

Warrick® Series 16

General Purpose Controls

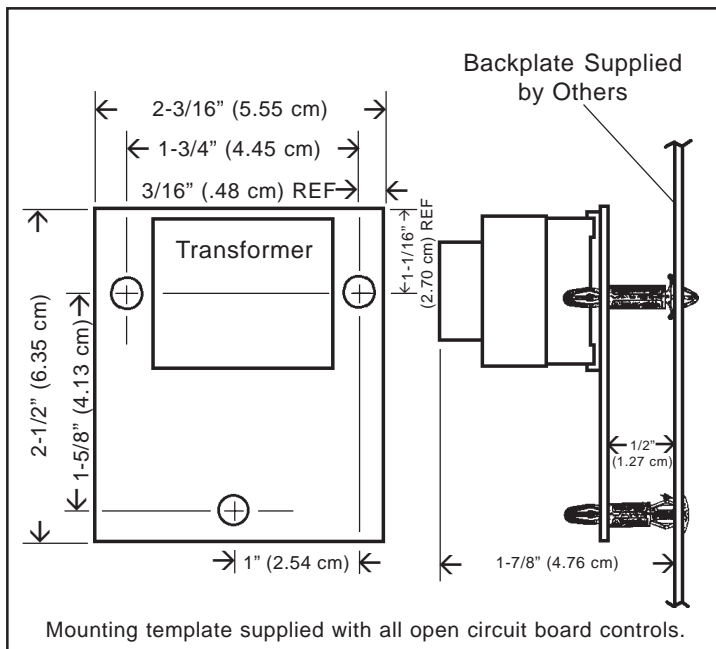
Installation and Operation Bulletin

This bulletin should be used by experienced personnel as a guide to the installation of Series 16 controls. Selection or installation of equipment should always be accompanied by competent technical assistance. We encourage you to contact Gems Sensors Inc. or its local representative if further information is required.

Specifications

- Control Design:** Open circuit board design
- Contact Design:** SPDT (1 form C): one normally open (N.O.) and one normally closed (N.C.), non-powered contacts.
- Contact Ratings:** 10A @ 120 or 240 VAC resistive (120°F), 1 A @ 120, 240 VAC resistive (150°F), 1/3 H.P. @ 120, 240 VAC (120°F)
- Contact Life:** Mechanical: 5 million operations.
Electrical: 100,000 operations minimum at rated load.
- Supply Voltage:** 120, 240 or 24 VAC models: +10% - 15%, 50/60 Hz. 208/240 Model: 187 Vmin to 255 Vmax. VAC 50/60 Hz
- Supply Current:** Relay energized 4.4 VA.
- Secondary Circuit:** 12 VAC RMS voltage on probes, 1.5 milli-amp current.
- Sensitivity:** Models operate from 0 to 1,000,000 Ohm maximum specific resistance
- Temperature:** -40 to 150° F. ambient.
- Terminals:** Probe connections 3/16" spade: Line and power connections 1/4" space
- Time Delays:** Standard H probe, 0.5 seconds on rising level
- Listing:** U.L. recognized, Industrial Motor Control (508)

Dimensions



Notes

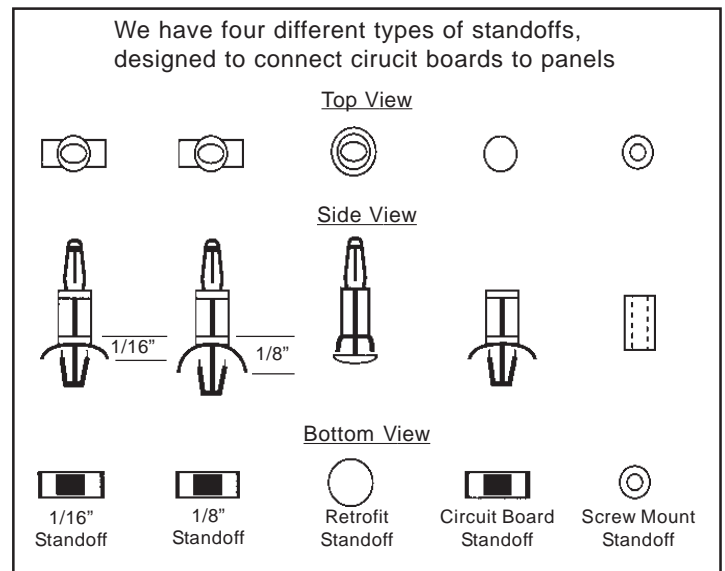
If panel mount stand-off is to be used, thru-holes to be drilled in back plate should be .187" Dia.

If retrofit stand-off is to be used, thru-holes to be drilled in back plate should be .250" Dia.

Installation

1. Drill three .187 dia. holes in customer supplied backplate using stick on template supplied with control. Standard standoffs are designed for backplate thickness of .062 (1/16"). Standoffs are available for backplates of .125 (1/8") nominal thickness. If retrofit plate standoffs are used, drill three .250 dia. holes in proper location.
2. Install three standoffs onto backplate. Install circuit board onto standoffs by pushing down on circuit board at outer edges of all four corners. Use both hands to slide board onto standoffs until standoffs lock. **CAUTION:** Do not overflex circuit board during installation. Do not push down on transformer or relays during installation. See sketch for proper installation. Install control in appropriate enclosure.
3. Wire control per diagram, following N.E.C. and local codes. Use appropriately sized spade terminals.

Standoffs

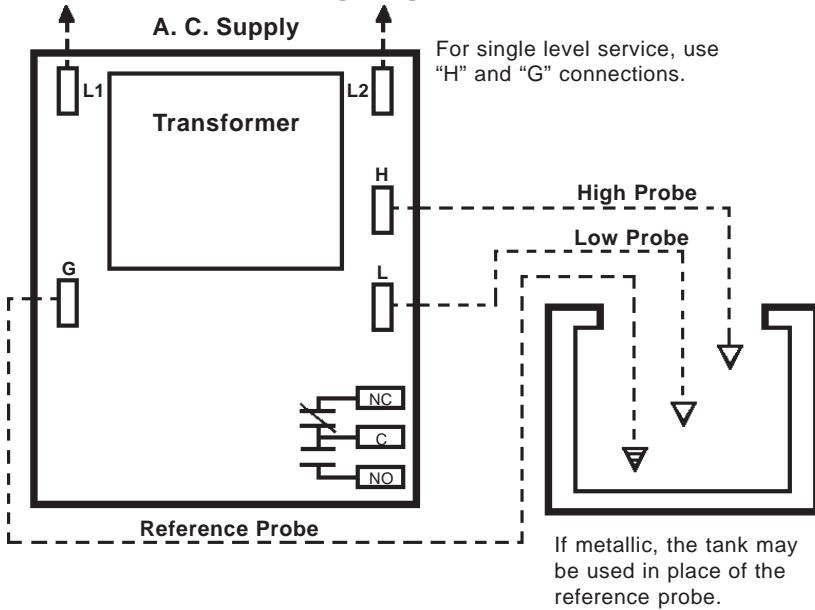


Sensitivities vs Maximum Probe Wire Distance*

Sensitivity Character	Sensitivity (K Ohms)	Distance (Ft)
A or K	4.7	10,000
B or L	10	5,700
C or M	26	2,200
D or N	50	1,075
E or P	100	570
F or R	470	270
G or S	1,000	38

* Based on type MTW or THHN wire, #14 or #16 AWG

Wiring Diagram



Operation

Direct Mode- Single Level Service: When the liquid rises to the electrode on terminal H, the control energizes, changing state of the load contacts. (LED will be lit) The control remains energized until the liquid level recedes below electrode on terminal H. The control then de-energizes, (LED will not be lit) returning load to original state.

Inverse Mode- Single Level Service: Control energizes with power, changing state of the load contacts. (LED will be lit) When the liquid rises to the electrode on terminal H, the control de-energizes, returning the load contacts to shelf state. (LED will not be lit) The control remains de-energized until liquid level recedes below the electrode connected to terminal H. The control then energizes.

Direct Mode- Differential Service: When the liquid rises to the electrode on terminal H, the control energizes, changing state of the load contacts. (LED will be lit) The control remains energized until the liquid level recedes below electrode on terminal L. The control then de-energizes, (LED will not be lit) returning the load contacts to original state.

Inverse Mode- Differential Service: Control energizes with power, (LED will be lit) changing state of the load contacts. When the liquid rises to the electrode on terminal H, the control de-energizes, returning load contacts to shelf state. (LED will not be lit) The control remains de-energized until the liquid level recedes below the electrode on terminal L. The control then energizes.

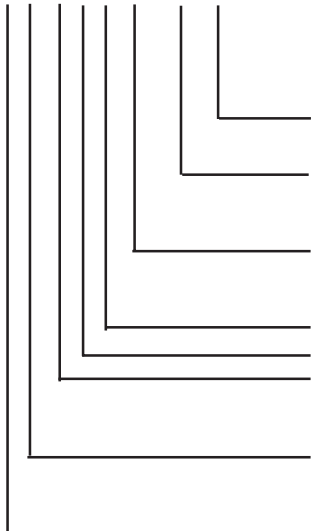
Optional

Time Delays: With time delay on increasing level, the liquid must be in contact with the short electrode for the full duration of the time delay before control will operate. With delay on decreasing level, the liquid must be below long electrode for the full duration of the time delay before control will operate. In single level service, terminals H and L must be jumpered together to achieve time delays on both increasing and decreasing levels or just decreasing level.

Dirty Electrode Detection: The LED will flash every half-second once the probe resistance reaches a value greater than the nominal control sensitivity rating. The relay state will not change until it exceeds the nominal sensitivity by more than 25% (typically) at nominal input voltage. At which time the LED and relay contact return to the dry state. Such a condition may suggest electrode maintenance is required.

Time Out Option: The latching circuit for the high and low electrode has an optional timer. In some applications the High or Low electrode may become short circuited or disconnected. Such an occurrence may potentially over fill in fill applications, or cause the pump to run dry in pump down applications. The time option is custom programmed up to 3 minutes. When a fault condition occurs, the fill LED will have a blink sequence of .5 seconds on 2 seconds off. See Chart A-1 for time delay options.

16 X X X X XX XX X



Dirty Probe/Timeout Timer Option:

(See Chart A-1)

Time Delay Decreasing Level:

H/L function 0-90 seconds,
blank = 0 seconds

Time Delay Increasing Level:

H/L function 0-90 seconds,
blank = 0 seconds

Optional Character: R = Retrofit plate or blank

Enclosure: 0-None, 1-Nema 1, 4-Nema 4

Standoff Style/Socket Type:

A - 1/16" Panel C - Screw Mount
B - 1/8" Panel D - Retrofit

Supply Voltage:

1 - 120 VAC 3 - 24 VAC
2 - 240 VAC 8 - 208/240 VAC

Mode/Sensitivity:

Direct Inverse
A - 4.7K K - 4.7K
B - 10K L - 10K
C - 26K M - 26K
D - 50K N - 50K
E - 100K P - 100K
F - 470K R - 470K
G - 1M S - 1M

Chart A-1

OPTIONAL CHARACTER	DIRTY PROBE 25% OF RANGE	TIMEOUT TIMER DELAY					
		30 SEC	60 SEC	90 SEC	120 SEC	150 SEC	180 SEC
A	X						
B	X	X					
C	X		X				
D	X			X			
E	X				X		
F	X					X	
G	X						X
H		X					
K			X				
L				X			
M					X		
N						X	
P							X



Gems Sensors Inc.
One Cowles Road
Plainville, CT 06062-1198
Tel: 860-793-4579
Fax: 860-793-4580