

WIPER CONTROL APPLICATION NOTES

INSTALLING THE RAIN SENSOR

Mount the rain sensor where it gets a clear indication of precipitation— away from overhangs, etc.

The mounting arm is designed to fit over a strap 0.75" (19 mm) wide. Two 0.25" (holes 6.35 mm) are placed 0.75" (19 mm) part.

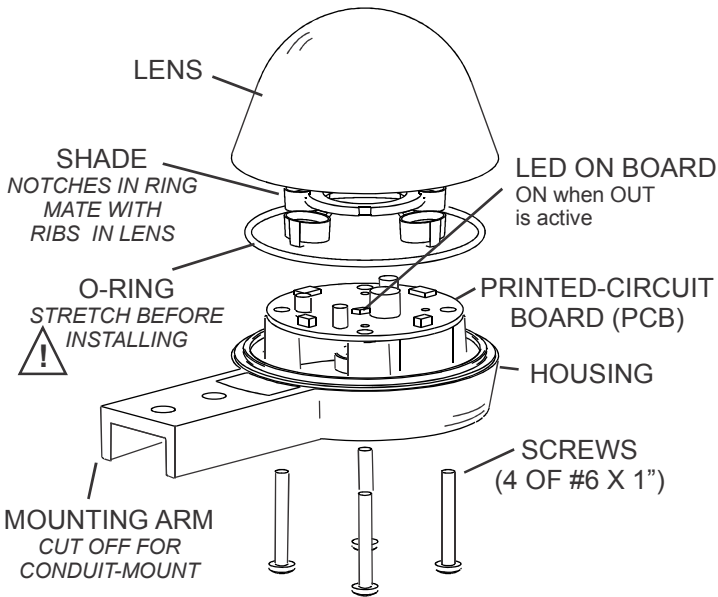
The gland style connector goes in the bottom hole. Be sure to use wire rated for outdoor (high-UV) use.

For conduit applications, the mounting arm may be removed, and the wiring hole drilled out using a step drill to accommodate a 1/2" EMT compression connector or similar style of conduit connector.


Assemble the device as shown. Stretch and release the silicone o-ring (size -036) a few times, so it fits easily in the groove. Optionally, you may coat the O-ring and screws with silicone grease.

For Wiper Control Mode, set DIP switches 5 and 6 ON, and set the other switches to the desired wipe setting. See the switch table on page 2 for other settings.

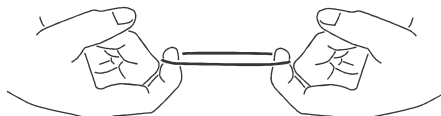
The RG-11 must be assembled when dry. Any water trapped inside can condense and cause corrosion. You may optionally add extra desiccant packets (not supplied.)



EXPLODED VIEW

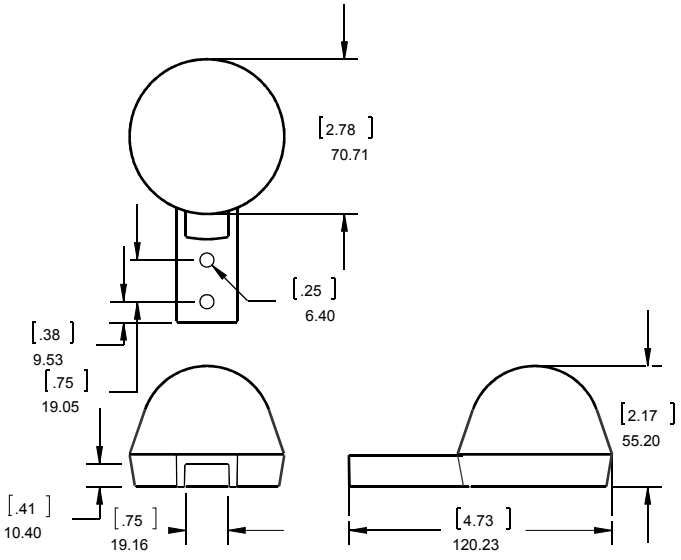


VERY IMPORTANT



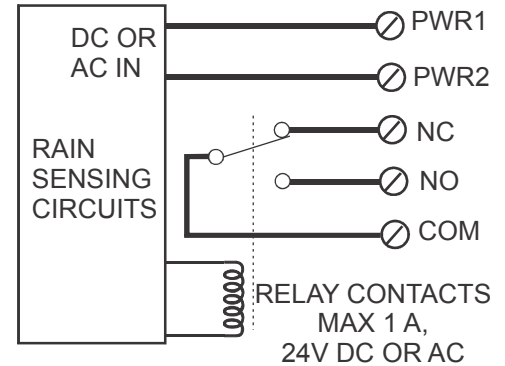
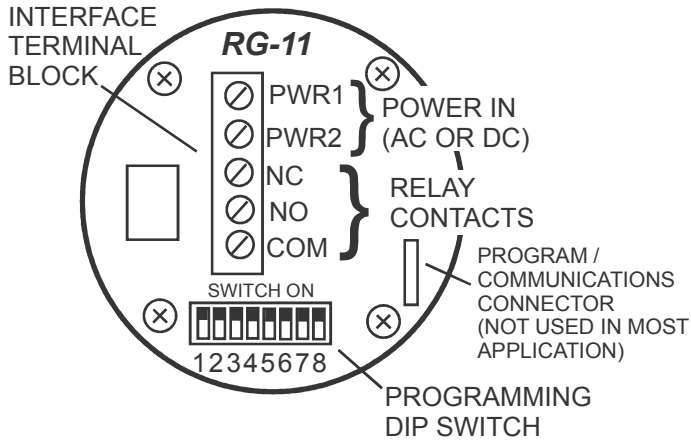
Stretch the O-ring a few times, so that it fits easily into the groove on the lens.

After the unit is assembled, verify that the O-ring is properly seated by confirming that you can see it through the lens, all the way around. The O-ring is slightly under-sized for the groove because that gives the optimal seal.



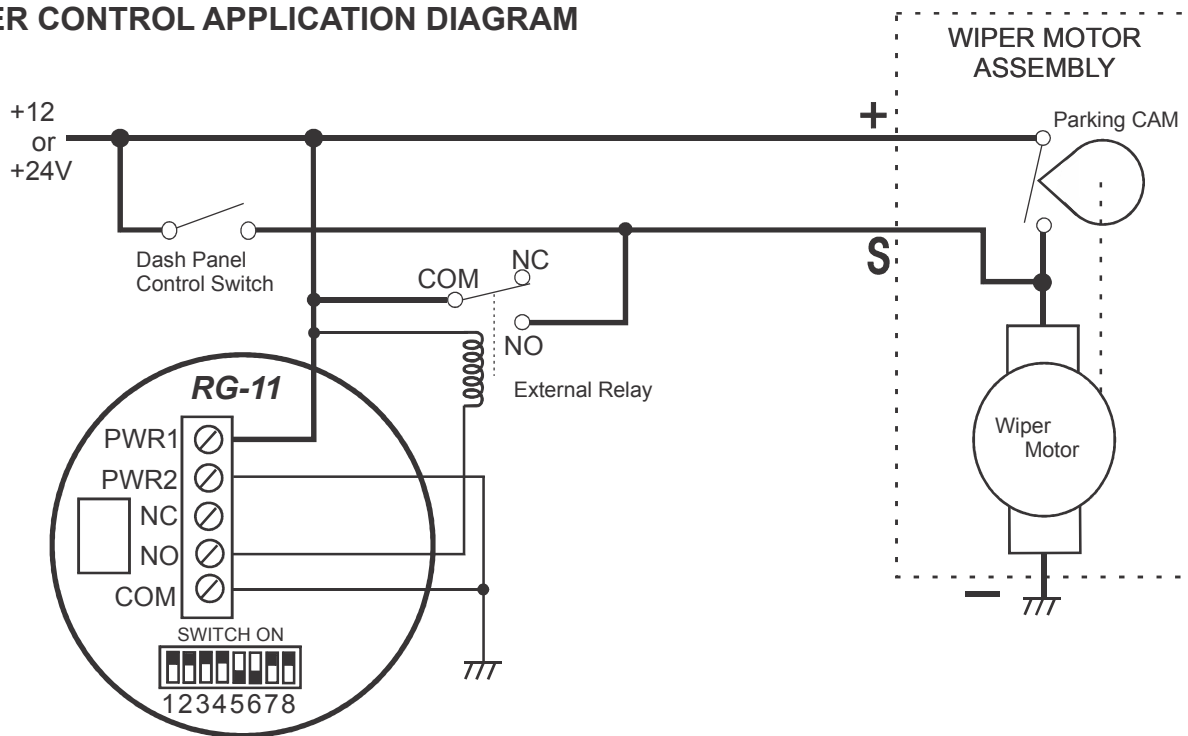
- APPLICATION WARNING -

Do not use the RG-11 in any application where the false indication of water or a missed valid detection of water could cause damage to life or property. It is the responsibility of the system designer / integrator to design redundancy into the system so that the failure of any one component, including the RG-11 or other sensor, does not result in disaster. The manufacturer of the RG-11, Hydreon Corporation, will in no way be liable for consequential damages due to the failure or false indication of one of its sensors.



EQUIVALENT SCHEMATIC

WIPER CONTROL APPLICATION DIAGRAM



MODE 3: WIPER CONTROL DIP SWITCH SETTINGS

Switch								Behavior	
8	7	6	5	4	3	2	1		
0	0	1	1	X	0	0	0	Normal Wiper Control	
					0	0	1	Wipe More	
					0	1	0	Wipe a Lot More	
					0	1	1	Wipe a Whole Lot More	
					1	0	0	Wipe Less	
					1	0	1	Wipe a Lot Less	
					1	1	0	Wipe a Whole Lot Less	
					1	1	1	Wipe hardly at All	
				0	X	X	X	Normal Slow Cycle Time (1.2 to 3 sec.)	
				1				Long Slow Cycle Time (3 - 8 sec.)	

Notes:

The RG-11 must be used with an external relay. The relay output of the RG-11 is rated for 1 A, which is much lower than the current needed to drive wiper motors. Match the external relay voltage to the supply voltage.

In the tables, 1 = switch ON, 0 = switch OFF, X = switch in either position. Switch 8 and 7 should be off for Wiper Control Applications.

Not all wiper systems will be the same as above, but most will have a similar configuration. See page 4 for troubleshooting tips.

Mode 3: Wiper Control

Rain sensing wiper control from off through intermittent and steady slow speeds

The RG-11 may be used to control a wiper system. The output relay turns on when the slow motor winding should be engaged. This will typically be used to drive an external relay, which will in turn drive the wiper motor windings. This may be used for the wipers for a boat, ship, locomotive, observation window, or many other applications. The RG-11 does not care what the wipers are wiping.

WARNING: The relay contacts of the RG-11 can control only a 1A load, and wiper systems generally require many times that current. The RG-11 MUST be used with a suitable external relay in wiper control applications.

The nominal wiper control is set so that it properly controls the wipers of a passenger car. It is optimized for wiper systems that require between 1.2 and 3 seconds to make a single complete actuation of the wipers. A long cycle time is provided (Switch 4 on) for systems with a wiper actuation cycle time between 3 and 8 seconds. In all cases, the RG-11 provides a pulse to initiate the wiper actuation. Most wiper system will include some sort of cam feedback mechanism that causes the wipers to keep running until they reach a home position.

Mount the RG-11 so that it generally gets the same rainfall as the surface to be wiped. Usually, this means about a 45 degree angle. The RG-11 does not need to be within the actual field of view of the window.

Adjust the sensitivity control DIP switches (3, 2, and 1) to set the system to wipe more or less, depending on the needs of the installation.

Specifications

Parameter	Value
Input Voltage	9 – 30VDC or 9 – 26 VAC 50V surge Reverse polarity protected to 50V
Current Drain	15 mA nominal. (No outputs on, not raining, no heater) about 1.5 mA in micro-power sleep mode. 50 mA with output on. 55 mA - With heater on, 24V dc input.
Output	Relay closure, Normally Open and Normally Closed contacts. Max load 1A, 24 VDC.
Operating Temperature range	-40 C to +60C

OUT LED

The LED in the center of the circuit board turns on when OUT is on, as an aid to debugging.

DIP Switches

Set the DIP switches for the application according to the table on page 2.

Switch 8 is Enable Micro-power Sleep Mode

Most applications will use SW 8 off. If micro-power is enabled, the low-power heater is disabled. In micropower mode, if a long time (about 20 min) has elapsed since the last rain was detected, the unit will enter a less sensitive sleep mode. A large drop will cause it to exit sleep mode and resume normal operation. This is for battery or solar powered applications. The unit will not read the DIP switches during sleep.

Condensation

Generally, the RG-11 will sense condensation as if it were rainfall, but this seldom amounts to a significant accumulation of water. The built-in low power heater (DIP SW 8 off) will tend to reduce condensation.

Ambient Light Interference

The RG-11 is almost completely immune to the effects of ambient light, and may freely be mounted in direct sunlight.

Heater

A built-in low power (0.25W) heater extends operation of the device to freezing (32 F or 0C). This is disabled if the micro-power (SW 8) is enabled. Note that this is a very modest amount of power; it will tend to drive off a modest amount of frost, but will not melt ice.

SAFETY, LIMITS OF RAIN GAGE LIABILITY, AND WARANTY

Only the rain sensor is covered-- absolutely no consequential damages

It is the responsibility of the systems integrator and purchaser of the Rain Gage to insure a safe installation. Any mechanical system, including one that incorporates a Rain Gage, requires appropriate safety interlocks. Hydreon Corporation (Hydreon) warrants only the actual cost of the sensor, and only that it is free from defects in workmanship.

The Rain Gage is warranted to be free from defects for a period of one year from date of purchase. Under no circumstances will Hydreon be liable for any consequential damages due to failure or any other mishap involving a Rain Gage. Hydreon's liability in the event of a failure, or inability to sense a condition, is limited to the actual cost of the particular sensor. Explicitly, if other objects are destroyed due to water damage, or if any object is destroyed because of a false indication of water, Hydreon is in no way whatsoever liable for anything other than the cost of the Rain Gage, and then only if the Rain Gage is shown to have some defect in materials or workmanship. Limitations and imperfections of the Rain Gage do not constitute a defect. Further, if some valuable data is not gathered because an erroneous indication of any sort due to the Rain Gage, Hydreon is liable only for the cost of the Rain Gage.

It is the responsibility of the system designer and purchasers of the Rain Gage to insure that a failure of the Rain Gage will not cause consequential damages. If a failure in Rain Gage would cause disaster, we recommend against deployment of the Rain Gage, or

against the system in which the Rain Gage is deployed. If a failure of a Rain Gage would cause great expense, Hydreon recommends redundant Rain Gages, and even in that case do not assume any liability for consequential damages. It is the responsibility of the system designer and purchasers of the Rain Gage to be aware of performance limitations of the device. If a Rain Gage fails for any reason Hydreon will not be responsible for the labor of servicing and or installing and/or removing the Rain Gage. Labor is NOT COVERED. Hydreon recommends that the system designer perform a Failure-Mode Effects Analysis that includes the possibility of Rain Gage failure. If a potential purchaser of the Rain Gage does not agree with these terms, we ask that the potential purchaser not buy the Rain Gage. Deployment of the Rain Gage implies understanding and agreeing to these limits of liability.

Apply engineering judgment: Hydreon does not claim the RG-11 is a perfect rain sensor. It is what it is, and senses what it senses.

CASE and COSMETIC POLICY

Some amount of yellowing or discoloration of the case is considered normal cosmetic aging of the device, and sensors so affected will not be replaced under warranty. Tiny cracks or crazing within the lens is also considered cosmetic, and units so affected will be replaced only if they are deemed by Hydreon corporation to be considered to be of a functional nature.

TROUBLESHOOTING

WIPING TOO MUCH

If the RG-11 is wiping too much, meaning not enough water has accumulated before the wipers activate, change the DIP switch settings appropriately. Wipe Less-- DIP switch 3 ON, Wipe a Lot Less-- DIP switches 3 and 1 ON, Wipe a Whole Lot Less-- DIP switches 3 and 2 ON, or Wipe Hardly at All-- DIP switches 3, 2, and 1 ON, will accomplish this.

NOT WIPING ENOUGH

If the RG-11 is not wiping enough, meaning too much water has accumulated before the wipers are activated, change the DIP switch settings appropriately. Wipe More-- DIP switch 1 ON, Wipe a Lot More-- DIP switch 2 ON or Wipe a Whole Lot More-- DIP switches 2 and 1 ON, will accomplish this.

DIP SWITCH SETTINGS

For all wiper control modes, DIP switches 6 and 5 must be on. DIP switch 8 is for Micro-power sleep mode. Also note the position of each numbered switch as compared to the switch setting table. For example, in the DIP switch settings table above, switch 8 is located on the left hand side of the table. Comparing that to the actual DIP switches on the RG-11 board, DIP switch 8 is located on the right side. Be sure the number in the table corresponds to the actual number on the RG-11 board.

NO SIGNAL

Check that the LED is on when the output should switch between NO and NC. If the LED does not light, check the power to the RG-11. Test by pouring water over the sensor. If the LED turns on, check to make sure that the output is wired properly. A common mistake is switching NO and NC or not using the COM and just wiring to the NO and NC.