H2SMART™

Modbus RTU Interface Via RS-485

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CE Conformity (Europe)

This product conforms to 73/23/EEC, the Low Voltage Directive, and 89/336/EEC, the EMC Directive.

AMS Conformity (North America)

This product conforms to SAE Aerospace Material Specifications AMS 2759/10 for nitriding and 2759/12 for nitrocarburizing

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1. General

H2Smart™ supports the standard Modbus commands 3 (Read n registers), 6 (write one register), 7 (fast read of sampling enable status). Floating point values are converted to and from 16 bit integers for Modbus communication, providing a LSB value given in the register assignment below. For example, if the H2Smart™ is calibrated for dissociation, a value of 5000 read from Modbus register 0 means a measured dissociation of 50.00%.

Any standard Modbus master with freely settable data addresses should be able to communicate with H2Smart™ without any problems. The interface must be configured for 4 wire communication. (Future development is planned for 2 wire communication.) The connection is through the female DB9 connector on the front of the unit designated 'Opt. Interface' according to the table. The default Modbus slave address of the unit is 2. The H2Smart™ is shipped with default parameters of 9600Bd, 8 bits/character, parity even, 1 stop bit. Setup of Modbus device address and interface mode is done using the H2Smart™ service software.

2. Modbus Register Assignment

2.1 Read Only Registers

<table>
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<tr>
<th>Register</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>H2Smart™ sensor result (H₂ or Dissociation, depending on calibration type) in 0.01%</td>
</tr>
<tr>
<td>1</td>
<td>Flow rate in 0.001 SLM or CFH (depending on flow sensor unit configuration)</td>
</tr>
<tr>
<td>3</td>
<td>TBlock in 0.01°C or °F (depending on temperature unit configuration)</td>
</tr>
<tr>
<td>4</td>
<td>Taux in 0.01°C or °F (depending on temperature unit configuration)</td>
</tr>
<tr>
<td>5</td>
<td>State of the digital inputs</td>
</tr>
<tr>
<td>6</td>
<td>State of the digital outputs</td>
</tr>
<tr>
<td>28</td>
<td>Model calculated KN in units of 0.01</td>
</tr>
<tr>
<td>29</td>
<td>Model calculated aC in units of 0.001</td>
</tr>
<tr>
<td>37</td>
<td>O₂ probe voltage measured by the optional O₂ probe input module in 0.1mV</td>
</tr>
<tr>
<td>38</td>
<td>O₂ probe temperature of the O₂ input module in 0.1 °C or °F (depending on temperature unit configuration)</td>
</tr>
<tr>
<td>48</td>
<td>Model calculated KC in units of 0.01</td>
</tr>
</tbody>
</table>

DB9 RS485 pin assignment

1 - A (TX-) (four wire mode only) (WHT)
2 + B (TX+)(four wire mode only) (BLK)
3 +B (RX/TX+) (BLK)
5 GND (Must be connected) (GND)
8 - A (RX/TX-) (RED)

(note: 2 wire not currently supported)
2.2 Read/Write Registers

9 Modbus sampling enable override signal: 0: Sampling stopped, 1: Sampling enabled

For continuous sampling, the sampling enable signal must be sent regularly every 10 to 80 seconds. If the sampling enable signal is not received, the sampling will stop after 90 seconds. This is to ensure that the unit does not get damaged in the event of a loss of communication.

10 Process gas 1 (Nitrogen) flow value in 0.001 m³/h (must be updated for a correct KN calculation)

11 Process gas 2 (Ammonia) flow value in 0.001 m³/h (must be updated for a correct KN calculation)

12 Process gas 3 (Dissociated Ammonia) flow value in 0.001 m³/h (must be updated for a correct KN calculation)

13 Process gas 4 (Carbon Dioxide) flow value in 0.001 m³/h (must be updated for a correct KN calculation)

14 Process gas 4 (Carbon Monoxide) flow value in 0.001 m³/h (must be updated for a correct KN calculation)

18 Furnace model Initialize. Writing 1 to this value resets the furnace model to the start condition.

30 Furnace temperature in 0.01°C