Industrial Application Whitepaper

ROC - Remote Online Counter Basic Setup Requirements

ROC – Basic Setup Requirements

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Introduction

The new ROC (Remote Online Counter) is the direct replacement for the PM4000 series instruments. Although the physical footprint is unchanged there are many new features beginning with the Serial and Modbus communications interface, a custom Software Utility, and enhanced reporting options that include: ISO, NAS, and SAE standards. This Whitepaper will address the fundamental requirements for successful installation of the ROC model into suitable applications.

The new HIAC ROC – Remote Online Counter in a word...'FITTING'…

- It will fit your pressure needs covering a pressure range of 20 – 7000 PSI (1.4 - 476 Bar)
- It will fit your flow needs covering a flow range up to 10 GPM (37.8 LPM)
- It will fit your reporting needs with the ability to report cleanliness codes or class information for the ISO 4406, NAS 1638, and SAE AS4059 Standards.
- It will fit your system communication needs offering MODBUS RTU, and RS485 or RS232 serial.
- It will fit your system administrator or technical reporting needs with a custom Software Utility
- It will fit your Remote Device control needs with a relay contact closure settable for clean to dirty or dirty to clean alarm and control applications.
- It will fit your real estate needs due to its compact size (~4" x 4" x 2") and weight (under 2 lbs.)
- It will fit your hydraulic fluid compatibility needs as it can be used for typical hydraulic/synthetic fluids in addition to Phosphate Esters.

A successful ROC installation begins with understanding these key elements:

1. **Input Pressure to the device**
   a. There are 5 different versions to accomodate your pressure/flow requirements.
2. **ΔP (Pressure difference) input relative to output**
   *
3. **Stable pressure at sampling point during the entire sample period**
   **
4. **System Flow requirements**
   a. We have versions to accommodate flows ranging from 20ml/min to 10 GPM (37.8 LPM)

App Note: What is the difference between PSI(A) and PSIG?

PSI or PSI(A) is pounds per square inch and is appropriate to use this when one is talking about pressure difference (ΔP). PSIG is the reading on a gauge and is atmospheric pressure (14.7 PSI) less. For example: 0 PSIG = 1 atmosphere or 14.7 PSI.

* Whenever possible it is recommended to route the ROC output to a reservoir or waste drain.

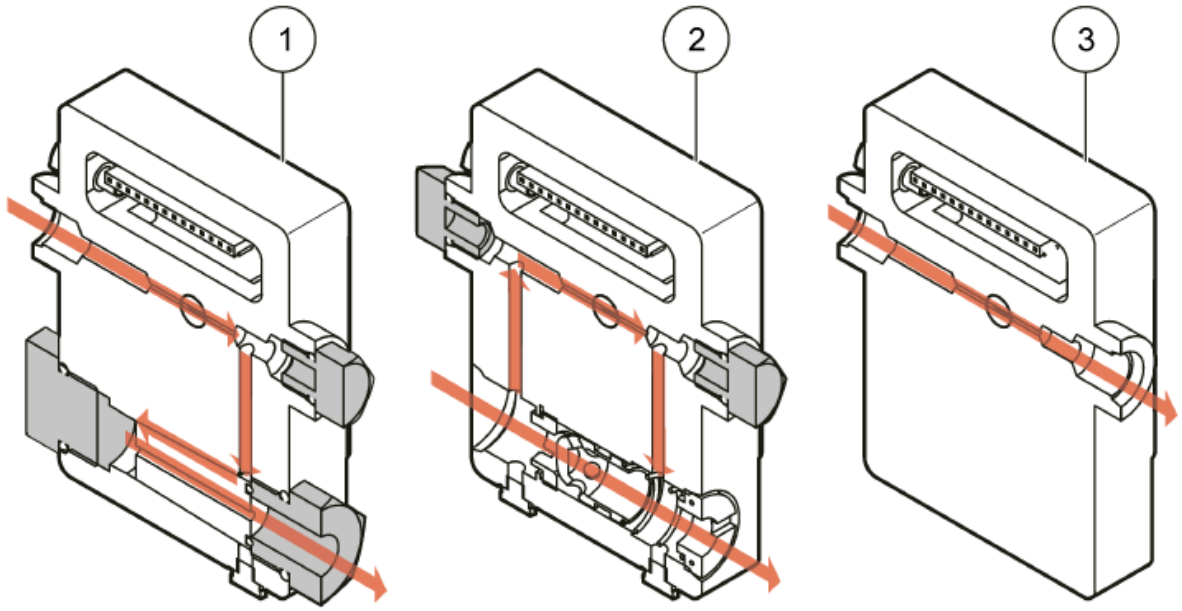
** If the flow drifts outside of the specified limits during the sample you could experience erratic results.

App Note: ΔP – Differential Pressure

These instruments must have a ΔP between the input relative to the output to create flow through the ROC (sounds simple but is often overlooked). Inaccurate counting issues can arise when the ROC is installed into an online application where the input and output pressures are essentially equal, so it is important to ensure the correct model is identified for individual pressure requirements. Example: A particular application has a moderate pressure requirement of 350 PSIG, flow rate not critical, and the exit flow can be routed to a return port that is at 0 PSIG. This application would point at the ROC-71 (no Display) or ROC-81 (local Display). This model includes and internal flow regulator and has a pressure range requirement 100-1200 PSI.

App Note:

Consistent pressure at the sample point is also important as fluctuating pressure (especially outside the specified range) during a sample can cause erratic and inaccurate results.



Option 1 - **High, Medium and Low Pressure** versions

- ROC-11 and -41 High Pressure Range is: 400 to 7000 PSIG
- ROC-71 and -81 Moderate Pressure Range is: 100 to 1200 PSIG
- ROC-91 and -01 Low Pressure Range is: 20 to 200 PSIG

Option 2 - **High Flow** version

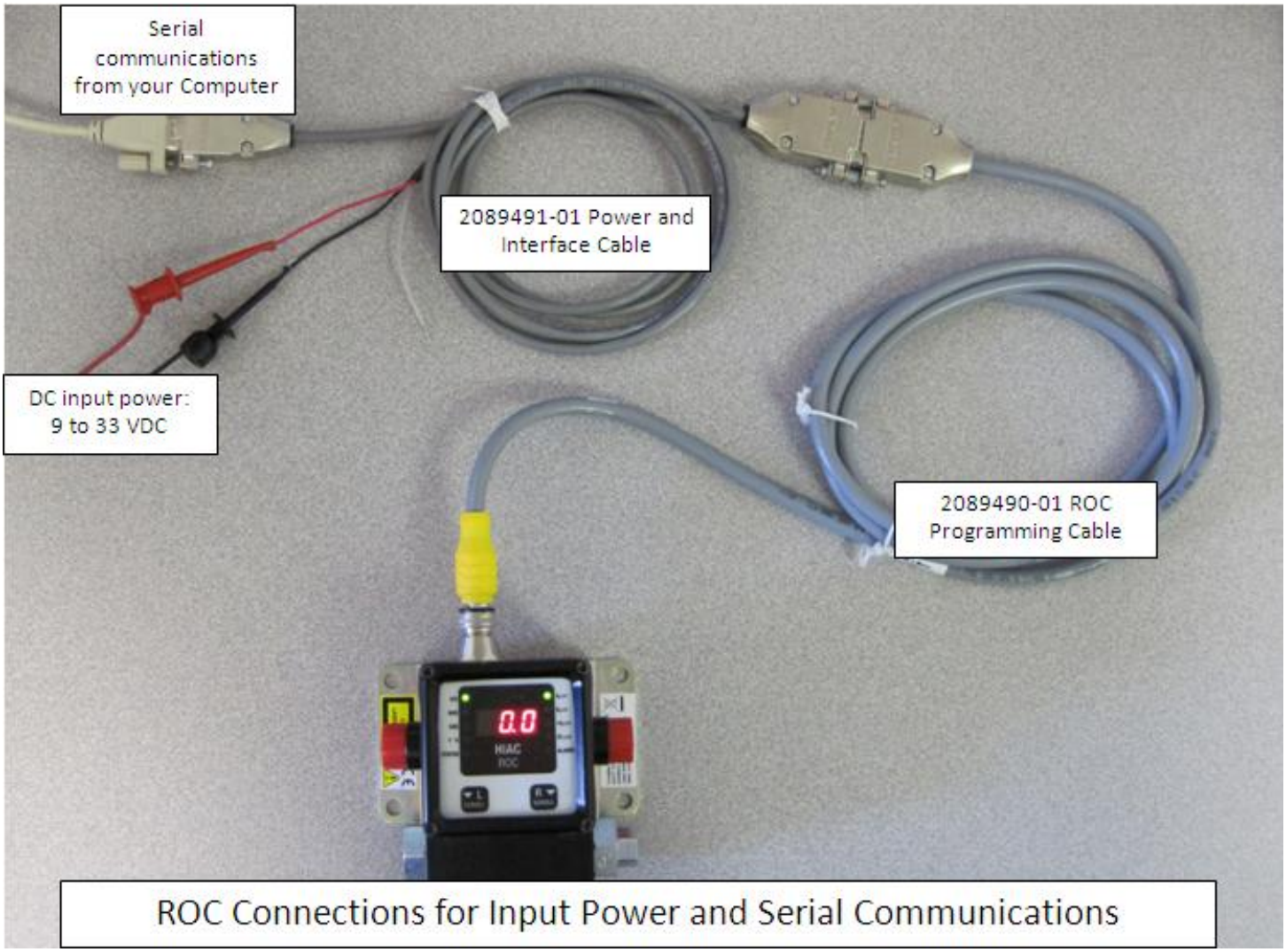
- ROC-21 and -51 Flow Range is: 1-10 GPM (3.78 to 37.8 LPM) version flow path

Option 3 - **External Flow Control** required

- ROC-31 and -61 Pressure Range is: 20 to 200 PSIG

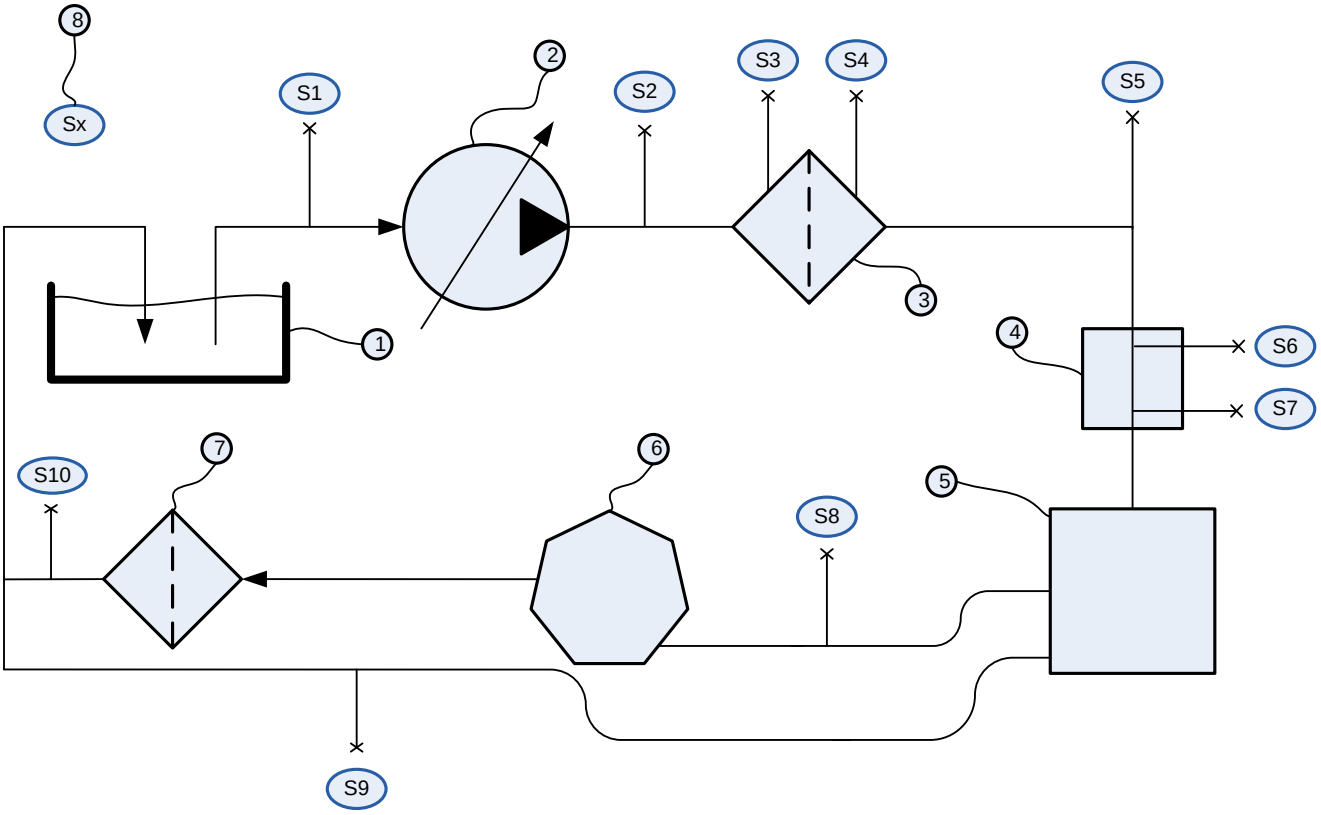
App Note:

Input Power and Communication considerations: The ROC requires a DC input voltage between 9 and 33 VDC. 12 or 24 VDC are the 2 most popular options. The Serial Communication protocol (RS232 or RS485) is: 9600 or 19200 Baud, (19200, 8 data bits, no parity, and 1 stop bit). The Modbus Communication protocol is MODBUS RTU. The Modbus Protocol register map can be requested from the Beckman Coulter Technical Support team at: 800.866.7889, Ext. 6195 or by email at: techsupportgp@beckman.com .



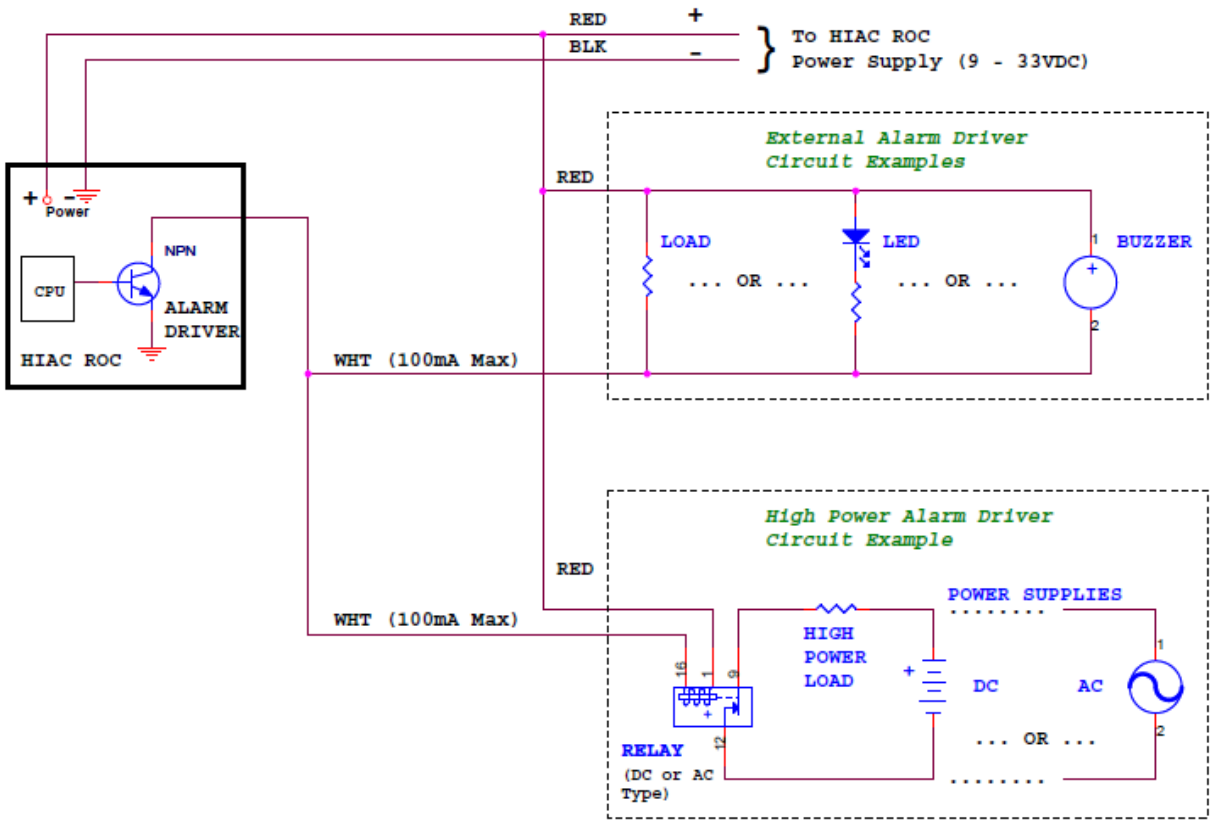
***Note - Both the 2089490-01 and 2089491-01 must be ordered separately**

Diagram for ROC sampling point locations for a typical Hydraulic system



1	Reservoir	5	Manifold
2	Pump	6	Workload (actuators, motors, etc)
3	Pressure Filter	7	Return Filter
4	Valve	8	Sampling Points (S1 - S10)

HIAC ROC ALARM DRIVER CONNECTIONS SCHEMATIC

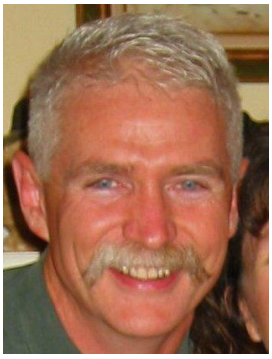


Conclusion:

To reiterate, the purpose of this Whitepaper/App Note is to provide the fundamental requirements for successful installation of any ROC Model into a suitable application. It is not intended to be a comprehensive procedure for detailing every conceivable online hydraulic configuration and so when there are questions…and there will be, please contact Technical Support at 800.866.7889, Ext. 6195 or at: techsupportgp@beckman.com.

Author Biography

Bill F. Bars is an Application Scientist for Beckman Coulter Life Sciences Company in Grants Pass, Oregon, USA. He has created and developed many of the Industrial Systems production processes and procedural tools for the Beckman Coulter / Hach Ultra Particle Counting Business Units products. These products include but are not limited to the: **HIAC PODS, 8011, 8011+, 8012, HRLD Sensors, PM4000, ROC,** and the **Calibration Fluids Lab**. He was a primary technical resource for the Hach Ultra Particle Counting ISO 17025 accreditation project which culminated in receiving their formal ISO 17025 Accreditation Certificate from A2LA. He received his Electronics Engineering degree from DeVry Institute of Technology in 1982. He has worked for the Beckman Coulter/Hach Ultra Companies for 17 years in a multitude of engineering capacities ranging from Metrology to Service Training and Industrial Application Support.



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