? \_\_\_\_\_ Length of Storage \_\_\_\_\_

Liquid being pumped \_\_\_\_\_

Debris in bottom of station? \_\_\_\_\_ Was debris removed in your presence? \_\_\_\_\_

#### If Floats Used for Level Control:

- A. Tip bottom two floats (All pumps should remain off).
- B. Tip third float, (and OFF float) one pump comes on.
- C. Tip fourth float (and OFF float), high level alarm on (on simplex) (both pumps on)

#### For ESPS Level Control:

Check ESPS manual for diagnostic tips.

Is the control panel used a Barnes control panel? Yes \_\_\_\_\_ No \_\_\_\_\_

Barnes Pumps Control panel part number \_\_\_\_\_

### ELECTRICAL READINGS:

Single Phase:

Voltage supply at panel line connection, Pump Off, L1, L2 \_\_\_\_\_

Voltage supply at panel line connection, Pump On, L1, L2 \_\_\_\_\_

Amperage: Load connection, Pump On, L1 \_\_\_\_\_ L2 \_\_\_\_\_

### FINAL CHECK:

Flow; Does station appear to operate at proper rate? \_\_\_\_\_ Pump down time \_\_\_\_\_

Comments: \_\_\_\_\_

Equipment difficulties during Start-Up: \_\_\_\_\_

### MANUALS:

Has operator received pump instructions and parts manual? \_\_\_\_\_

I Certify this report to be accurate (Name of Start-Up person) \_\_\_\_\_

Employed by: \_\_\_\_\_ Date: \_\_\_\_\_

