

## Product Data Sheet

Light Duty line of actuators  
with improved IP ratings for  
more demanding applications.



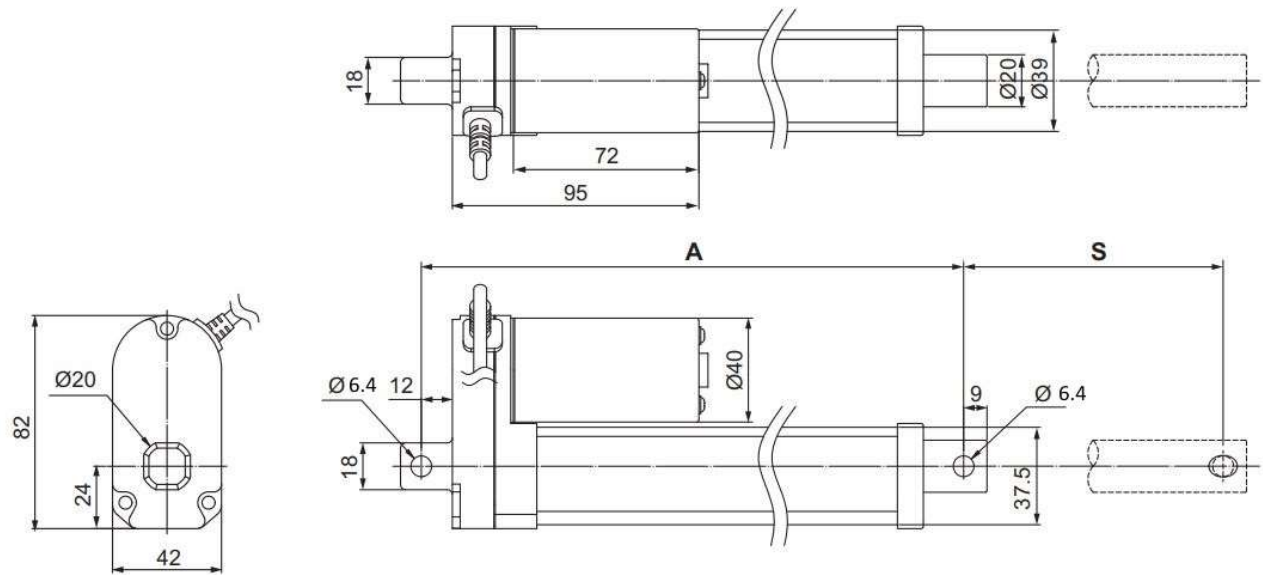
### Standard Features:

- Compact design
- All aluminum frame and extension tube
- Available in 12VDC or 24VDC operating voltages
- Nominal stroke lengths: 2" [50mm], 4" [100mm], 6" [150mm], 8" [200mm], 10" [250mm], 12" [300mm]
- Standard gear ratio: 20:1 [other ratios available]
- Dynamic load range: 34 lbs. [150 Newtons] –to- 225 lbs. [1000 Newtons]
- Maximum current draw: 2.4 Amps @ 12 VDC
- Typical speed at no load: 0.28 in/sec [7.0 mm/sec] –to- 1.73 in/sec [43.9 mm/sec]
- Typical speed at full load: 0.18 in/sec [4.6 mm/sec] –to- 1.21 in/sec [30.8 mm/sec]
- Built-in and preset limit switches to automatically halt motion at each end of stroke
- Mounting hole diameter (both ends): 1/4" [6.4mm]
- Typical lead wire length: 35" [900mm]
- Duty cycle: 25%, maximum 1 minute continuous operation in 4 minutes
- Working temperature: -13°F [-25°C] –to- +149°F [+65°C]
- Noise level: ≤60dB
- IP rating: IP69K
- Certified: CE Marking, Electromagnetic Compatibility Directive 2014/30/EU

### Available accessories:

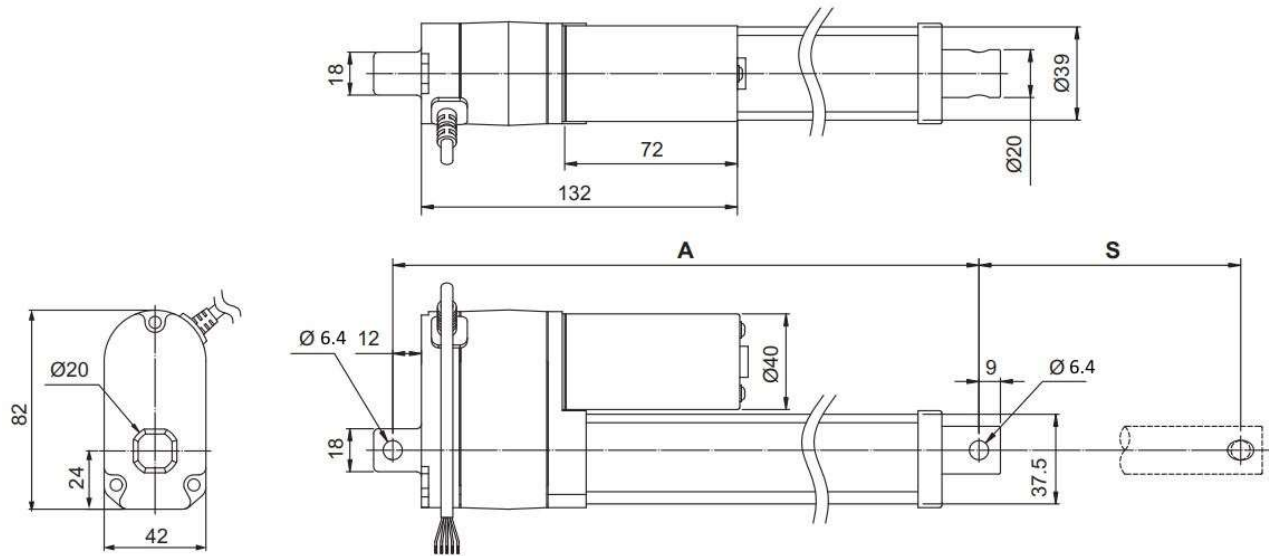
- Mounting brackets
- Direction reversing switches
- Wired and wireless controllers
- Direction reversing relays

**Dimensions – Standard (Without Hall effect sensors or potentiometer)**



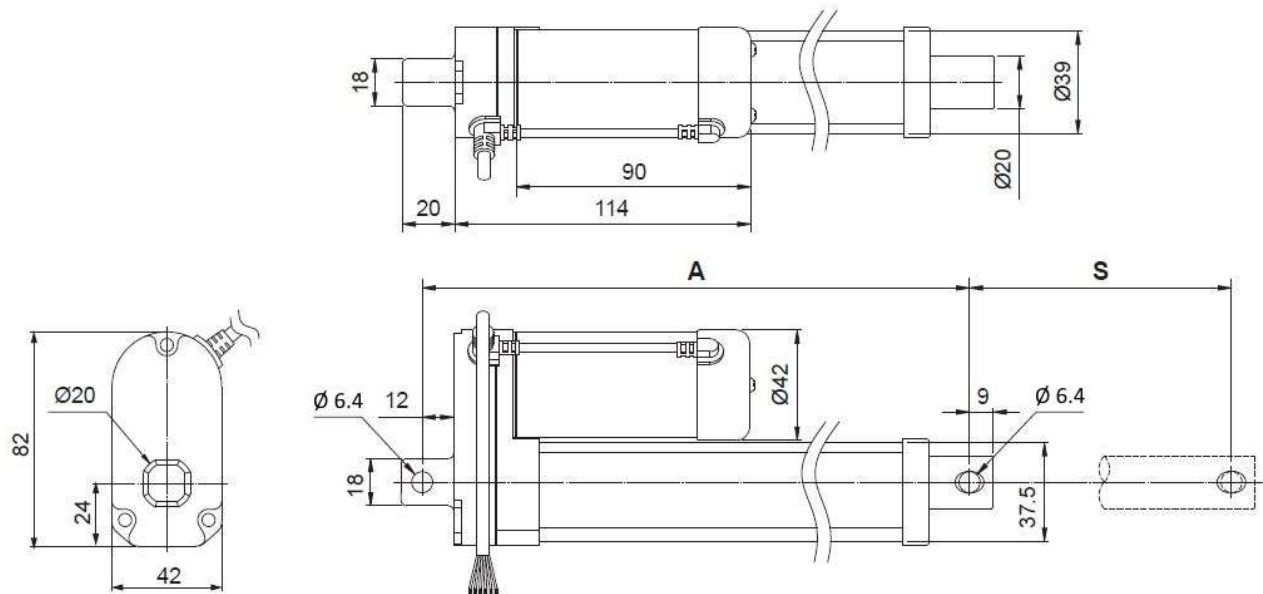
| Nominal Stroke       | 2"   |     | 4"    |     | 6"    |     | 8"    |     | 10"   |     | 12"   |     |
|----------------------|------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|
|                      | in   | mm  | in    | mm  | in    | mm  | in    | mm  | in    | mm  | in    | mm  |
| Actual Stroke        | 1.97 | 50  | 3.94  | 100 | 5.91  | 150 | 7.87  | 200 | 9.84  | 250 | 11.81 | 300 |
| Retracted Length (A) | 6.22 | 158 | 8.23  | 209 | 10.24 | 260 | 12.24 | 311 | 14.25 | 362 | 16.26 | 413 |
| Extended Length (B)  | 8.19 | 208 | 12.17 | 309 | 16.14 | 410 | 20.12 | 511 | 24.09 | 612 | 28.07 | 713 |

**Dimensions – with potentiometer**



| Nominal Stroke       | 2"   |     | 4"    |     | 6"    |     | 8"    |     | 10"   |     | 12"   |     |
|----------------------|------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|
|                      | in   | mm  | in    | mm  | in    | mm  | in    | mm  | in    | mm  | in    | mm  |
| Actual Stroke        | 1.97 | 50  | 3.94  | 100 | 5.91  | 150 | 7.87  | 200 | 9.84  | 250 | 11.81 | 300 |
| Retracted Length (A) | 7.68 | 195 | 9.69  | 246 | 11.69 | 297 | 13.70 | 348 | 15.71 | 399 | 17.72 | 450 |
| Extended Length (B)  | 9.65 | 245 | 13.62 | 346 | 17.60 | 447 | 21.57 | 548 | 25.55 | 649 | 29.53 | 750 |

**Dimensions – With Hall effect sensors**



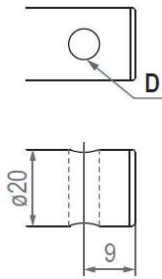
| Nominal Stroke       | 2"   |     | 4"    |     | 6"    |     | 8"    |     | 10"   |     | 12"   |     |
|----------------------|------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|
|                      | in   | mm  | in    | mm  | in    | mm  | in    | mm  | in    | mm  | in    | mm  |
| Actual Stroke        | 1.97 | 50  | 3.94  | 100 | 5.91  | 150 | 7.87  | 200 | 9.84  | 250 | 11.81 | 300 |
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| Extended Length (B)  | 8.19 | 208 | 12.17 | 309 | 16.14 | 410 | 20.12 | 511 | 24.09 | 612 | 28.07 | 713 |

## Custom extension rod and base stud offerings

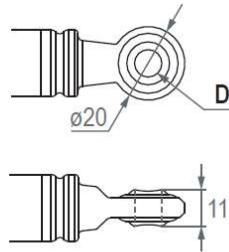
Contact Concentric International sales for these options and ordering details

### Extension rod options

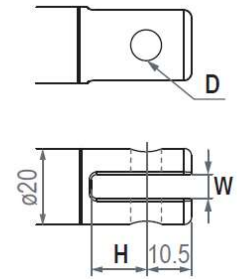
Drilled hole  
(standard)



Spherical rod eye



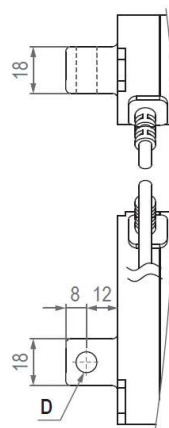
Plastic slot



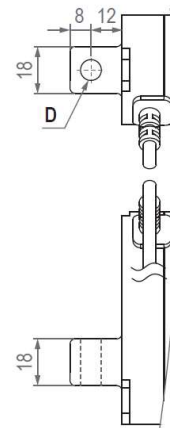
| Rod Option        | Diameter (D)<br>(w/o Bushing) | Slot width<br>(W) | Slot Depth<br>(H) |
|-------------------|-------------------------------|-------------------|-------------------|
| Drilled hole      | 6.4mm(std)                    | n/a               | n/a               |
|                   | 8mm                           | n/a               | n/a               |
|                   | 10mm                          | n/a               | n/a               |
| Spherical rod eye | 8mm                           | n/a               | n/a               |
| Plastic slot      | 8mm or 10mm                   | 6mm               | 15mm              |

### Base stud options:

Zinc alloy clevis, 0°



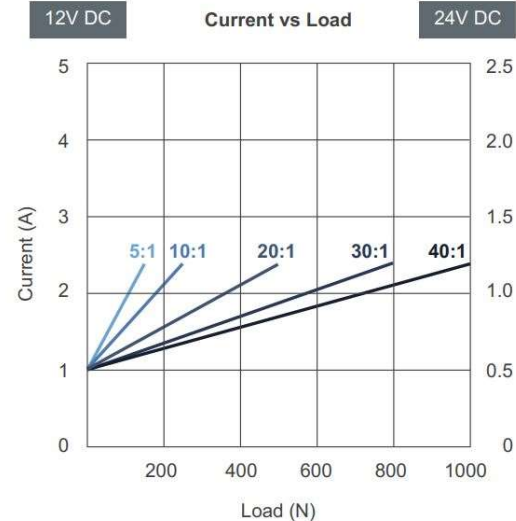
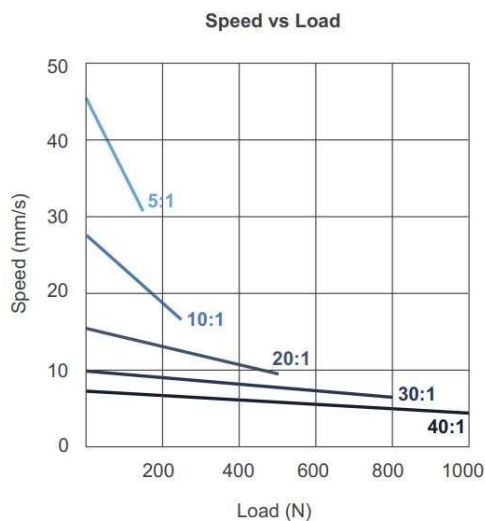
Zinc alloy clevis, 90°



## Performance Data

| Gear Ratio | Max Load/Dynamic |         | Self-Locking Ability |         | Speed/No Load |        | Speed/Max Load |        |
|------------|------------------|---------|----------------------|---------|---------------|--------|----------------|--------|
|            | lb <sub>f</sub>  | Newtons | lb <sub>f</sub>      | Newtons | inches/sec    | mm/sec | inches/sec     | mm/sec |
| 5:1        | 34               | 150     | 56                   | 250     | 1.73          | 43.9   | 1.21           | 30.8   |
| 10:1       | 56               | 250     | 76                   | 340     | 1.09          | 27.6   | 0.66           | 16.8   |
| 20:1       | 112              | 500     | 153                  | 680     | 0.57          | 14.6   | 0.37           | 9.5    |
| 30:1       | 180              | 800     | 229                  | 1020    | 0.37          | 9.5    | 0.25           | 6.3    |
| 40:1       | 225              | 1000    | 344                  | 1530    | 0.28          | 7.0    | 0.18           | 4.6    |

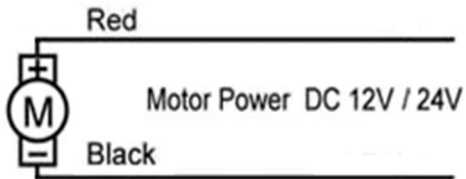
| Gear Ratio | Current (A) |        |           |        |
|------------|-------------|--------|-----------|--------|
|            | No Load     |        | Full Load |        |
|            | 12 VDC      | 24 VDC | 12 VDC    | 24 VDC |
| 5:1        | 1.0         | 0.5    | 2.4       | 1.2    |
| 10:1       | 1.0         | 0.5    | 2.4       | 1.2    |
| 20:1       | 1.0         | 0.5    | 2.4       | 1.2    |
| 30:1       | 1.0         | 0.5    | 2.4       | 1.2    |
| 40:1       | 1.0         | 0.5    | 2.4       | 1.2    |



**Note:** The typical speed and typical current are the average values – not the upper or lower limit. The performance curves are made with typical values.

### Electrical

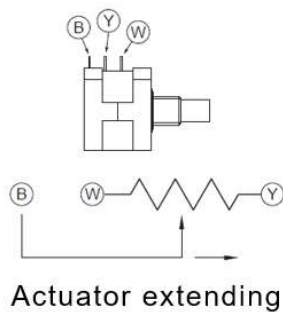
Actuators with no feedback and actuators with hall effect sensor(s) are shipped with flying leads



Red + // Black - : Extend  
Red - // Black + : Retract

With potentiometer this functionality is reversed:

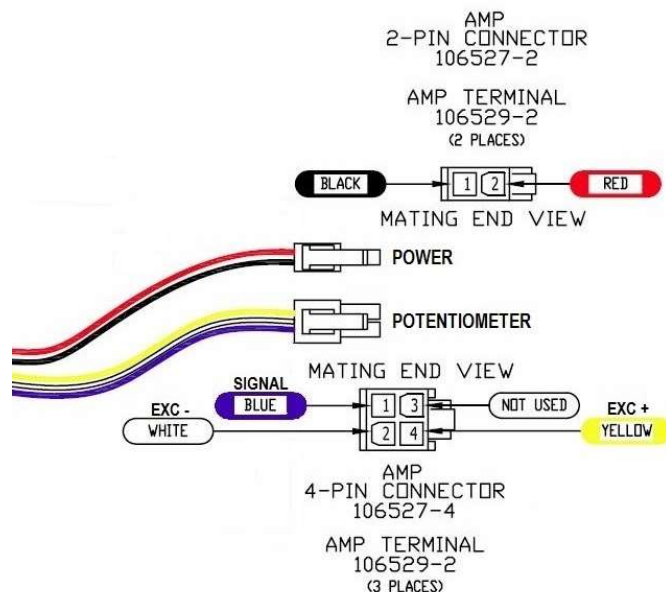
Red + // Black - : Retract  
Red - // Black + : Extend



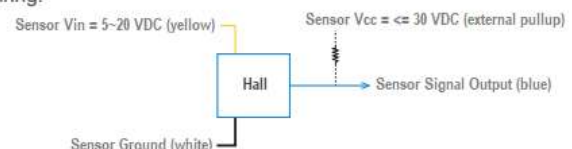
**Potentiometer Notes:**  
When fully retracted, the potentiometer reading between the blue and white wires will be in or near the range of 0 - 600Ω. When fully extended, this potentiometer reading will be in or near the range of 8.3 KΩ - 10KΩ.

| Stroke Length | Typical potentiometer range (+/- 300Ω) |
|---------------|----------------------------------------|
| 2             | 300Ω - 9.3KΩ                           |
| 4             | 300Ω - 9.7KΩ                           |
| 6             | 300Ω - 8.6KΩ                           |
| 8             | 300Ω - 9.6KΩ                           |
| 10            | 300Ω - 9.2KΩ                           |
| 12            | 300Ω - 9.2KΩ                           |

### Connector wiring (actuators with potentiometer)



**Electrical with single Hall effect sensor:**

|              | Wire color | Definition             | Descriptions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |                        |     |      |      |      |      |      |      |       |      |       |
|--------------|------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------------------|-----|------|------|------|------|------|------|-------|------|-------|
| Motor Power  | Red        | DC power               | Connect red wire to "Vdc +" & black wire to "Vdc -" of DC power to extend the actuator. Switch the polarity of DC input to retract it.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |            |                        |     |      |      |      |      |      |      |       |      |       |
|              | Black      |                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |            |                        |     |      |      |      |      |      |      |       |      |       |
| Signal wires | Yellow     | Vin                    | Voltage input range: 5 ~ 20V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |                        |     |      |      |      |      |      |      |       |      |       |
|              | Blue       | Hall output            | <p>The signal wire output should connect the pull-up resistor to the operating voltage (Vcc) of the system. (10KΩ resistor is recommended)</p> <p>Wiring:</p> <div><p>Sensor Vin = 5~20 VDC (yellow)</p><p>Sensor Vcc = &lt;= 30 VDC (external pullup)</p><p>Sensor Ground (white)</p><p>Sensor Signal Output (blue)</p></div> <p>High= Determined by Vcc and the pull-up resistor.<br/>Low= GND</p> <p>Hall signal data:</p>  <p>Hall effect sensor resolution:</p> <table><thead><tr><th>Gear ratio</th><th>Resolution (pulses/mm)</th></tr></thead><tbody><tr><td>5:1</td><td>2.27</td></tr><tr><td>10:1</td><td>3.62</td></tr><tr><td>20:1</td><td>6.86</td></tr><tr><td>30:1</td><td>10.57</td></tr><tr><td>40:1</td><td>14.27</td></tr></tbody></table> | Gear ratio | Resolution (pulses/mm) | 5:1 | 2.27 | 10:1 | 3.62 | 20:1 | 6.86 | 30:1 | 10.57 | 40:1 | 14.27 |
|              | Gear ratio | Resolution (pulses/mm) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |            |                        |     |      |      |      |      |      |      |       |      |       |
| 5:1          | 2.27       |                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |            |                        |     |      |      |      |      |      |      |       |      |       |
| 10:1         | 3.62       |                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |            |                        |     |      |      |      |      |      |      |       |      |       |
| 20:1         | 6.86       |                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |            |                        |     |      |      |      |      |      |      |       |      |       |
| 30:1         | 10.57      |                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |            |                        |     |      |      |      |      |      |      |       |      |       |
| 40:1         | 14.27      |                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |            |                        |     |      |      |      |      |      |      |       |      |       |
|              | White      | GND                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |            |                        |     |      |      |      |      |      |      |       |      |       |

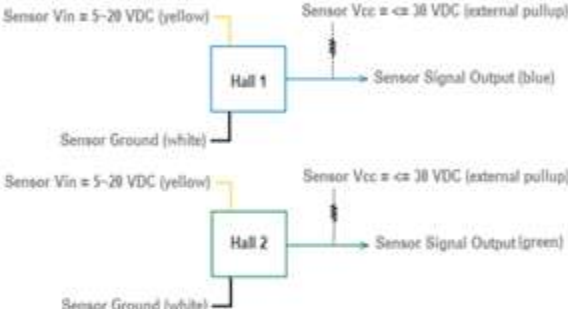
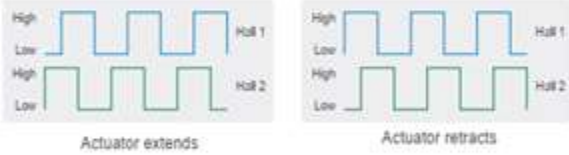


| Signal |        |        |
|--------|--------|--------|
| White  | Yellow | Blue   |
| GND    | Vin    | Data 1 |

| Gear Ratio | Signal Resolution |             |
|------------|-------------------|-------------|
|            | Pulses / inch     | Pulses / mm |
| 5:1        | 57.66             | 2.27        |
| 10:1       | 91.94             | 3.62        |
| 20:1       | 174.24            | 6.68        |
| 30:1       | 268.48            | 10.57       |
| 40:1       | 362.46            | 14.27       |



### Electrical with dual Hall effect sensors:

|              | Wire color  | Definition            | Descriptions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             |                       |     |        |      |        |      |        |      |        |      |        |
|--------------|-------------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----------------------|-----|--------|------|--------|------|--------|------|--------|------|--------|
| Motor Power  | Red         | DC power              | Connect red wire to "Vdc +" & black wire to "Vdc -" of DC power to extend the actuator. Switch the polarity of DC input to retract it.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             |                       |     |        |      |        |      |        |      |        |      |        |
|              | Black       |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                       |     |        |      |        |      |        |      |        |      |        |
| Signal wires | Yellow      | Vin                   | Voltage input range: 5 ~ 20V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             |                       |     |        |      |        |      |        |      |        |      |        |
|              | Blue        | Hall 1 output         | <p>The signal wires output should connect the pull-up resistor to the operating voltage (Vcc) of the system. (10KΩ resistor is recommended)</p> <p>Wiring:</p>  <p>High= Determined by Vcc and the pull-up resistor.<br/>Low= GND</p> <p>Hall signal data:</p> <p>- A type</p>  <p>- B type</p>  <p>Hall effect sensor phasing:</p> <table><thead><tr><th>Gear ratio:</th><th>Hall signal data type</th></tr></thead><tbody><tr><td>5:1</td><td>B type</td></tr><tr><td>10:1</td><td>A type</td></tr><tr><td>20:1</td><td>A type</td></tr><tr><td>30:1</td><td>A type</td></tr><tr><td>40:1</td><td>B type</td></tr></tbody></table> | Gear ratio: | Hall signal data type | 5:1 | B type | 10:1 | A type | 20:1 | A type | 30:1 | A type | 40:1 | B type |
|              | Gear ratio: | Hall signal data type |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                       |     |        |      |        |      |        |      |        |      |        |
|              | 5:1         | B type                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                       |     |        |      |        |      |        |      |        |      |        |
| 10:1         | A type      |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                       |     |        |      |        |      |        |      |        |      |        |
| 20:1         | A type      |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                       |     |        |      |        |      |        |      |        |      |        |
| 30:1         | A type      |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                       |     |        |      |        |      |        |      |        |      |        |
| 40:1         | B type      |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                       |     |        |      |        |      |        |      |        |      |        |
|              | Green       | Hall 2 output         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                       |     |        |      |        |      |        |      |        |      |        |
|              | White       | GND                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                       |     |        |      |        |      |        |      |        |      |        |

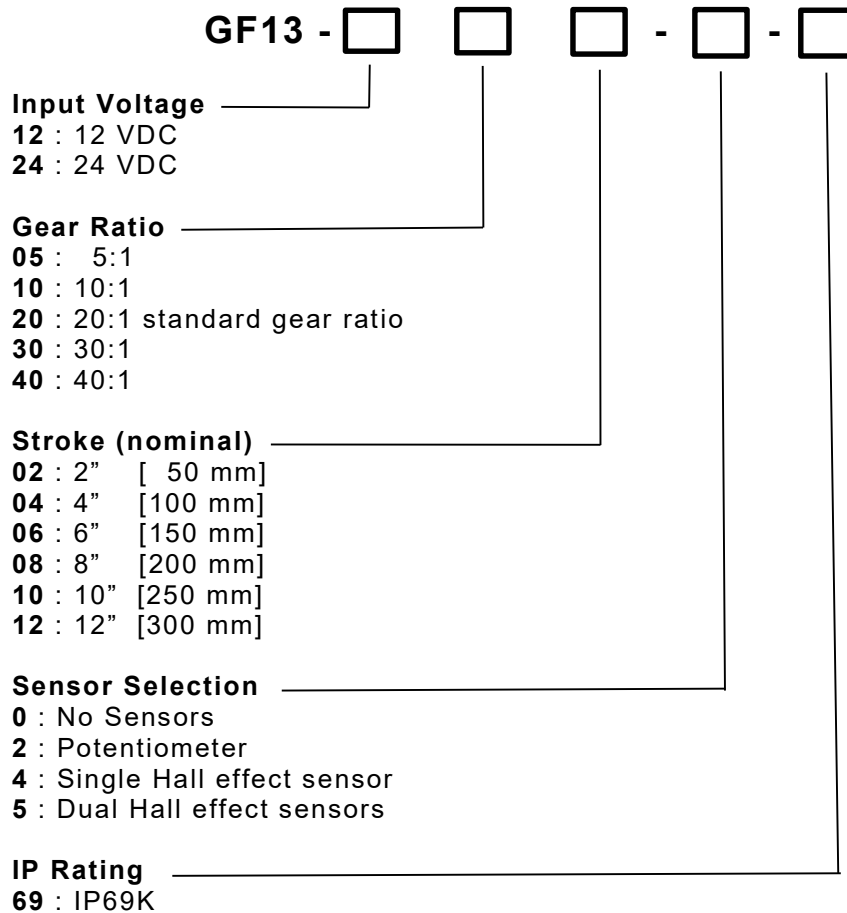
**Electrical With dual Hall effect sensors continued:**



| Signal |        |        |        |
|--------|--------|--------|--------|
| White  | Yellow | Blue   | Green  |
| GND    | Vin    | Data 1 | Data 2 |

| Gear Ratio | Signal Resolution |             |
|------------|-------------------|-------------|
|            | Pulses / inch     | Pulses / mm |
| 5:1        | 57.66             | 2.27        |
| 10:1       | 91.94             | 3.62        |
| 20:1       | 174.24            | 6.68        |
| 30:1       | 268.48            | 10.57       |
| 40:1       | 362.46            | 14.27       |

## Ordering Key



- Not all combinations stocked

Other actuator customizations are available for OEM clients. These include, and are not limited to, options in extension rod ends, base stud details, custom wire harnesses and lengths, as well as varieties of electrical connector combinations. Contact Concentric International sales for design consultation and ordering details.

### **Certifications**

The GF13 actuator is compliant with the following regulations, in terms of the essential conformity requirements of EMC Directive of 2014/30/EU.

| Emission                        | Immunity                                       |
|---------------------------------|------------------------------------------------|
| EN 55014-1:2006+A1:2009+A2:2011 | EN 55014-2:1997+A1:2001+A2+:2008<br>Category I |

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