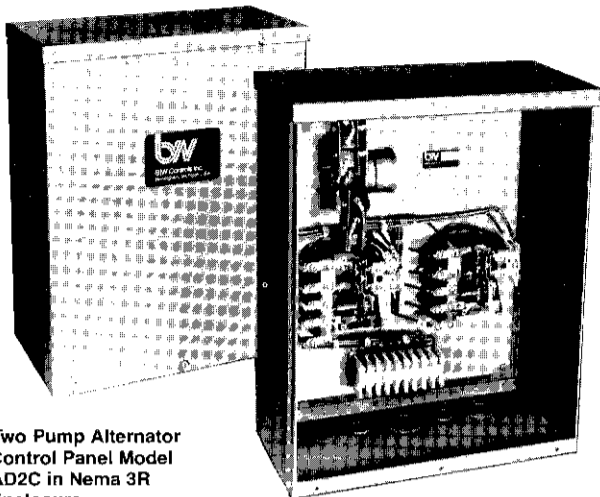


### AUTOMATIC ALTERNATOR PANELS



**Two Pump Alternator Control Panel Model AD2C in Nema 3R Enclosure**

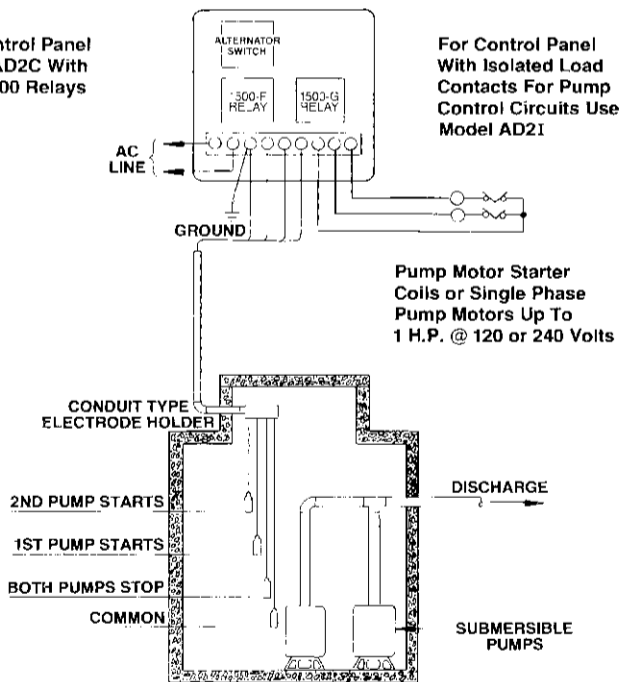
#### TYPICAL PUMP DOWN SYSTEM

The diagram below illustrates a basic pump down control used on systems for storm drainage condensate return, septic tank effluent, sewage lift stations, water soluble machine tool coolants, and cooling tower sumps.

While any of the BIW relays can be furnished, the Type 1500 induction relays are indicated. These have heavy duty load contacts that are capable of directly operating single phase pumps up to 1 H.P. @ 120 or 240 Volts A.C., or up to size 5 motor starter coils.

The Model AD2C for pump down (or AU2C for pump up) has a common power supply thru the BIW panel to energize the pump control circuits. For many applications it is desirable to have the pump motors and/or their motor starters on their own power supplies. For these situations Model AD2I for pump down or AU2I for pump up) has an isolated load contact for each pump control circuit and should be used.

**BIW Control Panel Model AD2C With Type 1500 Relays**



BIW Alternators are compact packaged units designed to provide automatic change in the operating sequence of any number of pumps on either "pump down" or "pump up" level control applications. They provide uniform usage of all pumps under normal operating conditions—yet permit use of full pumping capacity during peak load periods.

#### DESIGN FEATURES

Sequence changing is accomplished with a motor operated switch that has proved its reliability on thousands of applications. This alternator provides momentary time delay to prevent false operation or rapid cycling, and it retains proper sequencing even after a power failure. In addition there are two BIW level detecting relays and all controls are wired to barrier type terminal blocks.

Enclosures are available to meet all indoor and outdoor location requirements. A complete easy to read system wiring diagram is provided showing all of the field connections so that installation is quick and easy.

#### EXTRA FEATURES

Models can quickly be furnished to meet special application requirements. Extra features include: selector switches, pilot lights, and additional control functions. Also, alternators can be combined with signals and alarms as described on page 4. Systems complete with motor starters are shown on pages 8 & 9.

#### OPTIONAL SEQUENCING ARRANGEMENTS

The standard method of alternation automatically changes the sequence after each pumping operation after all pumps have stopped. Sometimes other methods of operation may be desirable and Patriot offers a choice. When manual sequence selection is desired, a rotary selector switch is provided and it can be located either on the cover or on the backplate inside the enclosure.

Many systems have continuous flow, and multiple pumps are used to handle the varying load conditions. For these applications BIW has a rotating sequence alternator that will change the pumps in operation whenever there is a significant change in the reservoir level. The pump that has been idle the longest will be added to those running, or the pump that has been running the longest will be stopped. Systems are available for up to 10 pumps.

In addition, BIW alternators can be built to operate fewer pumps than the maximum design number—with provisions made for easy conversion in the field to add the additional pumps when the need arises.

Contact us for assistance to meet your special requirements.

### AUTOMATIC ALTERNATOR PANELS

Catalog Number Example

8040-AU2I-X-L2-N4-1500-S8

ENCLOSURE	
OC	Open Chassis
N1	NEMA 1
N3R	NEMA 3R — Only for 2 Pump Alternators
N4	NEMA 4
N12	NEMA 12

LINE VOLTAGE	
L1	115 Volt 50/60 Hz
L2	208-230 Volt 50/60 Hz
L3	460 Volt 50/60 Hz
L4	575 Volt 50/60 Hz

OPTIONAL FEATURES	
X	None
HOA	Hand-off-Auto Switches, one for each pump mounted on cover with data plate
MA	Manual Alteration with sequence selector switch mounted on cover (specify detailed function of selector switch)
ROT	Rotating Sequence Alternation. For 4 or more pumps to equalize flow.
O	Other-Specify Details

RELAY SENSITIVITY	
S1-S11	Select from Chart Sec. 1500
LF1, HF2	Select from Chart Section 5200
LV1-2 HV3-4-5	Select from Chart Section 5200
V	Select from Chart Section 5300
F1-F8	Select from Chart Section 5300

RELAY TYPE	
1500	Induction Type 1500
5200-L	Series 5200-low sensitivity
5200-H	Series 5200-high sensitivity
5300-S	Series 5300-10 amp contacts
5300-P	Series 5300-25 amp contacts
5510	Series 5510-10 amp contacts

#### STANDARD PUMP DOWN ALTERNATORS

	NUMBER OF PUMPS	NUMBER OF ELECTRODES <sup>1</sup>	CONTROL DESCRIPTION	STANDARD OPERATION
AS2C <sup>2</sup>	2	None	Operates from single pole control devices such as relays, pressure switches, etc. Power for motor starter coils comes from B W control panel. (See Note <sup>1</sup> )	Pumps are started one at a time on "rising" level and all are stopped simultaneously at the desired "low" level. The starting sequence is then changed for the next cycle of operation.
AD2C	2	4	Power for the starter coils comes from B W control panel.	
AD2I	2	4	Has isolated load contacts which provide for standard two wire control of motor starters or remote control devices	
AD3I	3	5	Same as AD2I except for number of pumps and electrodes.	
AD4I	4	6	Same as AD2I except for number of pumps and electrodes.	

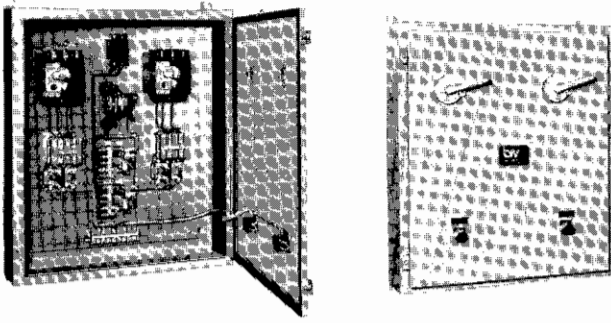
#### STANDARD PUMP UP ALTERNATORS

	NUMBER OF PUMPS	NUMBER OF ELECTRODES <sup>1</sup>	CONTROL DESCRIPTION	STANDARD OPERATION
AS2C <sup>2</sup>	2	None	Operates from single pole control devices such as relays, pressure switches, etc. Power for motor starter coils comes from B W control panel. (See Note <sup>2</sup> )	Pumps are started one at a time on "falling" level and all are stopped simultaneously at the desired "high" level. The starting sequence is then changed for the next cycle of operation.
AU2C	2	4	Power for the starter coils comes from B W control panel.	
AU2I	2	4	Has isolated load contacts which provide for standard two wire control of motor starters or remote control devices. Designed for use with either standard or Ice Free electrode assemblies. Also, for hydropneumatic tank control as well as ordinary pump up systems.	
AU3I	3	5	Has isolated load contacts which provide for standard two wire control of motor starters or remote control devices.	
AU4I	4	6	Same as AU3I except for number of pumps and electrodes.	

**Note<sup>1</sup>:** All alternators listed above are designed for use with one electrode to start each pump and one electrode to stop all pumps. A common electrode is included and it may be omitted if a dependable ground return connection to the liquid is provided by other means.

**Note<sup>2</sup>:** No "Relay Type" or "Relay Sensitivity" option available

## AUTOMATIC ALTERNATOR COMBINATION STARTER PANELS



Typical Model C1B Control  
In Nema 1 General Purpose Enclosure

### FEATURES AND ADVANTAGES

**Quick, Easy Installation** — All controls assembled in compact enclosures for fast, low-cost installation.

**Greater Operator Safety** — Operating handles are interlocked with cover and incorporate provisions for padlocks. Handles must be in the OFF position before the control panel can be opened.

**Accurate, Reliable Operation** — Based on original BIW concept of using the conductivity of liquids as a means of achieving reliable level control.

**Minimum Maintenance** — All components are conservatively rated, factory tested and performance proved.

### STANDARD DUPLEX SYSTEMS

Patriot has developed a number of basic controls for automatic operation of two pumps. The components include a BIW alternator and two BIW relays suitable for the application. Two across the line magnetic starters with 3 pole fixed-trip thermal overload devices are provided along with HOA selector switches on the cover.

There is a choice of thermal magnetic trip circuit breakers, or fusible disconnect switches for motor short circuit protection.

A complete system wiring diagram with description of operation is provided so that field installation and servicing is easily accomplished.

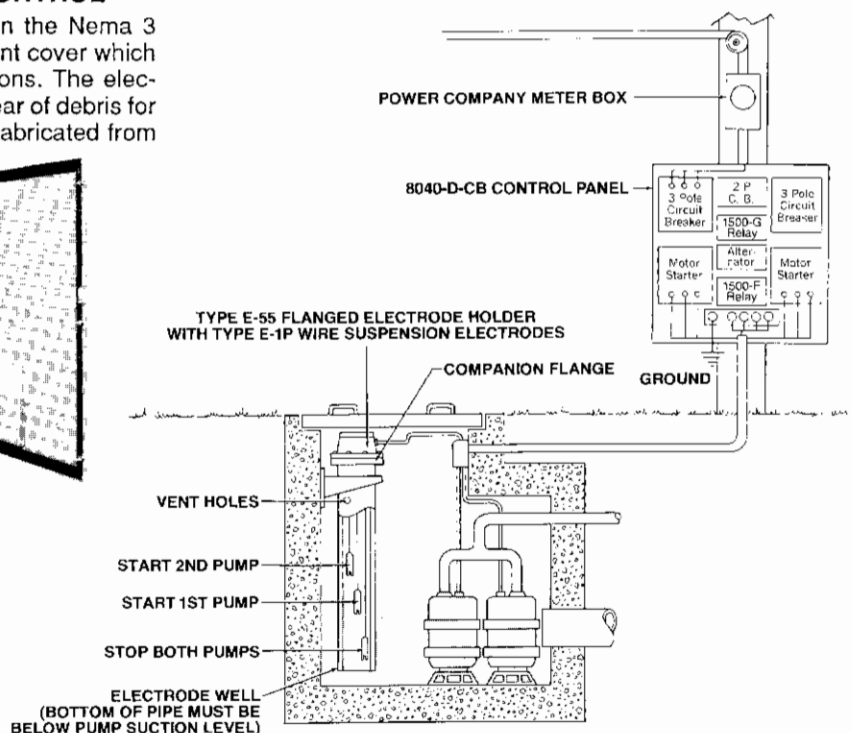
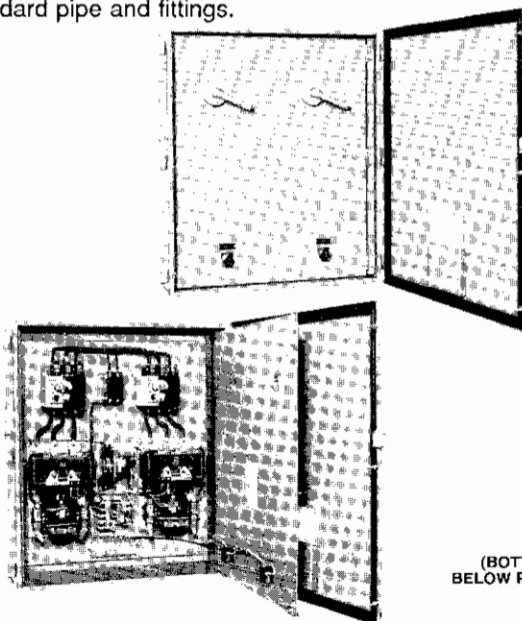
### SPECIAL CONTROL SYSTEMS

Basic duplex systems can be equipped with a variety of signals, alarms, meters, remote control or other control accessories. Also, instead of our standard automatic alternation, special sequencing or interlocking arrangements are available. Systems for more than two pumps can quickly be designed and provided.

Catalog Section 8044 shows our ability to provide custom panels. Just tell us what you want to accomplish and Patriot will provide the control system.

### TYPICAL STORM DRAIN SUMP CONTROL

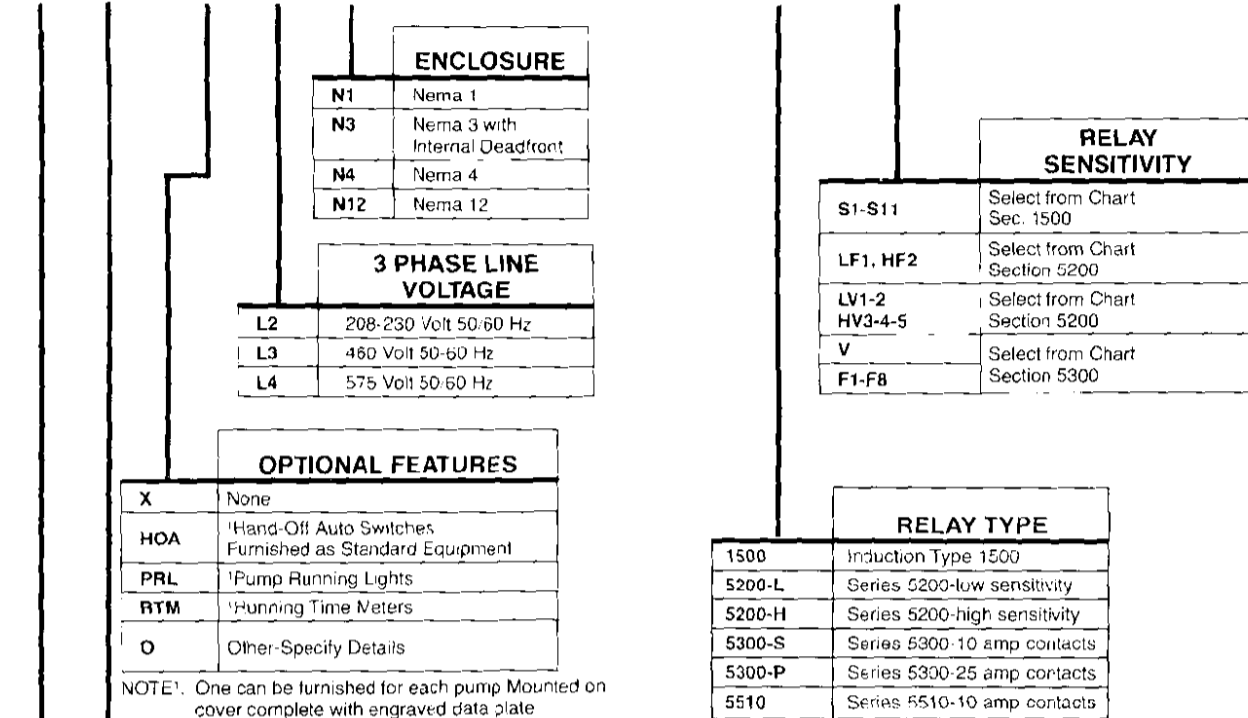
Model 8040-D-C3B control panel is shown in the Nema 3 weather tight enclosure with internal dead front cover which is designed for unattended outdoor installations. The electrode well serves to keep the liquid surface clear of debris for proper contact with the electrodes, and it is fabricated from standard pipe and fittings.



### AUTOMATIC ALTERNATOR COMBINATION STARTER PANELS

#### Catalog Number Example

8040-U-C1B2-HOA-L4-N12-1500-S7



NOTE<sup>1</sup>: One can be furnished for each pump Mounted on cover complete with engraved data plate

TYPE OF CONTROL	
D	Pump Down for 2 Pumps
U	Pump Up for 2 Pumps
H	Hydropneumatic Tank with 2 Pumps

	NEMA SIZE	LINE VOLTAGE	MAX. H.P. RATING	CIRCUIT BREAKER	
				Frame Size	Max. Amp <sup>2</sup>
C1B2	1	208-230	7½	EA	40
		460	10	FH	30
		550-600	10	FA	20
C2B2	2	208-230	15	EA	70
		460	25	FA	50
		550-600	25	FA	50
C3B2	3	208-230	25	FA	100
		208-230	30	JA	125
		460	50	FA	100
C4B2	4	550-600	50	FA	100
		208-230	50	JA	200
		460	100	JA	200
		550-600	100	JA	175

#### PANELS WITH CIRCUIT BREAKERS

NOTE<sup>2</sup>: The actual H.P. rating of the motors must be specified so that properly sized circuit breakers can be provided.

#### 4 ELECTRODES REQUIRED

These standard controls are based on two pump start electrodes and one pump stop electrode. A common electrode is included and it may be omitted if a dependable ground return connection to the liquid is provided by other means.

#### PANELS WITH FUSIBLE DISCONNECT SWITCHES

NOTE<sup>3</sup>: Fuses are not included. Proper fuses must be provided at time of installation in accordance with N.E.C. requirements

#### ORDERING INFORMATION

In addition to the complete Catalog Number, furnish details on the pump to be controlled including horsepower, voltage and full load current rating.

	NEMA SIZE	LINE VOLTAGE	MAX. H.P. RATING	DISCONNECT SWITCH
				FUSE CLIP SIZE <sup>3</sup>
C1F2	1	208-230	7½	31-60 ampere
		460	10	31-60 ampere
		550-600	10	31-60 ampere
C2F2	2	208-230	15	61-200 ampere
		460	25	61-100 ampere
		550-600	25	61-100 ampere
C3F2	3	208-230	25	61-100 ampere
		208-230	30	101-200 ampere
		460	50	101-200 ampere
C4F2	4	550-600	50	101-200 ampere
		208-230	50	201-400 ampere
		460	100	201-400 ampere
		550-600	100	201-400 ampere