

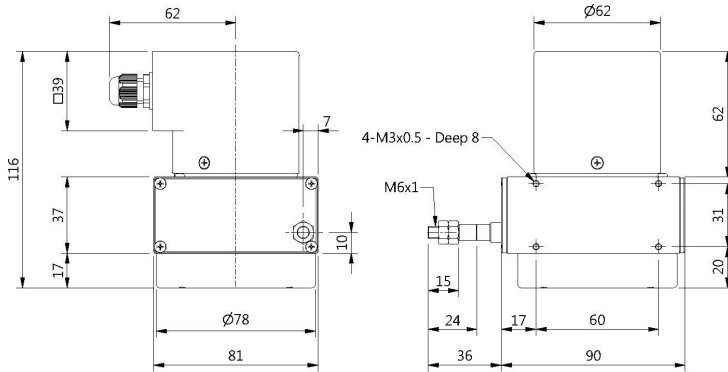
# HPS-M1-D

**DISPLACEMENT SENSOR**  
**LINEAR WIRE POTENTIOMETER**  
**RS 485**



- Stroke 行程: 1200 ~ 5000 mm
- Interface: RS485 MODBUS RTU Output

## DIMENSION



## ORDERING INFORMATION

| HPS-M1- | Measuring Range<br>量測行程 | Signal Mode<br>信號模式 | Pot. Life & Linearity<br>壽命<br>線性度                   | Signal Sequence<br>信號輸出序列 |
|---------|-------------------------|---------------------|--|---------------------------|
|         | 12: 1200 mm             | D: RS-485           | *F: 5 X 10 <sup>6</sup> cycles,<br>linearity 0.1% FS | *W: Reversed              |
|         | 125: 1250 mm            |                     |  |                           |
|         | 15: 1500 mm             |                     |  |                           |
|         | 175: 1750 mm            |                     |  |                           |
|         | 20: 2000 mm             |                     |  |                           |
|         | 25: 2500 mm             |                     |  |                           |
|         | 30: 3000 mm             |                     |  |                           |
|         | 35: 3500 mm             |                     |  |                           |
|         | 40: 4000 mm             |                     |  |                           |
|         | 50: 5000 mm             |                     |  |                           |

## ELECTRICAL SPEC.

|                                  |  |     |        |        |
|----------------------------------|--|-----|--------|--------|
| Full Stroke (mm) 量測行程            | 1200, 1250, 1500, 1750, 2000, 2500, 3000, 3500, 4000, 5000 |     |        |        |
| Sensor                           | Wire-wound and hybrid potentiometer                        |     |        |        |
| Output Signal Mode 輸出信號模式        | RS485 MODBUS RTU   | RL  | VH     | VL     |
|                                  |  | 50Ω | > 2V   | < 0.2V |
|                                  |  | 27Ω | > 1.5V | < 0.2V |
| Resolution 解析                    | < 0.025%(mcu AD 解析) / 12 bit (4096)                        |     |        |        |
| Potentiometer Life 電位計壽命         | 1X10 <sup>6</sup> cycles                                   |     |        |        |
| Linearity 線性度                    | [standard class] ±0.15% FS; [precision class] ±0.1% FS     |     |        |        |
| Repeatability 重覆性                | ±0.10% FS  |     |        |        |
| Input Power 供應電壓                 | DC12-24 Vdc ± 20%  |     |        |        |
| Input Current 供應電流               | 20 mA max.   |     |        |        |
| Output Short Protection 輸出短路保護   | Output short protection < 50mA                             |     |        |        |
| Polarity Reverse Protection 極性保護 | Input voltage polarity reverse protection 8~26 Vdc         |     |        |        |

## MECHANICAL SPEC.

|                              |   |
|------------------------------|---|
| Wire Specification 線徑規格      | Material: SUS304 with nylon coating; Diameter: 0.7 mm |
| Starting Torque on Spring 拉力 | [Stroke ≤ 1000 mm] 600 g; [Stroke ≥ 1500 mm] 1000 g   |
| Max. Travel Speed 最大往復速度     | 1,000 mm / sec.                                       |
| Vibration 震動                 | 10-55 Hz / 1.5 mm Vpp / 10 G (max.)                   |
| Cable 電線                     | Ø5.4, 100 cm long                                     |
| Weight 重量                    | < 1,000 g   |

## ENVIRONMENTAL SPEC.

|                                    |  |
|------------------------------------|--|
| Operating Temp. / Humidity 操作溫度/濕度 | -0°C ~ 70°C, RH35% ~ 90%(No Condensation)                    |
| Storage Temp. 儲存溫度                 | -20°C ~ 80°C   |
| Protection 保護等級                    | IP64: Dust & Dripping Proof (only for potentiometer housing) |
| Wire Life 壽命                       | Typical > 1 X 10 <sup>6</sup> cycles                         |

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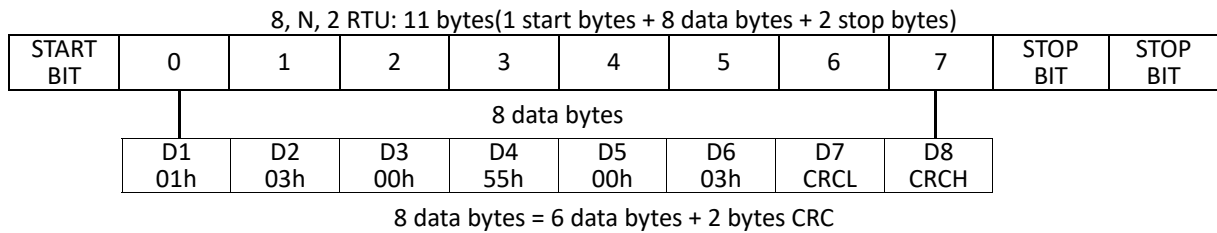
**DISPLACEMENT SENSOR**  
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**RS-485**



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## RS485 MODBUS RTU Communication Protocol

|                     |                         |
|---------------------|-------------------------|
| Baud Rate 傳輸速度      | 19200 (Programming 可修改) |
| Data Bit 資料位元       | 8 (Fix 固定)              |
| Parity Check 極性檢查   | N (Fix 固定)              |
| Stop Bit 停止位元       | 2 (Fix 固定)              |
| Device Address 產品位址 | 00 (Programming 可修改)    |



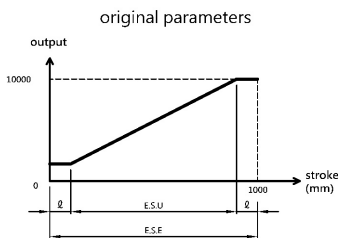
6 data bits (Readout Data): **01** **03** **0000** **0000**

|                |              |                      |                         |
|----------------|--------------|----------------------|-------------------------|
| D1             | D2           | D3 / D4              | D5 / D6                 |
| <b>01</b>      | <b>03</b>    | <b>0005</b>          | <b>0001</b>             |
| Device Address | Readout Code | Readout Data Address | Readout Data Value(16h) |
|                |              | 0005                 | 0~10000                 |

6 data bits (Write Data): **01** **06** **0000** **0000**

|                |            |                    |                  |
|----------------|------------|--------------------|------------------|
| D1             | D2         | D3 / D4            | D5 / D6          |
| <b>01</b>      | <b>06</b>  | <b>0000</b>        | <b>0000</b>      |
| Device Address | Write Code | Write Data Address | Set Data Address |
|                |            | 0000               | Write Address    |
|                |            | 0001               | Write Baud Rate  |
|                |            |                    | Data Value       |
|                |            |                    | 0000~00FF(256)   |
|                |            |                    | 0001~0005(5)     |
|                |            |                    | 0001: 9600       |
|                |            |                    | 0002: 19200      |
|                |            |                    | 0003: 38400      |
|                |            |                    | 0004: 57600      |

## Factory Fault

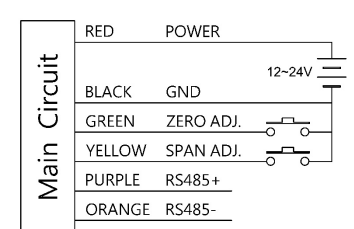


|                           |          |         |         |         |         |
|---------------------------|----------|---------|---------|---------|---------|
| E.S.E.有效電子行程 (mm)         | 1200     | 1250    | 1500    | 1750    | 2000    |
| E.S.U.使用電子行程 (mm)         | 10~1190  | 10~1240 | 10~1490 | 10~1740 | 10~1990 |
| Nonlinear Error 非線性誤差     | ±0.15%FS |         |         |         |         |
| Repeatability Error 重覆性誤差 | ±0.10%FS |         |         |         |         |

|                           |          |         |         |         |         |
|---------------------------|----------|---------|---------|---------|---------|
| E.S.E.有效電子行程 (mm)         | 2500     | 3000    | 3500    | 4000    | 5000    |
| E.S.U.使用電子行程 (mm)         | 10~2490  | 10~2990 | 10~3490 | 10~3990 | 10~4950 |
| Nonlinear Error 非線性誤差     | ±0.15%FS |         |         |         |         |
| Repeatability Error 重覆性誤差 | ±0.10%FS |         |         |         |         |

## Electrical Connection



## Programming of the start and end

- Pulling stainless wire according to the demand at the start position, connect signal ZERO (Green Wire) to GND (Black Wire) for a short circuit.
- Pulling stainless wire according to demand at the end position, connect signal SPAN (Yellow Wire) to GND (Black Wire) for a short circuit.
- 將鋼索拉至預計開始的行程，連接 ZERO (綠線) 和 GND (黑線) 短路至少 1 秒。
- 將鋼索拉至預計結束的行程，連接 SPAN (黃線) 和 GND (黑線) 短路至少 1 秒。