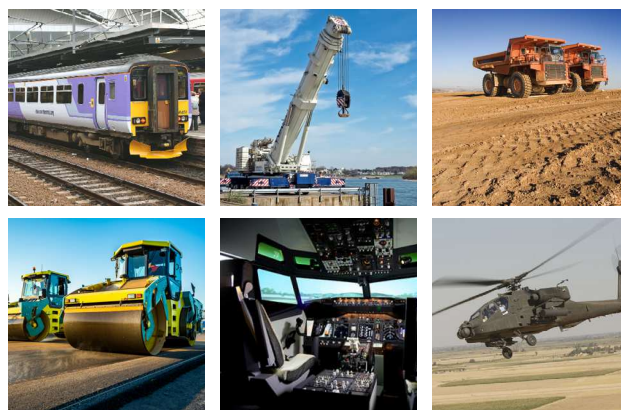


The NEW Ruby MEMS accelerometers represent the next generation of high-performance inertial sensors from Jewell Instruments. With an improved Price-Performance, the new Ruby inertial sensors offer improved resolution, faster frequency response, and wider bandwidth – all in a IP67 package that utilizes the same mounting configuration of Jewell’s current MEMS sensors.

- Ranges:  $\pm 0.5\text{g}$  to  $\pm 10\text{g}$
- Output Signal Options:  $\pm 5\text{V}$ ,  $4\text{--}20\text{mA}$ , or  $0\text{--}5\text{V}$
- Resolution: From  $0.08$  to  $0.02\text{ mg}$
- Bandwidth:  $1000\text{ Hz}$
- Operating Temp Range:  $-40^{\circ}$  to  $+85^{\circ}\text{C}$
- Seal: IP67
- RoHS compliant
- M12 and DB9 termination option



- Aerospace
- Military
- Robotics
- Academic Research
- Wind Turbine Controls
- Track Monitoring and Testing
- Wind Power Monitoring
- Vibration monitoring
- Automated Control Systems
- Vehicle Testing and more....

# JMHA-D SPECIFICATIONS: $\pm 5\text{VDC}$

## STATIC/DYNAMIC

| INPUT RANGE (g)                            | $\pm 0.5$  | $\pm 1$ | $\pm 2$ | $\pm 4$ | $\pm 10$ |
|--------------------------------------------|------------|---------|---------|---------|----------|
| FULL RANGE OUTPUT (VDC) <sup>1</sup>       | $\pm 5.00$ |         |         |         |          |
| RESOLUTION & THRESHOLD (mg max)            | 0.02       | 0.04    | 0.05    | 0.08    | 0.08     |
| NONLINEARITY (% FRO) <sup>2</sup> max      | 0.06       | 0.06    | 0.06    | 0.07    | 0.07     |
| NOMINAL SCALE FACTOR V/G                   | 10         | 5       | 2.5     | 1.25    | 0.5      |
| SCALE FACTOR TEMP COEFFICIENT (PPM/°C max) | 150        |         |         |         |          |
| BIAS TEMP SENSITIVITY (mg/°C max)          | 0.25       |         |         |         |          |
| TRANSVERSE AXIS MISALIGNMENT (° max)       | $\pm 0.15$ |         |         |         |          |
| BANDWIDTH (Hz, 3db)                        | 1000       |         |         |         |          |
| CROSS AXIS SENSITIVITY (g/g max)           | 0.01       |         |         |         |          |
| NONREPEATABILITY (mg, max)                 | 0.07       | 0.07    | 0.07    | 0.1     | 0.1      |

### NOTES:

1. Full Range is defined "from negative full input angle to positive full input angle."
2. Nonlinearity is specified as deviation of output referenced to theoretical sine function value, independent of misalignment.

\*Specifications subject to change without notice on account of continued product development

## ELECTRICAL

|                                  |                     |
|----------------------------------|---------------------|
| NUMBER OF AXES                   | 1, 2, 3             |
| INPUT VOLTAGE RANGE (VDC)        | $\pm 8$ to $\pm 18$ |
| INPUT CURRENT (mA, max)          | 22                  |
| OUTPUT IMPEDANCE (Ohms, nominal) | <1                  |

## ENVIRONMENTAL

|                       |               |
|-----------------------|---------------|
| OPERATING TEMP. RANGE | -40° to +85°C |
| STORAGE TEMP. RANGE   | -40° to +95°C |

## ENCLOSURE

|                                |          |
|--------------------------------|----------|
| WEIGHT (g)                     | 140      |
| PROTECTION CLASS (per IEC 529) | IP67     |
| CONNECTOR                      | DB9, M12 |

## PIN OUTS

| DB9 PIN# | FNCTN | M12 PIN# | FNCTN |
|----------|-------|----------|-------|
| 1        | VIN+  | 1        | VIN+  |
| 2        | GND   | 2        | GND   |
| 3        | VIN-  | 3        | VIN-  |
| 4        | X     | 4        | X     |
| 5        | Y     | 5        | Y     |
| 6        | Z     | 6        | Z     |
| 7        | GND   | 7        | GND   |
| 8        | TEMP  | 8        | TEMP  |
| 9        | GND   | 9        | GND   |
|          |       | 10       | N/C   |
|          |       | 11       | N/C   |
|          |       | 12       | N/C   |

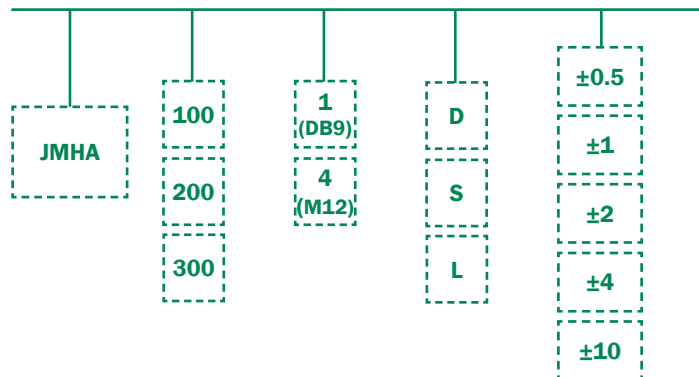


## ORDERING INFORMATION

### HOW TO ORDER

Model Numbers are comprised of the series, axes, the connector option, version, and the input range.

SERIES - AXES - CONNECTOR - VERSION - INPUT RANGE



**D (±5V), S (0-5V), L (4-20mA)**

|      | MODEL #          | PART #        |
|------|------------------|---------------|
| ±0.5 | JMHA-100-1-D-0.5 | 02550431-1122 |
|      | JMHA-100-4-D-0.5 | 02550431-1422 |
|      | JMHA-200-1-D-0.5 | 02550431-2122 |
|      | JMHA-200-4-D-0.5 | 02550431-2422 |
|      | JMHA-300-1-D-0.5 | 02550431-3122 |
|      | JMHA-300-4-D-0.5 | 02550431-3422 |

|     | MODED #           | PART #        |
|-----|-------------------|---------------|
| ±1  | JMHA-100-1-D-1.0  | 02550431-1123 |
|     | JMHA-100-4-D-1.0  | 02550431-1423 |
|     | JMHA-200-1-D-1.0  | 02550431-2123 |
|     | JMHA-200-4-D-1.0  | 02550431-2423 |
|     | JMHA-300-1-D-1.0  | 02550431-3123 |
|     | JMHA-300-4-D-1.0  | 02550431-3423 |
| ±2  | JMHA-100-1-D-2.0  | 02550431-1124 |
|     | JMHA-100-4-D-2.0  | 02550431-1424 |
|     | JMHA-200-1-D-2.0  | 02550431-2124 |
|     | JMHA-200-4-D-2.0  | 02550431-2424 |
|     | JMHA-300-1-D-2.0  | 02550431-3124 |
|     | JMHA-300-4-D-2.0  | 02550431-3424 |
| ±4  | JMHA-100-1-D-4.0  | 02550431-1126 |
|     | JMHA-100-4-D-4.0  | 02550431-1426 |
|     | JMHA-200-1-D-4.0  | 02550431-2126 |
|     | JMHA-200-4-D-4.0  | 02550431-2426 |
|     | JMHA-300-1-D-4.0  | 02550431-3126 |
|     | JMHA-300-4-D-4.0  | 02550431-3426 |
| ±10 | JMHA-100-1-D-10.0 | 02550431-1128 |
|     | JMHA-100-4-D-10.0 | 02550431-1428 |
|     | JMHA-200-1-D-10.0 | 02550431-2128 |
|     | JMHA-200-4-D-10.0 | 02550431-2428 |
|     | JMHA-300-1-D-10.0 | 02550431-3128 |
|     | JMHA-300-4-D-10.0 | 02550431-3428 |

## ACCESSORIES

### CABLE

| CONNECTOR | MODEL #    | LENGTH (m) |
|-----------|------------|------------|
| M12       | F848873-01 | 3          |
| M12       | F848873-02 | 10         |
| DB9       | F848874-01 | 3          |
| DB9       | F848874-02 | 10         |

# JMHA-S SPECIFICATIONS: 0-5VDC

## STATIC/DYNAMIC

| INPUT RANGE (g)                            | ±0.5  | ±1   | ±2   | ±4    | ±10  |
|--------------------------------------------|-------|------|------|-------|------|
| FULL RANGE OUTPUT (VDC) <sup>1</sup>       | 0-5   |      |      |       |      |
| RESOLUTION & THRESHOLD (mg max)            | 0.02  | 0.04 | 0.05 | 0.08  | 0.08 |
| NONLINEARITY (% FRO) <sup>2</sup> max      | 0.06  | 0.06 | 0.06 | 0.07  | 0.07 |
| NOMINAL SCALE FACTOR V/G                   | 5     | 2.5  | 1.25 | 0.625 | 0.25 |
| SCALE FACTOR TEMP COEFFICIENT (PPM/°C max) | 150   |      |      |       |      |
| BIAS TEMP SENSITIVITY (mg/°C max)          | 0.25  |      |      |       |      |
| TRANSVERSE AXIS MISALIGNMENT (° max)       | ±0.15 |      |      |       |      |
| BANDWIDTH (Hz, 3db)                        | 1000  |      |      |       |      |
| CROSS AXIS SENSITIVITY (g/g max)           | 0.01  |      |      |       |      |
| NONREPEATABILITY (mg, max)                 | 0.07  | 0.07 | 0.07 | 0.1   | 0.1  |

### NOTES:

1. Full Range is defined "from negative full input angle to positive full input angle."
2. Nonlinearity is specified as deviation of output referenced to theoretical sine function value, independent of misalignment.

\*Specifications subject to change without notice on account of continued product development

## ELECTRICAL

|                                  |          |
|----------------------------------|----------|
| NUMBER OF AXES                   | 1, 2, 3  |
| INPUT VOLTAGE RANGE (VDC)        | 12 to 18 |
| INPUT CURRENT (mA, max)          | 22       |
| OUTPUT IMPEDANCE (Ohms, nominal) | <1       |

## ENVIRONMENTAL

|                       |               |
|-----------------------|---------------|
| OPERATING TEMP. RANGE | -40° to +85°C |
| STORAGE TEMP. RANGE   | -40° to +95°C |

## ENCLOSURE

|                                |          |
|--------------------------------|----------|
| WEIGHT (g)                     | 140      |
| PROTECTION CLASS (per IEC 529) | IP67     |
| CONNECTOR                      | DB9, M12 |

## PIN OUTS

| DB9 PIN# | FNCTN | M12 PIN# | FNCTN |
|----------|-------|----------|-------|
| 1        | VIN+  | 1        | VIN+  |
| 2        | GND   | 2        | GND   |
| 3        | VIN-  | 3        | VIN-  |
| 4        | X     | 4        | X     |
| 5        | Y     | 5        | Y     |
| 6        | Z     | 6        | Z     |
| 7        | GND   | 7        | GND   |
| 8        | TEMP  | 8        | TEMP  |
| 9        | GND   | 9        | GND   |
|          |       | 10       | N/C   |
|          |       | 11       | N/C   |
|          |       | 12       | N/C   |

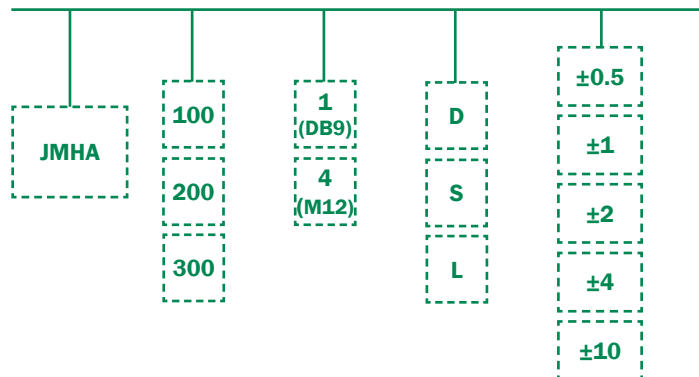


## ORDERING INFORMATION

### HOW TO ORDER

Model Numbers are comprised of the series, axes, the connector option, version, and the input range.

SERIES - AXES - CONNECTOR - VERSION - INPUT RANGE



**D (±5V), S (0-5V), L (4-20mA)**

|      | MODEL #          | PART #        |
|------|------------------|---------------|
| ±0.5 | JMHA-100-1-S-0.5 | 02550431-1112 |
|      | JMHA-100-4-S-0.5 | 02550431-1412 |
|      | JMHA-200-1-S-0.5 | 02550431-2112 |
|      | JMHA-200-4-S-0.5 | 02550431-2412 |
|      | JMHA-300-1-S-0.5 | 02550431-3112 |
|      | JMHA-300-4-S-0.5 | 02550431-3412 |

|     | MODED #           | PART #        |
|-----|-------------------|---------------|
| ±1  | JMHA-100-1-S-1.0  | 02550431-1113 |
|     | JMHA-100-4-S-1.0  | 02550431-1413 |
|     | JMHA-200-1-S-1.0  | 02550431-2113 |
|     | JMHA-200-4-S-1.0  | 02550431-2413 |
|     | JMHA-300-1-S-1.0  | 02550431-3113 |
|     | JMHA-300-4-S-1.0  | 02550431-3413 |
| ±2  | JMHA-100-1-S-2.0  | 02550431-1114 |
|     | JMHA-100-4-S-2.0  | 02550431-1414 |
|     | JMHA-200-1-S-2.0  | 02550431-2114 |
|     | JMHA-200-4-S-2.0  | 02550431-2414 |
|     | JMHA-300-1-S-2.0  | 02550431-3114 |
|     | JMHA-300-4-S-2.0  | 02550431-3414 |
| ±4  | JMHA-100-1-S-4.0  | 02550431-1116 |
|     | JMHA-100-4-S-4.0  | 02550431-1416 |
|     | JMHA-200-1-S-4.0  | 02550431-2116 |
|     | JMHA-200-4-S-4.0  | 02550431-2416 |
|     | JMHA-300-1-S-4.0  | 02550431-3116 |
|     | JMHA-300-4-S-4.0  | 02550431-3416 |
| ±10 | JMHA-100-1-S-10.0 | 02550431-1118 |
|     | JMHA-100-4-S-10.0 | 02550431-1418 |
|     | JMHA-200-1-S-10.0 | 02550431-2118 |
|     | JMHA-200-4-S-10.0 | 02550431-2418 |
|     | JMHA-300-1-S-10.0 | 02550431-3118 |
|     | JMHA-300-4-S-10.0 | 02550431-3418 |

## ACCESSORIES

### CABLE

| CONNECTOR | MODEL #    | LENGTH (m) |
|-----------|------------|------------|
| M12       | F848873-01 | 3          |
| M12       | F848873-02 | 10         |
| DB9       | F848874-01 | 3          |
| DB9       | F848874-02 | 10         |



# JMHA-L SPECIFICATIONS: 4-20mA

## STATIC/DYNAMIC

| INPUT RANGE (g)                            | ±0.5  | ±1   | ±2   | ±4   | ±10  |
|--------------------------------------------|-------|------|------|------|------|
| FULL RANGE OUTPUT (mA) <sup>1</sup>        | 4-20  |      |      |      |      |
| RESOLUTION & THRESHOLD (mg max)            | 0.02  | 0.04 | 0.05 | 0.08 | 0.08 |
| NONLINEARITY (% FRO) <sup>2</sup> max      | 0.06  | 0.06 | 0.06 | 0.07 | 0.07 |
| NOMINAL SCALE FACTOR mA/G                  | 16    | 8    | 4    | 2    | 0.8  |
| SCALE FACTOR TEMP COEFFICIENT (PPM/°C max) | 150   |      |      |      |      |
| BIAS TEMP SENSITIVITY (mg/°C max)          | 0.25  |      |      |      |      |
| TRANSVERSE AXIS MISALIGNMENT (° max)       | ±0.15 |      |      |      |      |
| BANDWIDTH (Hz, 3db)                        | 1000  |      |      |      |      |
| CROSS AXIS SENSITIVITY (g/g max)           | 0.01  |      |      |      |      |
| NONREPEATABILITY (mg, max)                 | 0.07  | 0.07 | 0.07 | 0.1  | 0.1  |

### NOTES:

1. Full Range is defined "from negative full input angle to positive full input angle."
2. Nonlinearity is specified as deviation of output referenced to theoretical sine function value, independent of misalignment.

\*Specifications subject to change without notice on account of continued product development

## ELECTRICAL

|                                  |                                             |
|----------------------------------|---------------------------------------------|
| NUMBER OF AXES                   | 1, 2, 3                                     |
| INPUT VOLTAGE RANGE (VDC)        | 12 to 18                                    |
| INPUT CURRENT (mA, max)          | 40 (1-axis),<br>60 (2-axis),<br>80 (3-axis) |
| OUTPUT IMPEDANCE (Ohms, nominal) | 15                                          |

## ENVIRONMENTAL

|                       |               |
|-----------------------|---------------|
| OPERATING TEMP. RANGE | -40° to +85°C |
| STORAGE TEMP. RANGE   | -40° to +95°C |

## ENCLOSURE

|                                |          |
|--------------------------------|----------|
| WEIGHT (g)                     | 140      |
| PROTECTION CLASS (per IEC 529) | IP67     |
| CONNECTOR                      | DB9, M12 |

## PIN OUTS

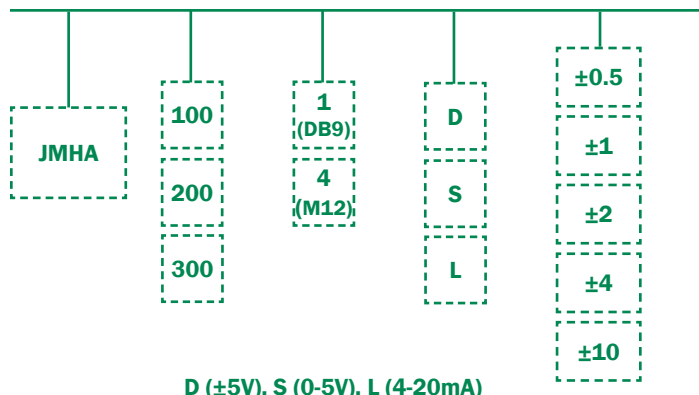
| DB9 PIN# | FNCTN | M12 PIN# | FNCTN |
|----------|-------|----------|-------|
| 1        | VIN+  | 1        | VIN+  |
| 2        | GND   | 2        | GND   |
| 3        | VIN-  | 3        | VIN-  |
| 4        | X     | 4        | X     |
| 5        | Y     | 5        | Y     |
| 6        | Z     | 6        | Z     |
| 7        | GND   | 7        | GND   |
| 8        | TEMP  | 8        | TEMP  |
| 9        | GND   | 9        | GND   |
|          |       | 10       | N/C   |
|          |       | 11       | N/C   |
|          |       | 12       | N/C   |

# ORDERING INFORMATION

## HOW TO ORDER

Model Numbers are comprised of the series, axes, the connector option, version, and the input range.

SERIES - AXES - CONNECTOR - VERSION - INPUT RANGE



|      | MODEL #          | PART #        |
|------|------------------|---------------|
| ±0.5 | JMHA-100-1-L-0.5 | 02550431-1132 |
|      | JMHA-100-4-L-0.5 | 02550431-1432 |
|      | JMHA-200-1-L-0.5 | 02550431-2132 |
|      | JMHA-200-4-L-0.5 | 02550431-2432 |
|      | JMHA-300-1-L-0.5 | 02550431-3132 |
|      | JMHA-300-4-L-0.5 | 02550431-3432 |

|     | MODED #           | PART #        |
|-----|-------------------|---------------|
| ±1  | JMHA-100-1-L-1.0  | 02550431-1133 |
|     | JMHA-100-4-L-1.0  | 02550431-1433 |
|     | JMHA-200-1-L-1.0  | 02550431-2133 |
|     | JMHA-200-4-L-1.0  | 02550431-2433 |
|     | JMHA-300-1-L-1.0  | 02550431-3133 |
| ±2  | JMHA-100-1-L-2.0  | 02550431-1124 |
|     | JMHA-100-4-L-2.0  | 02550431-1424 |
|     | JMHA-200-1-L-2.0  | 02550431-2124 |
|     | JMHA-200-4-L-2.0  | 02550431-2424 |
|     | JMHA-300-1-L-2.0  | 02550431-3124 |
| ±4  | JMHA-100-1-L-4.0  | 02550431-1136 |
|     | JMHA-100-4-L-4.0  | 02550431-1436 |
|     | JMHA-200-1-L-4.0  | 02550431-2136 |
|     | JMHA-200-4-L-4.0  | 02550431-2436 |
|     | JMHA-300-1-L-4.0  | 02550431-3136 |
| ±10 | JMHA-100-1-L-10.0 | 02550431-1138 |
|     | JMHA-100-4-L-10.0 | 02550431-1438 |
|     | JMHA-200-1-L-10.0 | 02550431-2138 |
|     | JMHA-200-4-L-10.0 | 02550431-2438 |
|     | JMHA-300-1-L-10.0 | 02550431-3138 |
|     | JMHA-300-4-L-10.0 | 02550431-3438 |

## ACCESSORIES

### CABLE

| CONNECTOR | MODEL #    | LENGTH (m) |
|-----------|------------|------------|
| M12       | F848873-01 | 3          |
| M12       | F848873-02 | 10         |
| DB9       | F848874-01 | 3          |
| DB9       | F848874-02 | 10         |