RGC12 Rain Gauge Converter

Introduction

This converter is designed to allow our standard RH12H or RG12K rain gauge to be connected to a PLC, SCADA, BMS or other industrial control system without the need for additional wiring or specialised interfaces.

Features

The converter has -

- **Two separate electronic (solid state) outputs.** One provides a low going pulse while the other provides a high going pulse, when the rain gauge bucket tips.
- **A relay output,** which has two sets of both normally open and normally closed contacts. This provides two isolated voltage free contacts
- **A test button**, which will simulate a tip of the rain gauge bucket, without the need for a rain gauge to be connected. This allows you to confirm that the converter is working and wired correctly independently of your rain gauge.
- **An indicator LED**, which lights when a tip is occurring, giving a visual indicator to simplify installation and testing.
- **A signal inverter** that inverts all outputs so that the steady state of the signal to the control system input can be set.

PLC / SCADA Timing Requirements

The rain gauge Converter must be connected to a DIGITAL or PULSE input on your PLC, SCADA, or BMS system. This input MUST be

A. Scanned MORE than FIVE times per second, or
B. Have a scan INTERVAL of LESS than every 200 milliseconds.

Wiring Diagram

Measure the voltage of the PLC, SCADA, BMS input with respect to zero volts with the **Rain Gauge converter** disconnected. This voltage may be A. Close to zero volts, or B. Close to five (5) volts or C. Close to the PLC / SCADA supply voltage – usually 12 or 24 volts.

From this measurement, choose the appropriate wiring diagram from the table below.

Case	Measured PLC, SCADA, BMS **Input Voltage**	For Electronic Output	For Relay Output or Voltage Free contacts
A	Zero volts	Output 1	Output 3, diagram 3A
B	Five volts	Output 2 *	Output 3, diagram 3B
C	12 or 24 volts	Output 2	Output 3, diagram 3B

* The Rain Gauge may also work correctly if wired straight into the PLC / SCADA without the Rain Gauge Converter

Test Button

When the button is pressed, a 'tip' of the rain gauge bucket is simulated. This will also light the LED indicator as described below. The Test button will always simulate a 'tip' whether a rain gauge is plugged in or not.

LED Indicator

This indicator will flash whenever there is an incoming pulse from the rain gauge or if the Test button is pressed.
In the 'normal' mode, the LED will ONLY be lit when the tip is occurring.
In the 'Invert' mode, the LED will be ON all the time, except when a tip is occurring.

Normal / Inverter Jumper Selection

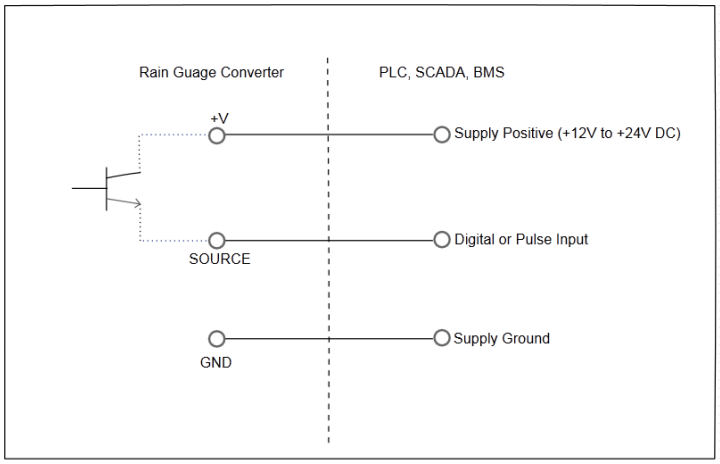
This is a user selectable jumper that inverts the output signal for ALL outputs. That is, it converts a steady **low** output with a high going 'tip' (normal mode) to a steady **high** output with a low going tip.

Diagram 1 - high going pulse

Diagram 2 - low going pulse

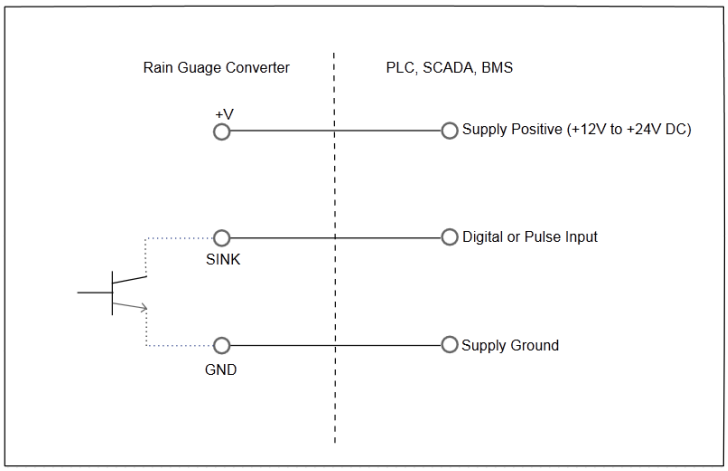
Output 1 - Current Sourcing Output

When this electronic or ‘solid state’ output is turned ON, there is a low resistance path from this output to the (positive) voltage supplied to the converter. This is the **most commonly used output** as it suits most inputs to PLC systems where the input stays at or near zero volts with nothing connected.
This output is capable of supplying up to 150 milliamps and is therefore also capable of driving a relay coil connected from the output to ground or zero volts.



Output 2 - Current Sinking Output

When this electronic or ‘solid state’ output is turned ON, there is a low resistance path from this output to ground or zero volts. This suits some inputs to PLC systems where the input stays at or near the supply volts with nothing connected.
This output is capable of sinking up to 150 milliamps and is therefore also capable of driving a relay coil connected from the supply to this output.

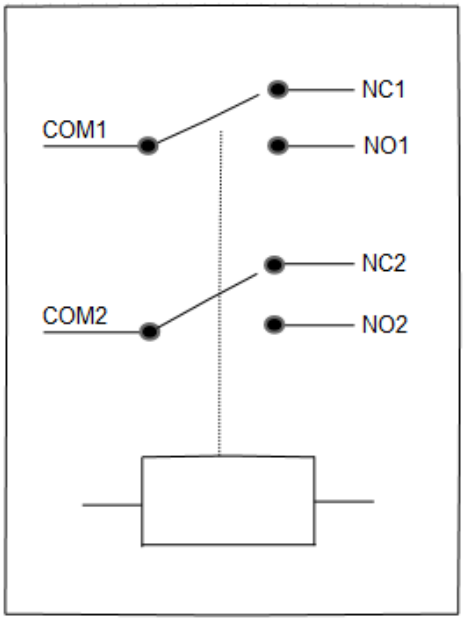


Output 3 –Relay Output

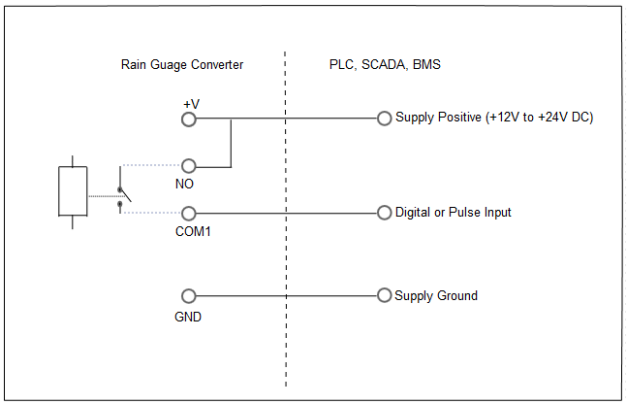
When this output is turned ON, a relay is energised and two sets of contacts ‘changeover’. Each set has one normally closed (NC) and one normally Open (NO) contact. For contact set one, there is a low resistance path from COMMON1 to either the NO1 or NC1 contact as appropriate. For contact set two, there is a low resistance path from COMMON2 to either the NO2 or NC2 contact as appropriate.

These contact sets are called ‘voltage free’ contacts as any reasonable voltage can be placed on them as they are isolated from the rest of our circuit, and one contact set is isolated from the other contact set.
This suits inputs to PLC systems where there may be significant variations in voltage levels for the one wire e.g. ‘Ground’ over the monitoring site.

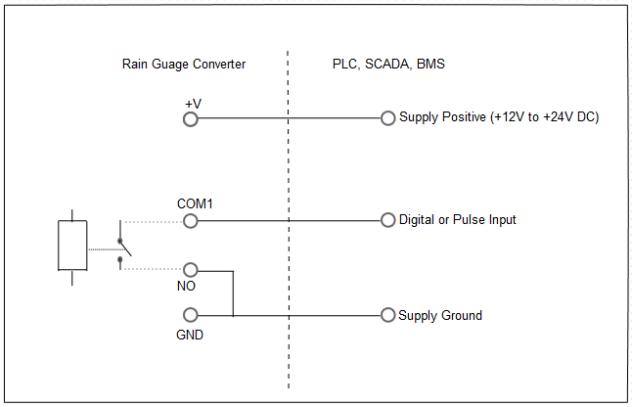
All contacts are capable of handling up to 500 milliamps at up to 60 volts and are therefore also capable of driving a larger relay coil, if required.



3. Relay Internal Wiring diagram



3A. Wiring diagram for Input normally low.



3B. Wiring diagram for Input normally high.

Installation Procedure

1. Mount the Rain Gauge (RG12) and the Rain Gauge Converter (RGC) as required, checking the available cable.
2. Connect the PLC supply voltage (normally +24 volts) to the +V on the RGC.
3. Connect the zero volts or Ground from the PLC to the GND on the RGC.
4. Confirm that +24 volts is present on the RGC terminals, (+V) and (GND).
5. Press the 'Test' button and confirm the LED on the RGC lights.
6. Measure the voltage on the PLC input (with no connection). Connect the PLC input to the RGC using the table below.
7. Confirm that the 'Test' button still lights the LED.
8. Confirm that the PLC has detected the pulse or change of state.
9. Connect the RG12 to the RGC using the 3 pin plug provided.
10. Pour water into the RG12 or remove the funnel and tip the bucket by hand. Confirm that the LED lights for each tip of the bucket.
11. Confirm the calibration. For ten tips of the bucket, the PLC total should INCREASE by 2.0 millimetres of rain.

PLC Input Voltage (no connection)	**Connect PLC Input to RGC Terminal**
Zero volts or low	SOURCE
Supply voltage or high	SINK

Maintenance

No maintenance should be necessary on the converter. If it is not functioning correctly, check that the Invert Jumper is correctly located on the jumper pins.

Fault-Finding

Tip Test

If the converter does not appear to be working correctly, press the 'tip' button to see if the LED indicator will operate and if so, confirm if this pulse registers on your PLC / SCADA system. If not, check the following

1. The wiring to the PLC / SCADA input.
2. The power connections and voltage supply to the RGC12.
3. The Invert jumper is properly connected.
4. Disconnect the rain gauge itself and re-test.

Rain Gauge Testing

If the tip test works, but there is no signal from the rain gauge, then check the following in the rain gauge:

1. Check to see if the rain gauge funnel is blocked, and clean if necessary.
2. Open the rain gauge. Clean and check the internal operation.
3. Manually tip the bucket and see if this causes the Rain gauge LED Indicator to flash.
4. Manually tip the bucket and see if this causes the RGC12 LED Indicator to flash.
5. Check the connection between the rain gauge and the Rain Gauge Converter.
6. Pour in 70 millilitres of water into the rain gauge funnel. Listen to confirm that you hear 10 tips of the bucket.
7. Confirm that the water is exiting the rain gauge.