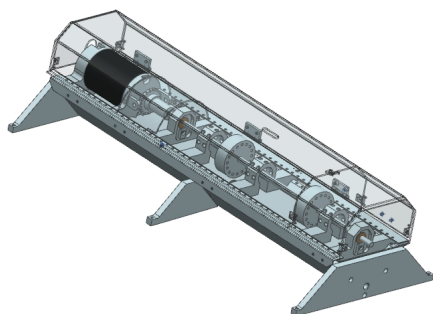


# RK 4 Model Rotor Kit

## Datasheet

**Cordant™**

141592 Rev. P



## Description

The RK 4 Rotor Kit closely simulates actual rotating machine behavior. Its unique geometry and its ability for users to isolate and control individual machine characteristics make it useful as both a teaching aid and as a research and development tool.

Machine malfunctions and experiments that can be demonstrated include, but are not limited to:

- Rotor unbalance - both single plane and multiplane
- Shaft rub condition
- Oil whirl and oil whip instabilities

In addition to machinery behavior, the rotor kit can be used to teach the fundamentals of proximity probe placement, gapping, and troubleshooting. It can also help technicians learn how to read and interpret proximity probe signals using an oscilloscope.

## Performance and Features

The RK 4 Rotor Kit has a V-frame design that has been developed to provide better control of the housing dynamic stiffness properties. The mechanical tolerances have also been tightened, resulting in more accurate machine behavior modeling. The RK 4 Rotor Kit motor can closely hold the desired speed with changes in loading conditions. This has been accomplished by incorporating a direct current motor and high performance control circuitry. The motor can run in either a clockwise or counter-clockwise direction and has adjustable slow roll speed capability. It can be controlled remotely by using a  $\pm 5$  volt control input, such as a signal generator or dc power supply, to drive the motor speed.

control device. Rotor speed is displayed on a digital tachometer with a large LCD readout.

The RK 4 Rotor Kit consists of:

- A mechanical base (including motor, coupling, rotor shaft, two balance wheels, two journal bearings and bearing blocks, six proximity probes, three probe mounts, a rub screw, and three safety covers).
- A Proximator assembly that contains five Proximator units.
- A direct current motor speed control device.

The motor speed control device provides power for both the rotor kit and the Proximator assembly. A measurement and diagnostic tool, such as an oscilloscope or other diagnostic instrument, should be ordered separately in order to observe the RK 4 machine behavior.

An optional Oil Whirl/Whip kit can be ordered. The Oil whirl kit consists of:

- A high pressure oil pump assembly.
- An oil whirl bearing assembly.
- A rotor kit shaft with oil bearing journal.
- A load frame.

Fluid-induced instabilities (both oil whirl and whip) as well as basic journal bearing behavior can be demonstrated using the oil whirl/whip kit. The oil whirl bearing is made from transparent plastic, allowing the user to view the oil film development during operation. The load frame is used to remove the effect of gravity on the rotor and to position the rotor to any desired eccentricity ratio.

The kit includes:

- A mechanical base (including motor, coupling, drive assembly, drive belts, and two proximity probes for motor speed control and Keyphasor signal pickup).
- A motor speed control unit.

## Specifications

### Basic Rotor Kit

|                                     |                                                                                             |
|-------------------------------------|---------------------------------------------------------------------------------------------|
| Power                               | 95 to 125 Vac, single phase, or 190 to 250 Vac, single phase, 50 to 60 Hz at 3.0 A maximum. |
| Fuse Rating                         | 250 V at 3 A slow-blow.                                                                     |
| Buffered Proximity Assembly Outputs | 200 mV/mil.                                                                                 |
| Max Speed                           | 10,000 rpm, typical.                                                                        |
| Max Ramp Rate                       | ±15,000 rpm/min. typical.                                                                   |
| Mechanical Base Dimensions          |                                                                                             |
| Height                              | 165 mm (6.5 in)                                                                             |
| Width                               | 340 mm (13.4 in)                                                                            |
| Depth                               | 789 mm (30.8 in)                                                                            |
| Motor Speed Control Dimensions      |                                                                                             |
| Height                              | 115 mm (4.5 in)                                                                             |
| Width                               | 260 mm (10.3 in)                                                                            |
| Depth                               | 325 mm (12.8 in)                                                                            |
| Proximity Assembly Dimensions       |                                                                                             |
| Height                              | 86 mm (3.4 in)                                                                              |
| Width                               | 154 mm (6.1 in)                                                                             |
| Depth                               | 158 mm (6.2 in)                                                                             |
| Shaft diameter                      | 10 mm (0.4 in)                                                                              |
| Environmental                       |                                                                                             |
| Operating Temperature               | 25° C ± 10° C (77° F ± 18° F)<br>95% RH Non-condensing<br>Recommended indoor use only.      |

### Weight

|                     |                 |
|---------------------|-----------------|
| Rotor Kit Base      | 14.5 kg (32 lb) |
| Proximity Assembly  | 0.9 kg (2 lb)   |
| Motor Speed Control | 2.7 kg (6 lb)   |

### Oil Whirl/Whip Kit

|                      |                                                                                                                                                      |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Oil Pump Power       | 95 to 125 Vac, single phase 50 to 60 Hz at 1.5 A maximum; or 190 to 250, single phase, 50 to 60 Hz at 0.75 A maximum. User-selectable input voltage. |
| Oil Pump Fuse Rating | 95 to 125 Vac<br>250 V 3.0 A slow-blow<br>190 to 250 Vac<br>250 V 1.5 A slow-blow<br>User-selectable fuse                                            |
| Oil Pump Dimensions  |                                                                                                                                                      |
| Height               | 145 mm (5.7 in)                                                                                                                                      |
| Width                | 317 mm (12.5 in)                                                                                                                                     |
| Depth                | 292 mm (11.5 in)                                                                                                                                     |

## Ordering Information



For the detailed listing of country and product specific approvals, refer to the Approvals Quick Reference\_Guide (108M1756) available from [www.Bently.com](http://www.Bently.com).

### Rotor Kit

#### 123456-AA

##### A: Oil Whirl/Whip Kit

|           |              |
|-----------|--------------|
| <b>00</b> | Not required |
| <b>01</b> | Required     |

### Accessories

#### Manuals

|        |                    |
|--------|--------------------|
| 126376 | RK 4 Rotor Kit     |
| 137482 | Oil Whirl/Whip Kit |

#### Safety Cover Replacement Parts (refer to Figure 1)

|                                                        |                                                    |
|--------------------------------------------------------|----------------------------------------------------|
| 106M5920                                               | Main Cover                                         |
| 106M5918                                               | Small End Cover                                    |
| 106M5916                                               | Speed Wheel Cover                                  |
| 106M5917                                               | End Cap Cover<br>(for use with fluid bearing only) |
| 105M7924,<br>105M7930,<br>106M8448,<br>and<br>106M8449 | Lock Mechanism                                     |
| 105M7923<br>and<br>105M7929                            | Polycarbonate Screw<br>(need quantity of 3 each)   |
| 105M7931                                               | Rubber Bumper<br>(need quantity of 3)              |

|                                                          |                 |
|----------------------------------------------------------|-----------------|
| 04312254<br>(16), 168614<br>(16), and<br>105M7925<br>(4) | Cover Hinge Set |
|----------------------------------------------------------|-----------------|

#### Spare Power Cords

|          |                        |
|----------|------------------------|
| 02198937 | USA 10A/250V 3-wire    |
| 285300   | Brazil 10A/250V 3-wire |

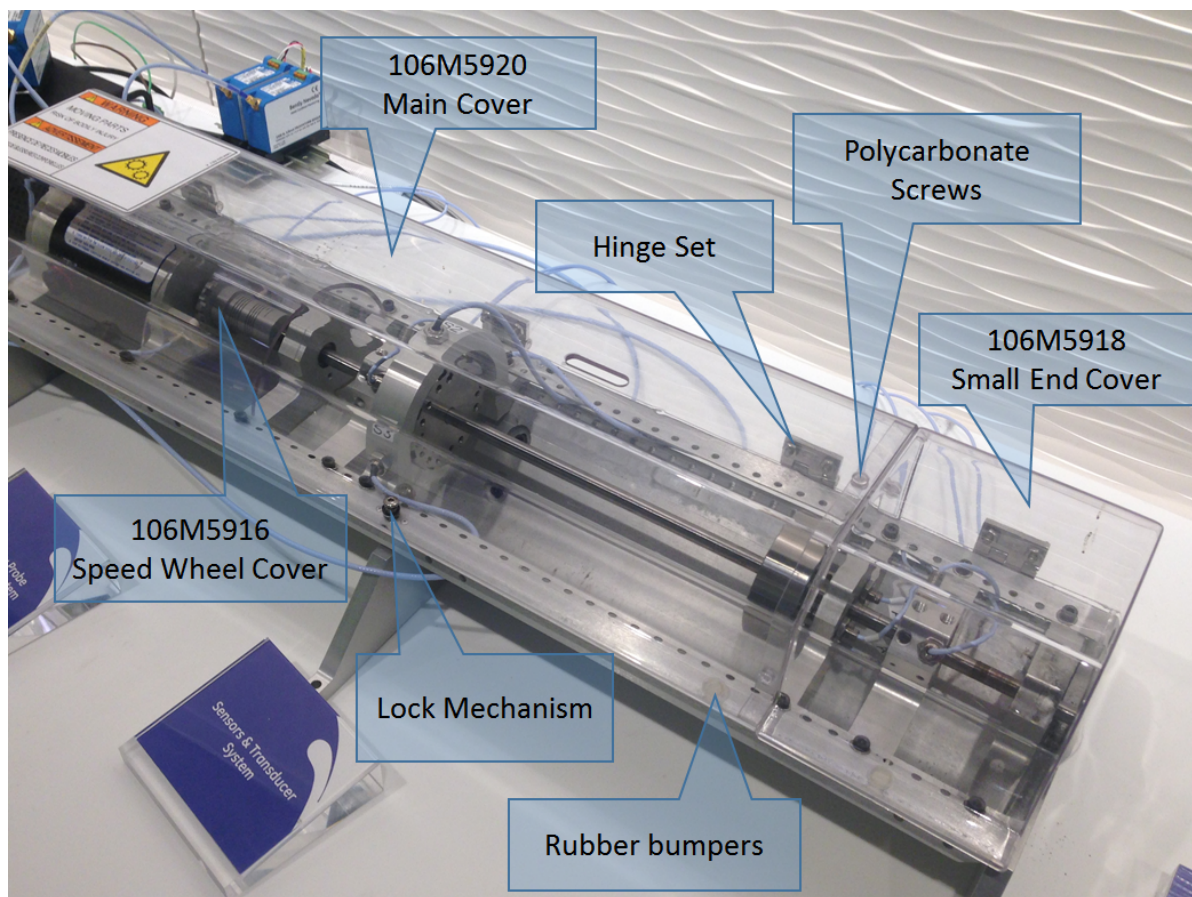
#### Spare Probes

|                               |                                                                               |
|-------------------------------|-------------------------------------------------------------------------------|
| 330903-<br>00-03-10-<br>02-00 | Spare 3300 NSv Probe, M8X1,<br>without armor<br>(Vibration, Keyphasor probes) |
| 330903-<br>00-02-10-<br>02-00 | Spare 3300 NSv Probe, M8X1,<br>without armor<br>(Speed Probe)                 |

#### Additional Oil Whirl/Whip Option

|        |                    |
|--------|--------------------|
| 126379 | Oil Whirl/Whip Kit |
|--------|--------------------|

## Graphs and Figures



**Figure 1: Rotor Kit**

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