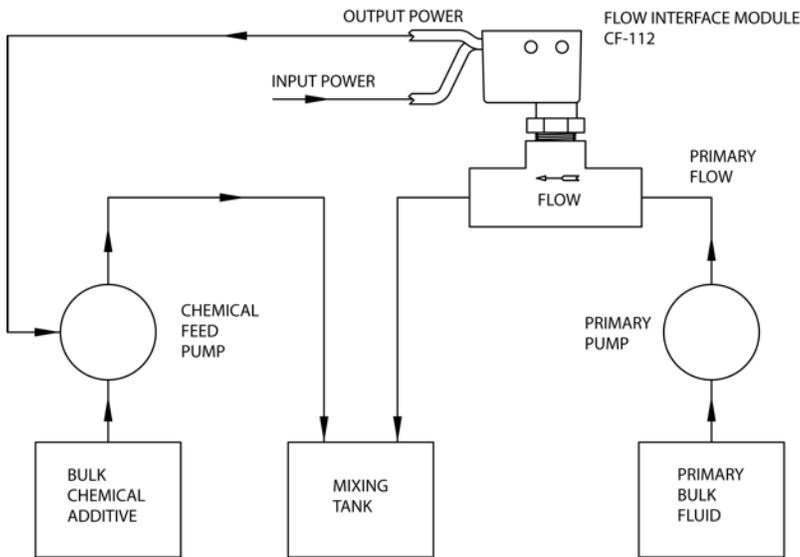


# CHEMICAL FEED PUMP INTERFACE MODULE

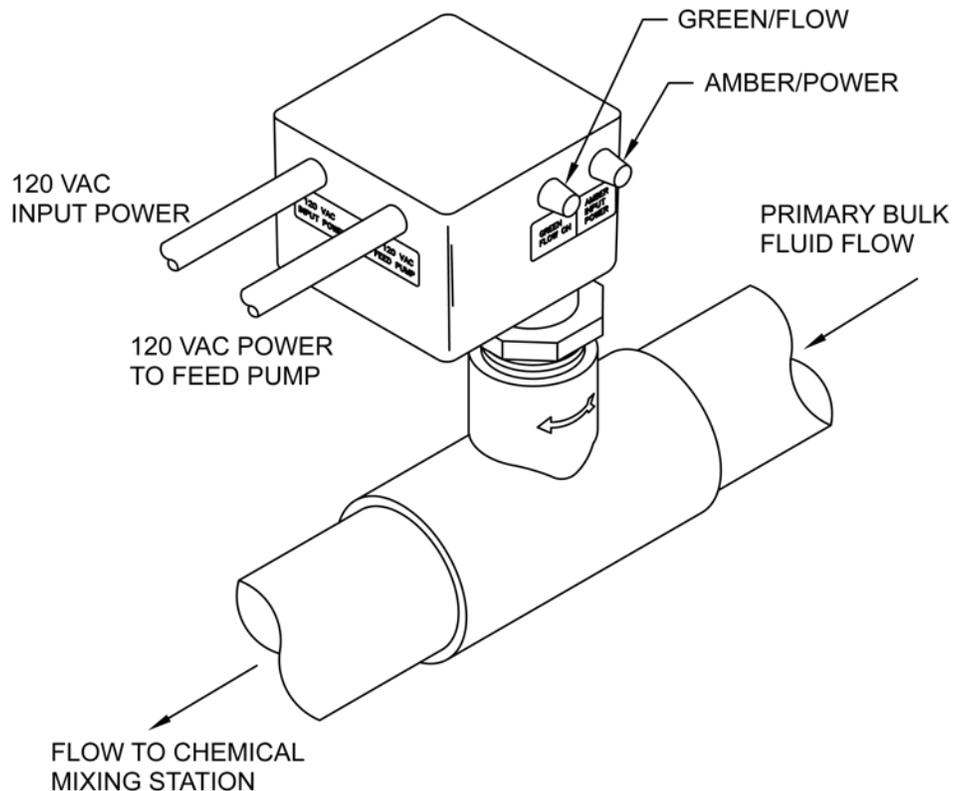
# Model CF-112

STAND ALONE INTERFACE MODULE AUTOMATICALLY ACTUATES A CHEMICAL FEED PUMP WHEN PRIMARY BULK FLUID BEGINS TO FLOW.



CF-112 Module can be used in isolated stand alone systems or as part of large complex systems.

- Ideal for metering chlorine to well water for individual homes, ranches, farms, mines, remote industrial sites.
- Adding chlorine or related chemicals to animal drinking water, e.g. chicken, cattle, pig, and similar drinking water systems.
- All manner of fluid systems involving injection of additives to primary bulk fluids in both continuous and batch systems.
- Adding chemical as required to process waste fluids.
- Adding bactericides to cooling tower makeup water plus ph/orp control.
- Boiler treatment additives.
- Metal plating make up solutions.
- Model CF-112 is available for 120 VAC 50-60 Hz power as standard.
- Feed pump to 1/3 HP.
- DC power combinations available per special order.
- Wetted surfaces are G.E. Noryl® (PPO)/316 Stainless/Epoxy or Fortron® (PPS)/ Hast.® C./Epoxy for superior long term chemical resistance.

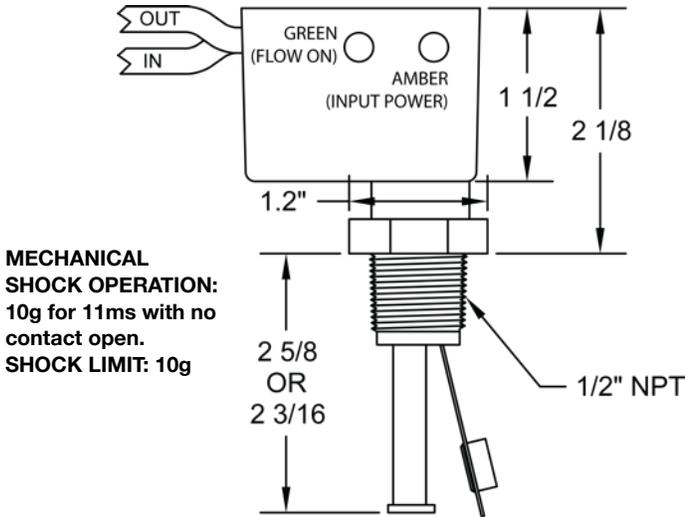


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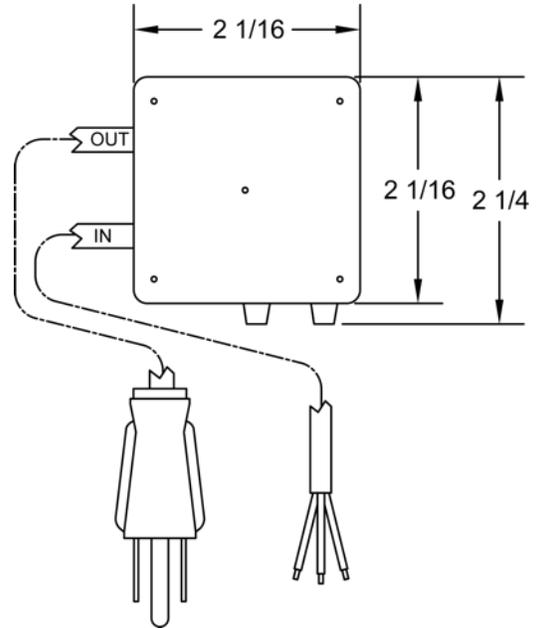
541 Kinetic Drive, Oxnard, CA 93030  
Tel: (805) 988-6800 Fax: (805) 988-6804  
Email: harwil@harwil.com

NOTE: ALL CIRCUITRY POTTED IN FLEXIBLE URETHANE FOR MAX. LONG TERM SHOCK, THERMAL, STRESS, AND MOISTURE PROTECTION.

# Model CF-112



**MECHANICAL SHOCK OPERATION:**  
10g for 11ms with no contact open.  
**SHOCK LIMIT: 10g**



## SPECIFICATIONS:

Flow ON/OFF switch set points water calibrated at 70°F.

Primary Flow Line Size (in.)	Primary Flow On/Off Switch Set Point (GPM)		CF-112 Part Number	
	ON	OFF	Noryl® (PPO) Body	Fortron® (PPS) Body
3/4 FITTED W/ 0.25" ORIFICE	0.4	0.3	CF-112N-1	CF-112CR-1
3/4 (NO ORIFICE)	2.0	1.5	CF-112N-2	CF-112CR-2
1	4	3	CF-112N-3	CF-112CR-3
1.5	13	12	CF-112N-4	CF-112CR-4
2	15	12	CF-112N-5	CF-112CR-5
3	33	25	CF-112N-6	CF-112CR-6
4	56	43	CF-112N-7	CF-112CR-7

Consult factory for larger pipes and lower ON/OFF switch set points.

## Wetted Surfaces

**Model CF-112 N**  
Noryl® (PPO)  
(10% glass fibers)  
316 Stainless Steel  
Epoxy

**Model CF-112CR**  
Fortron® (PPS)  
(40% glass fibers)  
Hastelloy® C  
Epoxy

For performance in your working fluid, see extensive corrosion resistance guide on page 49. **Free parts samples available for testing in your "exotic" unlisted fluids.**

## FEED PUMP MOTOR MAX. CONTACT RATINGS

**VOLTAGE: 120 VAC**  
**LOAD TYPE: RESISTIVE: 10A, MOTOR: 1/3 HP**  
**SWITCH CONTACTS: SPNC OR SPNO**  
**CONSULT FACTORY FOR OTHER AC MOTOR VOLTAGES PLUS DC MOTOR OPERATION.**

## Max. Nominal Operating Temperature/Pressure

**CF-112N:** 180°F @ ambient pressure / 250 Psig @ room temperature  
**CF-112CR:** 200°F @ ambient pressure / 250 Psig @ room temperature

## Sample Part #

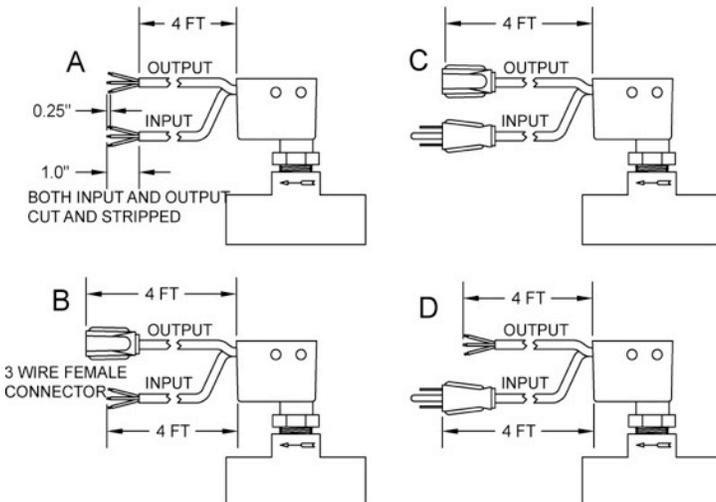
Part number from above table  
For corresponding pipe size.

Input/Output  
Cable Connection  
Configuration

**CF - 112N - 2 - NO - A**

Output Contact Configuration

NO - Normally Open  
NC - Normally Closed

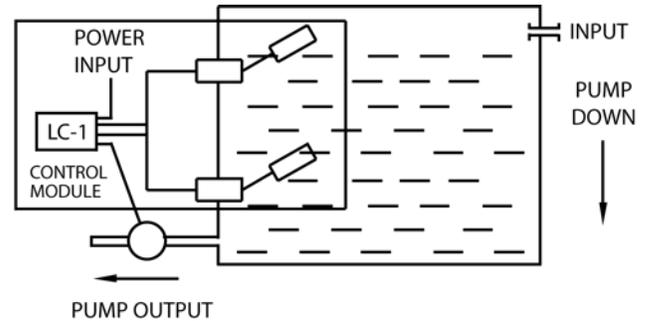
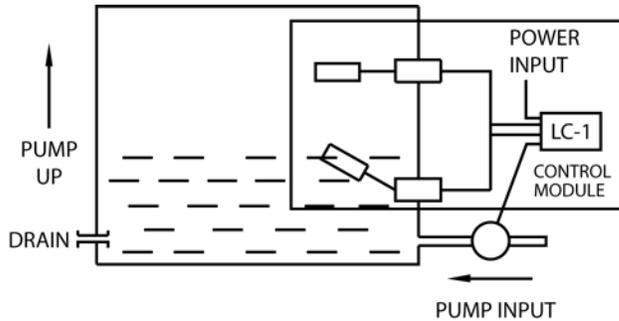


- Installation drawing and a numbered parts list is supplied with each unit.
- Current Price Information is Listed on Separate Sheet.
- Special One Day Delivery Available.

# PUMP UP/PUMP DOWN LIQUID LEVEL CONTROL

# Model LC-1 Module

The combination of any two Harwil liquid level switches and an electronic control module mounted in a weather-resistant box provide a ready-to-go system for the automatic filling or emptying of tanks or vessels.



### System is composed of:

- Electronic Latching/Unlatching Control Module
- Special electronic module design eliminates false starts due to turbulent wave action.
- Nema 4 weather resistant box with two standard 1/2" seal tight flexible conduit fittings.
- A secondary 10 amp SPDT relay output is also provided.
- Color coded w/ ring and labeled terminal strip.
- 120 or 240 VAC 50/60 Hz models available.
- 30 amp DPST motor contactor output for driving 1 1/2 (120 VAC)/3 HP (240 VAC) pumps.

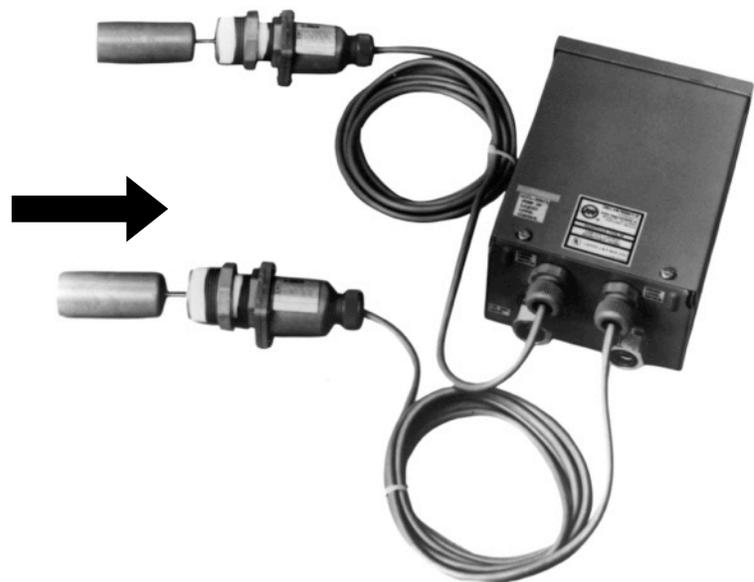
### Choose from any two Harwil liquid switch models.

- Models for clean or contaminated fluids such as water, sea water, sewage, thin slurries, contaminated ground water, etc.
- Models for strong acids, bases, hydrocarbons, alcohols, inorganics, ketones, esters or ethers.
- Each system is provided with a complete, descriptive parts list and an installation and wiring diagram for both level switches and control module.
- Maintenance and check out requires only a standard multimeter.
- LC-1 Control Module is delivered pre-wired and is ready to hook-up to control your liquid level.

**UPPER AND  
LOWER LEVEL  
SWITCHES  
COMPRISING  
ANY TWO OF  
THE FOLLOWING  
HARWIL  
MODELS:**

**L-40N  
L-40VCR  
L-30RV  
L-30NV  
L-30CRV  
L-5  
L-5SS  
LD-5  
LD-5SS  
L-8R**

**L-8N  
L-8CR  
L-21N  
L-21VCR  
L-30N  
L-30R  
L-30CR**



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# Model LC-1 Module

## Electronic Latching Control Module Specifications:

### Operating Voltage (Input)

Voltage: 120 or 230 VAC  
Tolerance: ±15%  
Frequency: 50/60 Hz

### Output

Electromechanical relay  
Form: Single pole double throw, isolated  
Rating: 10 AMPs resistive at 240 VAC

### Protection

Transient Protected  
Dielectric Breakdown: 1500 volts RMS minimum between input, output and probe.

### Environment

Operating Temperatures: -20°C to +55°C  
Storage Temperatures: -20°C to +55°C  
Coating: Printed circuit board is conformal coated to resist moisture and corrosion.

## Motor Contactor Specifications

### Operating Coil

120 VAC or 208-240 VAC 50/60 HZ  
Inrush: 31 VA  
Continuous use: 7 VA  
Pickup: 90 VAC (120 VAC Coil)  
170 VAC (208-240 VA Coil)  
Coil Insulation: Class B  
Coil Connections: Double Male 1/4" quick connect  
Maximum Ambient Temperature: 155°F

### Output Power Contacts

Type: DPST - Normally Open  
Contact rating per pole:

VOLTS (VAC)	LOCKED ROTOR AMPS (LRA)	FULL LOAD AMPS (FLR)	RESISTIVE AMPS
120/240	100	20	30

VOLTS	MAX NOMINAL MOTOR HORSE POWER
120 VAC	1.5 HP
208-240 VAC	3.0 HP

## Terminal Strip - 812 Series

### Electrical Rating

Rated voltage - 1600 Volts RMS  
Current rating - 30 AMPS

### Wire Size

Will accommodate lugs for wire sizes AWG #14 to 12

### Hardware

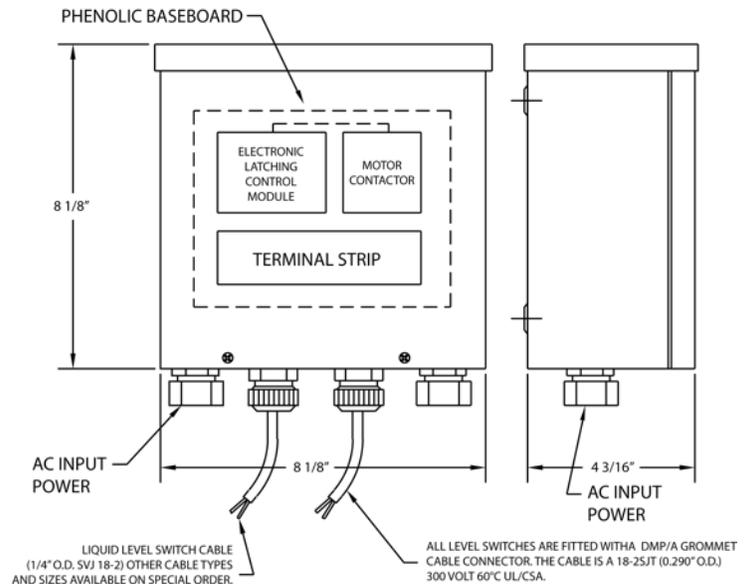
Screws and terminals - brass, nickel plated  
Solder terminals - brass, hot-tinned

### Molded Material

G.P. phenolic (94V-0).  
UL Recognized

## Control Box

Rain resistant type 3R UL listed.



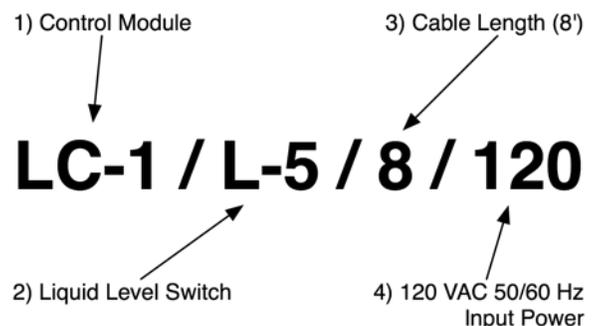
Complete operating instructions, mechanical and electrical installation drawing and a numbered parts list is supplied with each unit.

### How to order:

Four items are required to order a complete control system:

1. Basic Model Number: LC-1
2. Level Switch Model Number: Choose from 15 standard models.
3. Length of cable in feet between control module and liquid level switches. Standard cable is 1/4" O.D. SVJ 18-2/90°C UL listed. Note: if customer is to supply cable, enter "O"
4. Operating Voltage.

## Sample Part Numbers:



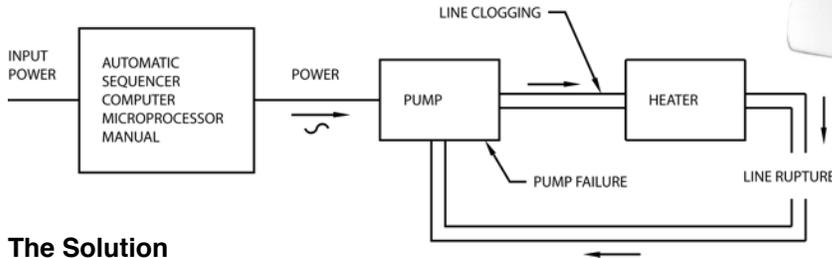
- Installation drawing and a numbered parts list is supplied with each unit.
- Current Price Information is Listed on Separate Sheet.
- Special One Day Delivery Available.

# AUTOMATIC FLOW SHUT DOWN CONTROL

# Model SDC-101

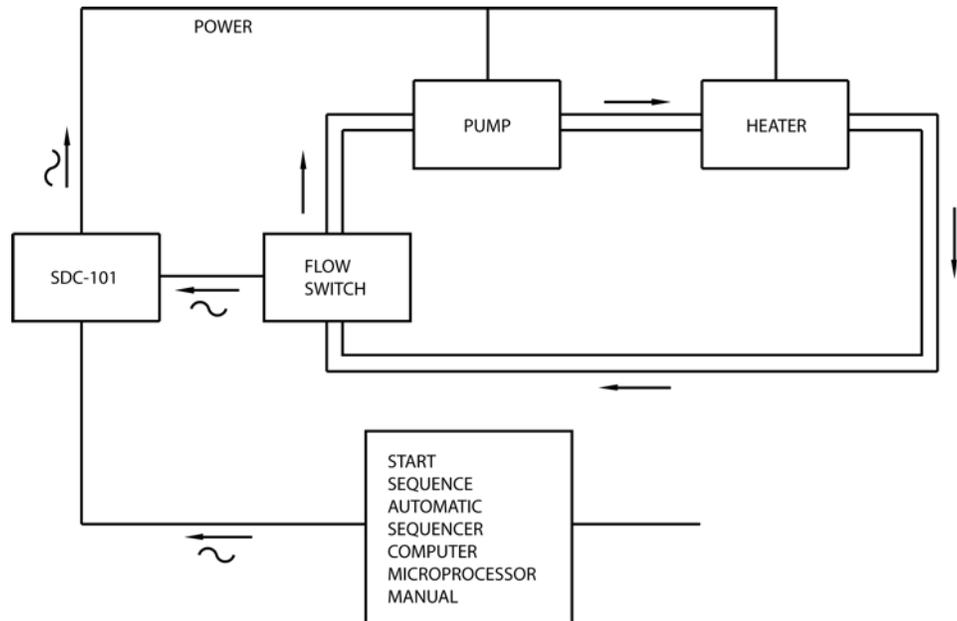
## The Problem

- Failure to establish programmed flow after pump turn on signal has been applied.
- Failure to maintain proper flow during normal operation due to line clogging, line rupture, incorrect valve positioning, etc.



## The Solution

- Insertion of an SDC-101 shut down control in the input power line of pumps, heaters, valves, etc., that are flow critical will interrupt power automatically upon loss of flow.
- Power will remain off until the problem has been corrected and proper flow re-established.
- Loss of pump prime is a persistent fluid system problem. A flow switch at the pump output is a viable solution, except that it presents a “catch 22” situation, i.e. lack of flow at start up will not allow the flow switch to supply power to the pump. A manual push to start or automatic time delay relay switch in parallel with the flow switch is required to supply power to the pump motor during startup. After the pump is up to speed the parallel switch kicks out and the flow switch takes over flow monitoring. Model SDC-101 is provided with a parallel variable time delay relay switch/flow switch combination to provide pump protection during startup as well as the continuous phase of operation.



## SDC-101 modules may be connected to monitor:

- Critical points in simple one pump systems or, in series, with pumps, heaters, valves, etc., so that failure of any part will shut the whole system down.
- Isolated or remote components and sub-systems.

## For Use In:

- Chemical process industry
- Sanitation
- Food processing
- Aerospace ground support systems
- Water treatment
- Mining
- Agriculture
- Transportation

## Additional Features:

- Continuous adjustment of time delay cycle.
- 120/240 VAC and DC power options
- Rain resistant housing for rugged, industrial usage
- Can be used in mobile vehicles, ships, trains, etc.

## Operational Features:

- Supplied pre-wired and ready for immediate installation
- All components UL listed or recognized
- Input and output power lines are quickly and easily attached to 30 AMP terminal block
- Terminal block positions are numbered and wiring is color coded for easy, fast and accurate installation and servicing.
- Performance checks are quick and straightforward using an uncomplicated, standard multimeter.



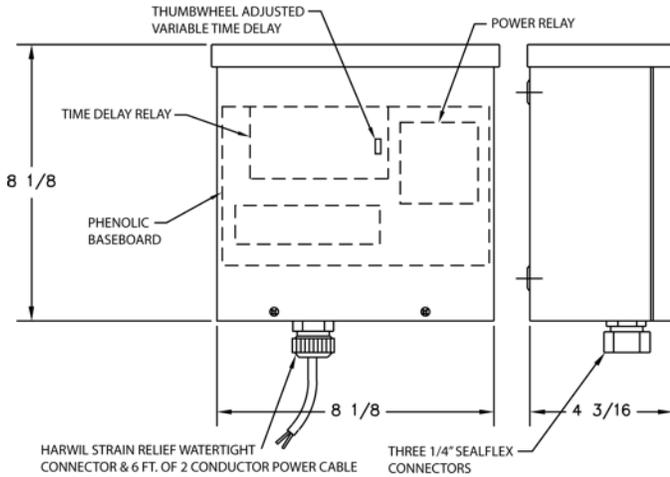
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**Specifications:**

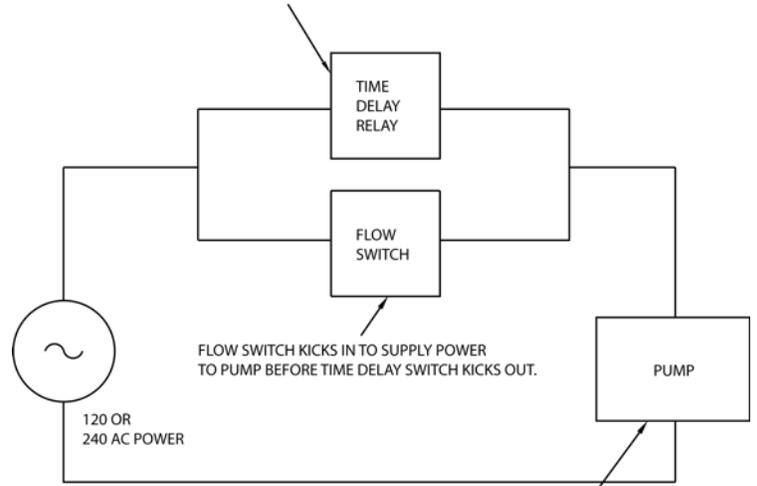
**Control Box**

Rain resistant type 3R - UL listed.

# Model SDC-101



POWER IS SUPPLIED TO THE PUMP IMMEDIATELY ON STARTUP. THE TIME DELAY IS ALSO INITIATED WHICH THEN OPENS HE PARALLEL BYPASS SWITCH AT END OF THE DELAY PERIOD.



IF PUMP FAILS TO INITIATE FLOW ON STARTUP, PUMP POWER IS IMMEDIATELY SHUT OFF. IF PUMP IS ESTABLISHED AT STARTUP, BUT IS LOST AT A LATER TIME, PUMP POWER IS SHUT OFF.

**Time Delay Relay**

**Operation**

When rating voltage is applied to the input, the timing cycle begins and the DPDT relay is activated. At the end of the timing cycle, the relay is de-activated and remains in that condition until power is removed from the input. Switching off and then turning on of input power re-starts the timing cycle. This timing sequence will repeat each time the system is turned on.

**Input Voltage - 120/240 VAC, 50/60 Hz**

**Output Contact Arrangement - DPDT**

**Contact Rating**

10 AMP, 1/2 HP @ 120/240 VAC, 50/60 Hz

**Standard Time Cycle**

1 to 180 sec., Continuously adjustable

**Ambient Operating Temp. Range -5° to 140°F**

**Termination - 1/4" quick disconnect terminals**

**Switch Performance Data**

Refer to manufacturer's specification sheets for information regarding performance of:

- Harwil Fluid Flow switches
- Harwil Air Flow switches
- Pressure switches
- Motion Limit switches
- Proximity Switches, etc. which may be used in conjunction with, but are not included with, the SDC-101 module.

**Complete operating instructions. Mechanical and Electrical installation drawing and a numbered parts list is supplied with each unit.**

**Maintenance and checkout is a snap for your present personnel using an uncomplicated standard test meter.**

**Motor Contactor Specifications**

**Operating Coil**

- 120 VAC or 208-240 VAC 50/60 Hz
- Inrush: 31 VA
- Continuous Use: 7 VA
- Pickup: 90 VAC (120 VAC Coil)
- 170 VAC (208 VA Coil)
- Coil Insulation: class B
- Coil Connections: Double Male 1/4" quick connect
- Maximum Ambient Temperature: 155°

**Output Power Contacts**

Type: DPST - Normally Open  
Contact rating per pole.

**Terminal Strip - 812 Series**

**Electrical Rating**

Rated voltage - 1600 Volts RMS  
Current rating - 30 AMPS

**Wire Size**

Will accommodate lugs for wire sizes AWG #14 to #12

**Hardware**

Screws and terminals - brass, nickel plated  
Solder terminals - brass, hot-tinned

**Molded Material**

G.P. phenolic (94V-0).  
UL Recognized

VOLTS (VAC)	LOCKED ROTOR AMPS (LRA)	FULL LOAD AMPS (FLR)	RESISTIVE AMPS
120/240	100	20	30

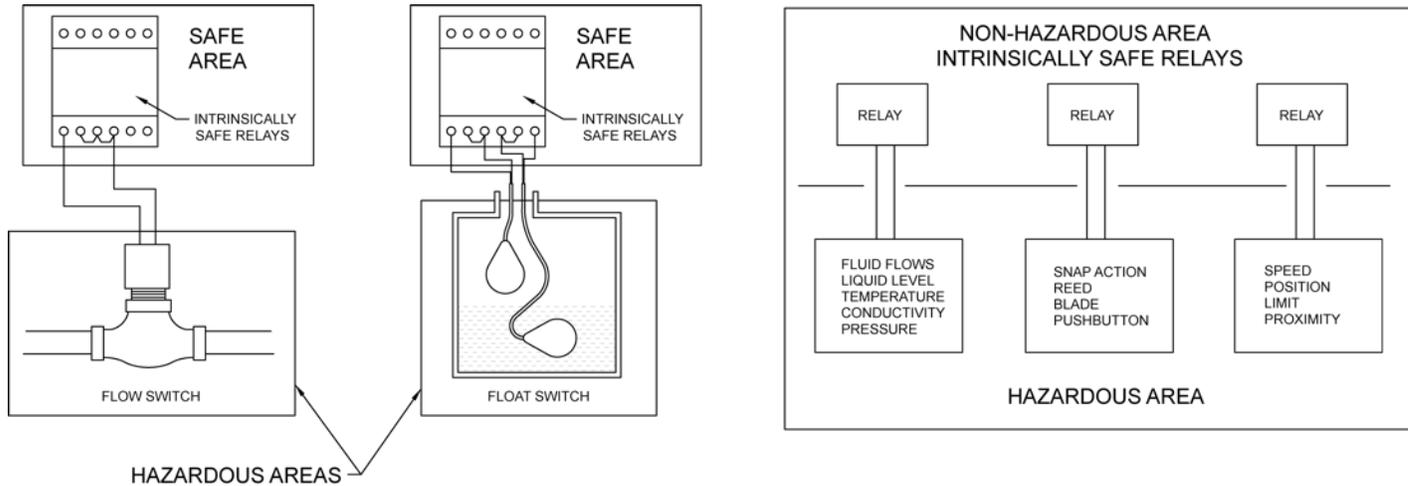
VOLTS	MAX NOMINAL MOTOR HORSE POWER
120 VAC	1.5 HP
208-240 VAC	3.0 HP

- Installation drawing and a numbered parts list is supplied with each unit.
- Current Price Information is Listed on Separate Sheet.
- Special One Day Delivery Available.

# INTRINSICALLY SAFE SOLID STATE HAZARDOUS AREA RELAY

## Series 27

ALLOWS USE OF STANDARD, OFF-THE-SHELF SWITCHES IN HAZARDOUS AREAS



### What is intrinsically safe?

- Intrinsically safe equipment and wiring is equipment and wiring which is incapable of releasing sufficient thermoelectric energy to cause ignition of a hazardous atmospheric mixture of gases, vapors, or dusts. Intrinsically safe electrical equipment and wiring may be installed in any hazardous location of any group classification for which it is accepted without requiring explosion-proof housings or other means or protection.

### Operational Features:

- Modern, cost effective, solid state technology eliminates expensive, old style, explosion proof enclosures.
- Installation and maintenance of equipment is fast, simple, and inexpensive.
- Long-term safety and reliability is increased substantially by elimination of sealed joints, special housings, and gaskets.
- Epoxy encapsulation of solid state circuitry provides protection against harsh industrial environments.
- Immunity to normal shocks, vibrations, thermal expansion, and contraction.

### Single Unit Provides Two Modes of Operation for Liquid Level Applications

- 1) Single Non-Latching Input for high or low level alarm.
- 2) Dual Latching Input for Pump Up/Pump Down liquid level control.

### Approved For Use in the Following Hazardous Areas:

**CLASS 1 AND 2      DIVISION 1      GROUPS A, B, C, D, E, F, AND G**  
**CLASS 3**

### Approved: Factory Mutual System and U.L.

**Versatile Single and Dual Input Switching Logic also allows one Unit to be Used in a Multitude of Alarm and Control Applications, Such as:**

Fluid Flow	Pressure	Temperature	Limits
Speed	Proximity	Conductivity	Position...



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# Specifications

## Contact Design: SPDT

One normally open (N.O.) and  
One normally closed (N.C.)

## Contact Ratings

8 amperes resistive load at 120/250 volts A.C. and 8 amperes at 30 volts D.C.

## Contact Life

Electrical at rated load = 100,000 cycles.  
Mechanical - 10,000,000 cycles

## Electronic Module

Solid State components epoxy encapsulated in nylon shell.

## Primary (A.C. Supply Line)

- (a) Voltage: 120 or 240 VAC, plus 10% minus 15%
- (b) Frequency: 50/60 Hertz
- (c) Power: Relay energized 2.2 watts

## Secondary Nominal Voltage 11.3 VAC, 2.3 mA

## Sensitivity

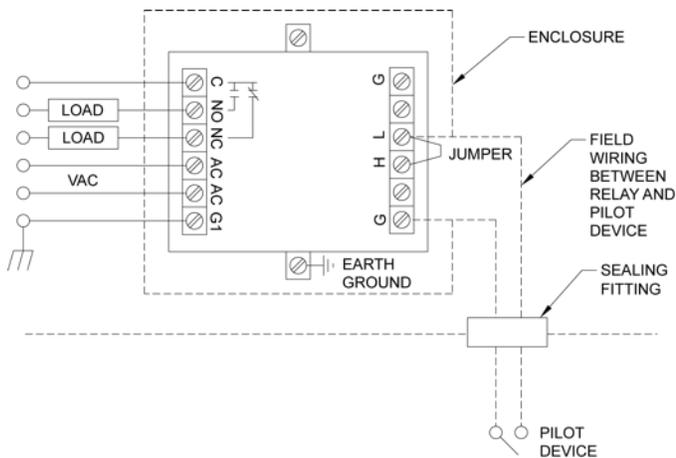
Operates from 0 - 100,000 ohm maximum specific resistance.

## Temperature

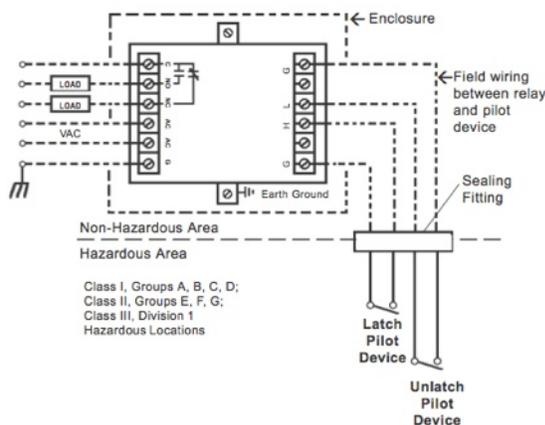
-40° to 150°F ambient. Terminals: Size 6 pan head screws with captivated wire clamping plate.

## Single Input (Non-Latching) Pilot Contact Actuated

NOTE: Jumper must be installed as shown to insure proper operation.



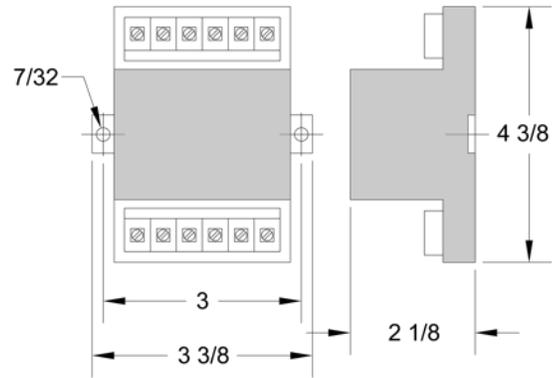
## Dual Input (Latching) Pilot Contact Actuated



Each unit is provided with detailed installation instruction sheet, wiring diagram, and hazardous area information background resume. Both models are product of Warrick Controls, Inc. a subsidiary of Armstrong International, Inc.

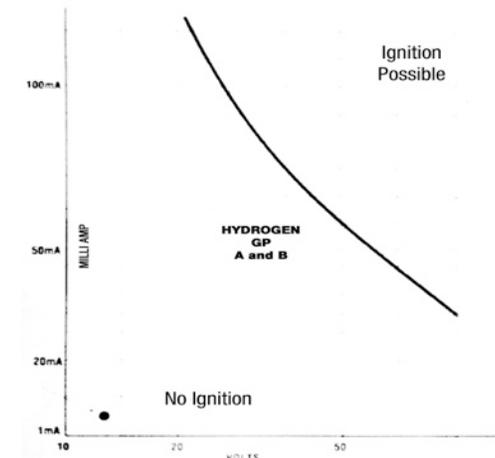
# Series 27

## Dimensions



## The Switching Current vs. Voltage Plot

shown below illustrates areas of safe and unsafe operation. The operating point of Series 27 Intrinsically Safe Relays confirms the conservative design of this module.



## Order Numbers

- P/N S17 / A / 3 / C / 0  
For use with 24 VAC Input Power
- P/N S27 / A / 1 / D / 0  
For use with 115/120 VAC 50/60 Input Power
- P/N S27 / A / 2 / D / 0  
For use with 220/240 VAC 50/60 Hz Input Power

## Warranty

Warrick Controls, Inc. warrants to the original user that those products supplied by it and used in the service and in the manner for which they are intended shall be free from defects in materials and workmanship for a period of one (1) year after installation, or fifteen (15) months from the date of shipment. WARRICK DOES NOT MAKE ANY OTHER REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR MERCHANTABILITY AND ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. In no event shall Warrick be liable for special, direct, indirect or consequential damages, including, but not limited to, loss of use or profits or to interruption of business activity.

- Installation drawing and a numbered parts list is supplied with each unit.
- Current Price Information is Listed on Separate Sheet.
- Special One Day Delivery Available.