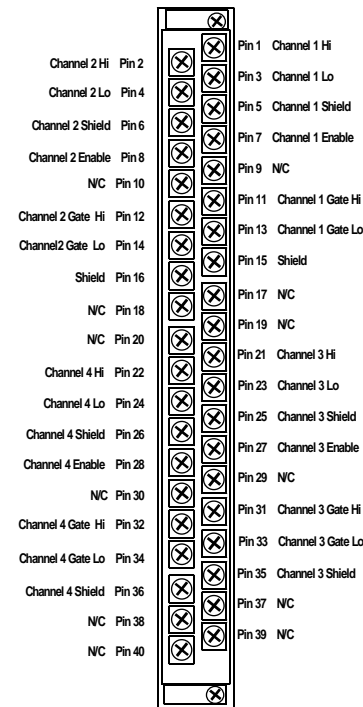


Flow/Meter Proving Input Module 140 MPM 204 00sc 4-Channel



Specifications											
Number of Channels	4 Channels of Counter Inputs 4 Channels of Pulse Fidelity Checking 4 Input Enable and Gate Control Lines										
Input Registers Required	11										
Output Registers Required	6										
LEDs	11: One each for Ready, Active, Fault, Channel & Gate										
Input Modes	DC Counter, AC Flowmeter										
Input Ranges	<table border="1"> <thead> <tr> <th>Voltage Category</th> <th>Operating Voltage</th> </tr> </thead> <tbody> <tr> <td>5 Vdc</td> <td>3.5 to 75 Vdc</td> </tr> <tr> <td>12 Vdc</td> <td>9 to 75 Vdc</td> </tr> <tr> <td>24 Vdc</td> <td>10.5 to 75 Vdc</td> </tr> <tr> <td>AC</td> <td>0.05 to 75 Vac</td> </tr> </tbody> </table>	Voltage Category	Operating Voltage	5 Vdc	3.5 to 75 Vdc	12 Vdc	9 to 75 Vdc	24 Vdc	10.5 to 75 Vdc	AC	0.05 to 75 Vac
Voltage Category	Operating Voltage										
5 Vdc	3.5 to 75 Vdc										
12 Vdc	9 to 75 Vdc										
24 Vdc	10.5 to 75 Vdc										
AC	0.05 to 75 Vac										
Counter Speed	0 to 50 kHz										
Input Frequency	0 to 50 kHz										
Minimum Pulse Time	<table border="1"> <tbody> <tr> <td>DC Mode</td> <td>10 microseconds</td> </tr> <tr> <td>External Enable/Disable and Gate Input (Meter Proving)</td> <td>Enable and Disable setup time = 10 microseconds Enable and Disable setup time = 10 microseconds</td> </tr> </tbody> </table>	DC Mode	10 microseconds	External Enable/Disable and Gate Input (Meter Proving)	Enable and Disable setup time = 10 microseconds Enable and Disable setup time = 10 microseconds						
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Accuracy	<table border="1"> <tbody> <tr> <td>Counter Mode</td> <td>+/-1 count</td> </tr> <tr> <td>Frequency Instantaneous Mode</td> <td>0.8% @ 50KHz 0.1Hz Resolution</td> </tr> </tbody> </table>	Counter Mode	+/-1 count	Frequency Instantaneous Mode	0.8% @ 50KHz 0.1Hz Resolution						
Counter Mode	+/-1 count										
Frequency Instantaneous Mode	0.8% @ 50KHz 0.1Hz Resolution										
Count Value Range	Low Range 64K, Extended Range 16M										
Nominal Input Impedance	15 KOhms										
Counter Voltage Input	Programmable 5,12,24 Vdc										
Channel Update Time	<table border="1"> <tbody> <tr> <td>Without Scaling</td> <td><1 ms per channel</td> </tr> <tr> <td>With Scaling</td> <td><1.5 ms per channel</td> </tr> </tbody> </table>	Without Scaling	<1 ms per channel	With Scaling	<1.5 ms per channel						
Without Scaling	<1 ms per channel										
With Scaling	<1.5 ms per channel										
Power Dissipation	6.6 Watts (maximum)										
Backplane Current Draw	670mA @ 5V (maximum)										
Isolation Voltage	1000 Vdc Wiring to Backplane/Chassis to Ground										
Environmental Conditions	<table border="1"> <tbody> <tr> <td>Operational Conditions</td> <td>0 to 60°C (32 to 140°C)</td> </tr> <tr> <td>Storage Temperature</td> <td>-40 to 85°C (-40 to 185°C)</td> </tr> <tr> <td>Relative Humidity</td> <td>5 to 95% (non-condensing)</td> </tr> </tbody> </table>	Operational Conditions	0 to 60°C (32 to 140°C)	Storage Temperature	-40 to 85°C (-40 to 185°C)	Relative Humidity	5 to 95% (non-condensing)				
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Storage Temperature	-40 to 85°C (-40 to 185°C)										
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Certifications	UL/cUL (Class I, Div 2, Groups ABCD) CE per Council Directive 89/336/EEC for EMC										

Flow/Meter Proving Input Module 140 MPM 204 00sc 4-Channel Modicon Quantum Automation™ Series PLC



The 140 MPM 204 00sc Flow/Meter Proving Input Module provides Quantum Automation Series PLCs the benefits of a stand-alone flow computer coupled with the convenience and reliability of a PLC. This module offers four flowmeter inputs—each easily configured for AC or DC signals. Each input supports pulse fidelity checking and double chronometry for meter proving. The 140 MPM 204 00sc module also features typical flowmeter setup parameters such as K (scaling) and M (calibration) factors in addition to input control lines for meter proving.

The 140 MPM 204 00sc module resides in a standard Quantum backplane and offers:

- **Versatility** by providing both flow measurement and meter proving in one module.
- **Exceptional value** by dramatically lowering installation costs. Meters may be interfaced directly to the module eliminating the expense of additional external conditioning devices.
- **Flexibility** through a wide variety of user selectable features.
- **Convenience** with automatic conversion of signals into engineering units.
- **Ease of installation** with support from Concept, Modsoft and ProWORX NxT programming software. The installation and operation of the 140 MPM 204 00sc module mirrors Quantum modules and is easily configured.

Designed for, but not limited to, applications in oil and gas industries, the 140 MPM 204 00sc module is suitable for pipeline monitoring, custody transfer and totalized volume flow applications. Regardless of the media, the 140 MPM 204 00sc module is the ideal building block to your flow computer replacement system.

Reduce Installation Costs

The 140 MPM 204 00sc module incorporates dedicated flow computer technology—at a fraction of the cost. An existing Quantum PLC can be used to achieve the same results as a dedicated flow computer, with the added reliability, flexibility and security of a PLC. The result is maximum accuracy at a lower total-cost-of-ownership.

Outstanding Features

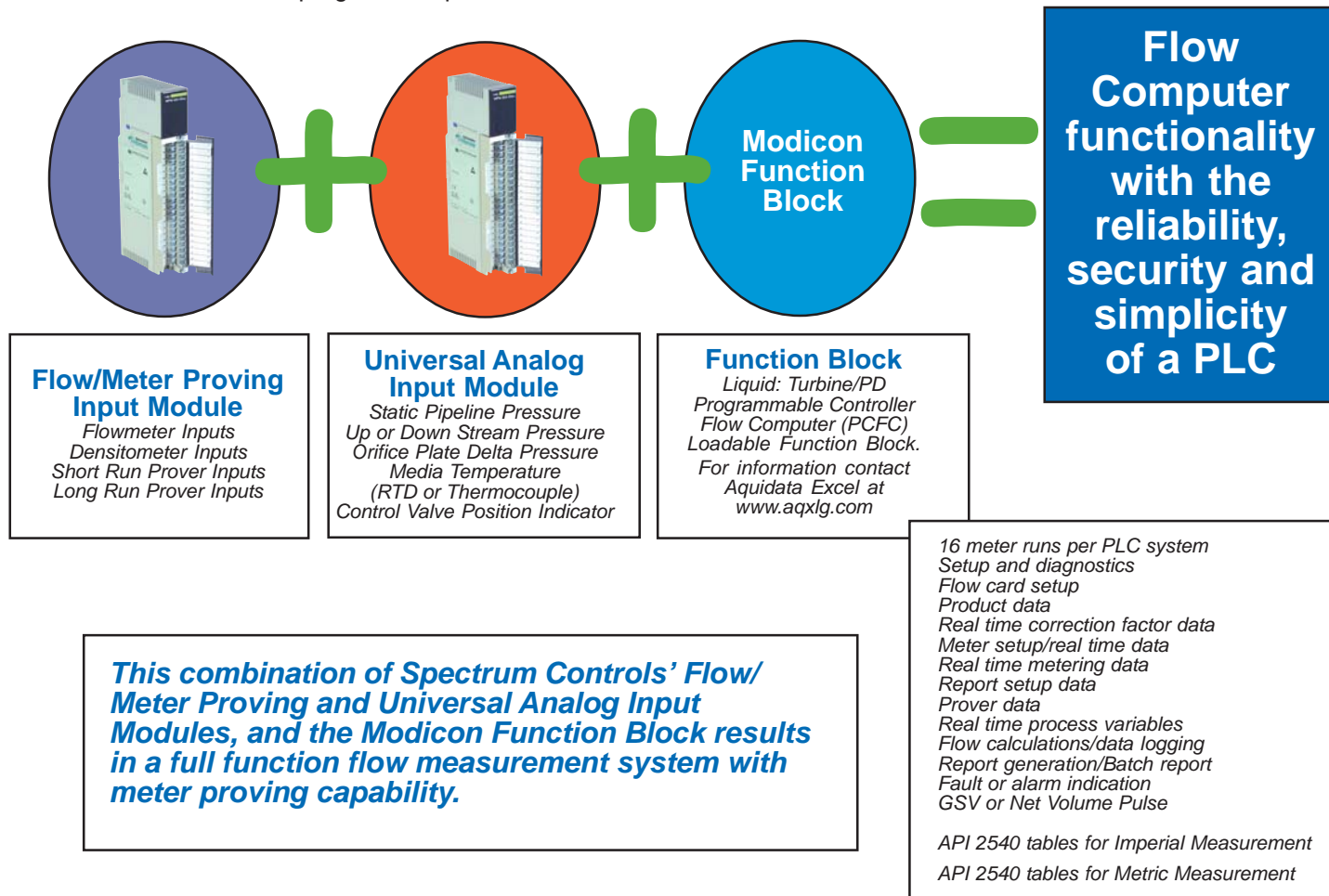
The Flow/Meter Proving Input Module includes:

- Pulse Fidelity Checking per American Petroleum Institute (API) standards
- Double Chronometry/Pulse Interpolation per API standards
- Scaling of input counts or input frequency to engineering units
- Simultaneous flow rate/volume
- Over-range flag when the frequency exceeds a preset limit
- Start, stop and reset control

Flow/Meter Proving Input Module 140 MPM 204 00sc 4-Channel Modicon Quantum Automation™ Series PLC

Formula for Replacing your Flow Computer using Spectrum Controls' Modules

Your Quantum PLC can have the same level of functionality as a dedicated flow computer. However, there are two components necessary to achieve this feature set—I/O modules with the necessary input types and a “loadable” software program that performs the certified flow calculations.



Spectrum Controls I/O for Quantum PLCs

Spectrum Controls offers a complete line of Quantum I/O modules to meet your measurement requirements.

The **140 MPM 204 00sc** can monitor up to four flowmeters each with pulse fidelity checking, and can perform four independent prover runs.

The **140 EHC 204 00sc** 4 Channel Counter Flowmeter Module and the **140 EHC 208 00sc** 8 Channel Counter Flowmeter Module support general purpose flow and count applications.

The **140 AUI 040 00 sc** 16 Channel Universal Analog Input Module supports current/voltage/thermocouple/RTD input types.

The **140 ACI 051 00sc** 32 Channel Analog Input Module supports current or voltage signals and is also available with a timestamp option.

Double Chronometry

What is Double Chronometry?

In order to verify the performance of a flowmeter, it is necessary to collect a minimum number of pulses over the duration of the proving period. The number of pulses that a meter can produce per unit volume of throughput is often limited by design constraints. A means of increasing the flowmeter's resolution is necessary to increase resolution.

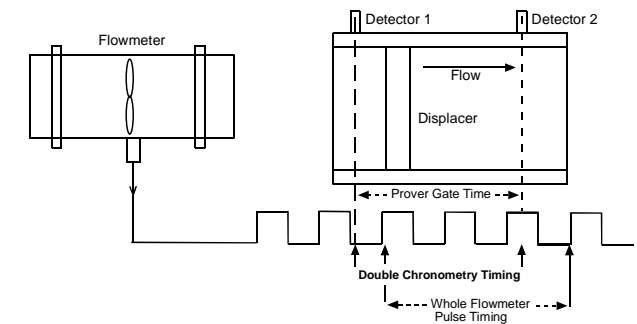
Double Chronometry is a method of pulse interpolation that is employed to increase meter resolution. The pulses generated by the meter are electronically measured and the distance between pulses can be broken into smaller time units. This allows the time between a signal start and a signal stop to be measured with more definition.

The benefits of Double Chronometry

Double Chronometry is recognized by the American Petroleum Institute (API) as a standardized method of proving flowmeters. Double Chronometry allows you to perform small volume prover runs with a higher degree of accuracy, and is a cost effective method of increasing the accuracy of meter proving systems.

Note that the Double Chronometry measurement time is consistent with the actual prover transit time, and the whole flow measurement time relies on full pulse counting.

Double Chronometry ensures that the prover transit time is measured with a higher degree of accuracy. This is essential for short run prover applications.



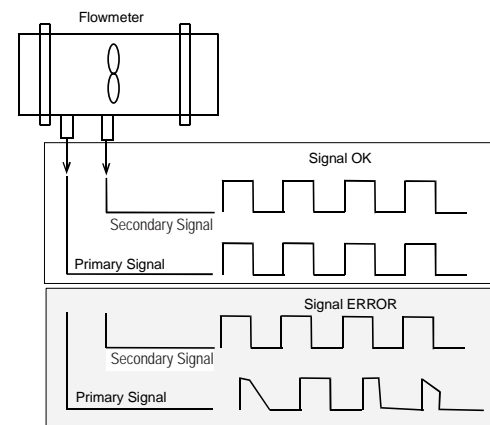
Pulse Fidelity and Data Security

What is Pulse Fidelity?

Pulse Fidelity is a method by which pulsed-data from flowmeter systems is verified to a certain level of fidelity and security. Fidelity is defined as the accuracy to which the meter reproduces the precision of the output signal. There are a variety of security levels for Pulse Fidelity. The level of checking is correlated to the relative level of security.

The benefits of Pulse Fidelity

Fidelity checking reduces flowmeter uncertainty caused by added or missing pulses due to electrical transients or equipment failure. Pulse Fidelity will detect, quantify and alarm any occurrences of phase, frequency, sequence and common mode noise and transients.



Pulse Fidelity provides a clear indication of your flowmeter's health and potential disturbances within the system.

Note that even though the two signal pickup points are on the same meter, the signal is different when an error occurs. This is an indication that the meter should be checked.