

# MOTOR TEST RIG

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# WHAT IS A MOTOR TEST RIG?

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- Treating one compressor as a motor and the other as a generator.
- In this case, we'll be using two compressors provided by Danfoss Turbocor.
- A transducer placed between will measure the axial loads and determine the power efficiency

# TT-500 DANFOSS TURBOCOR COMPRESSOR

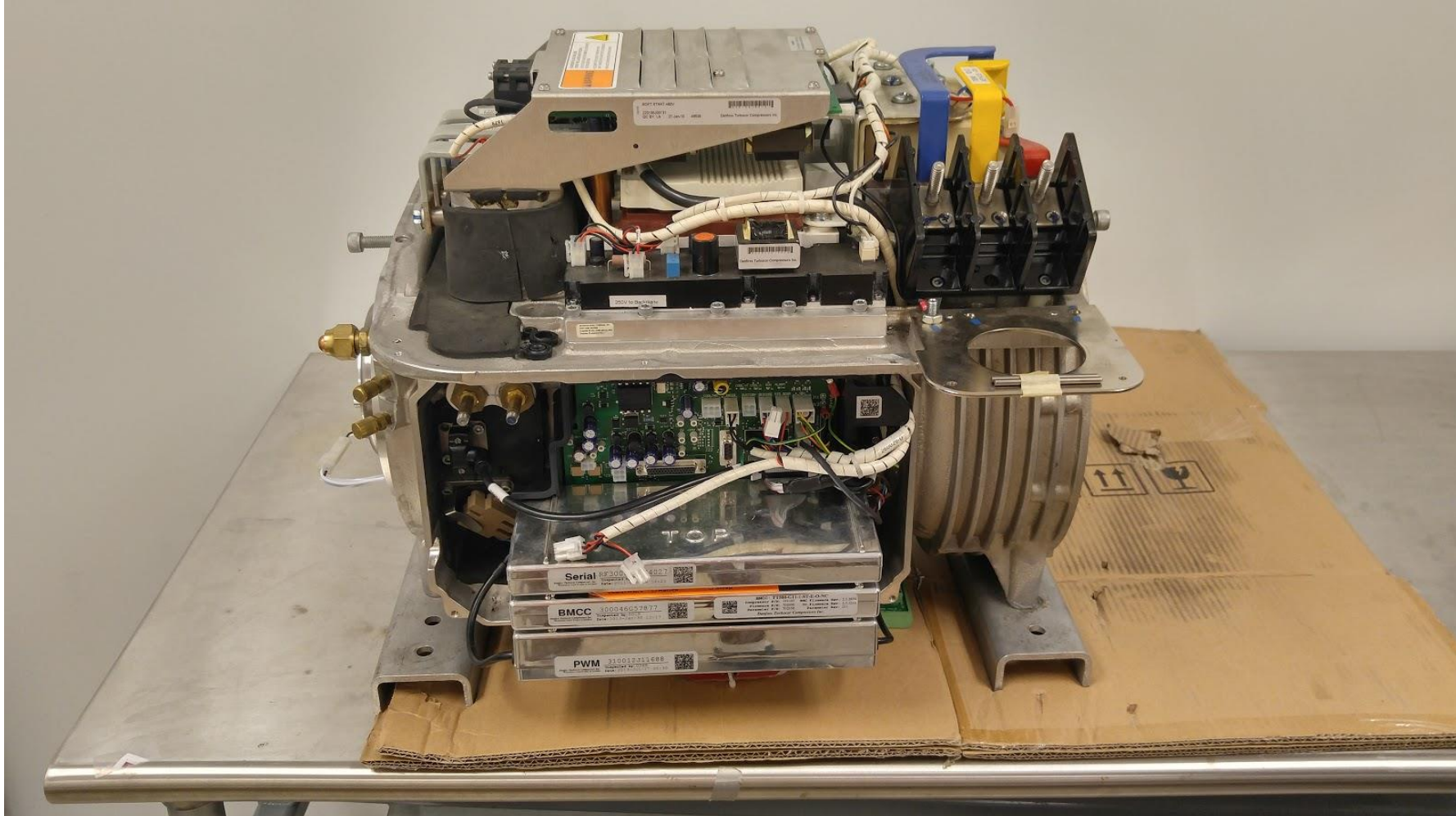
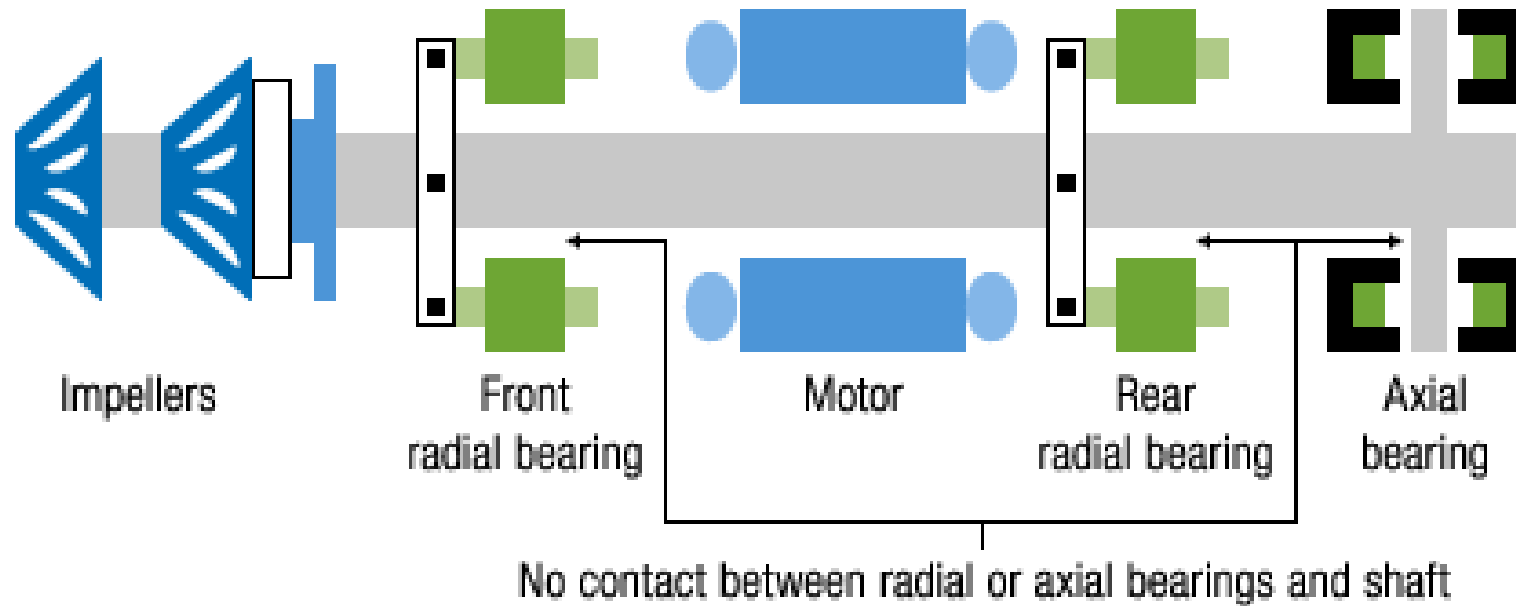


Fig. 1 Compressor

# WHY TURBOCOR'S COMPRESSORS ARE DIFFERENT

- Magnetic bearings

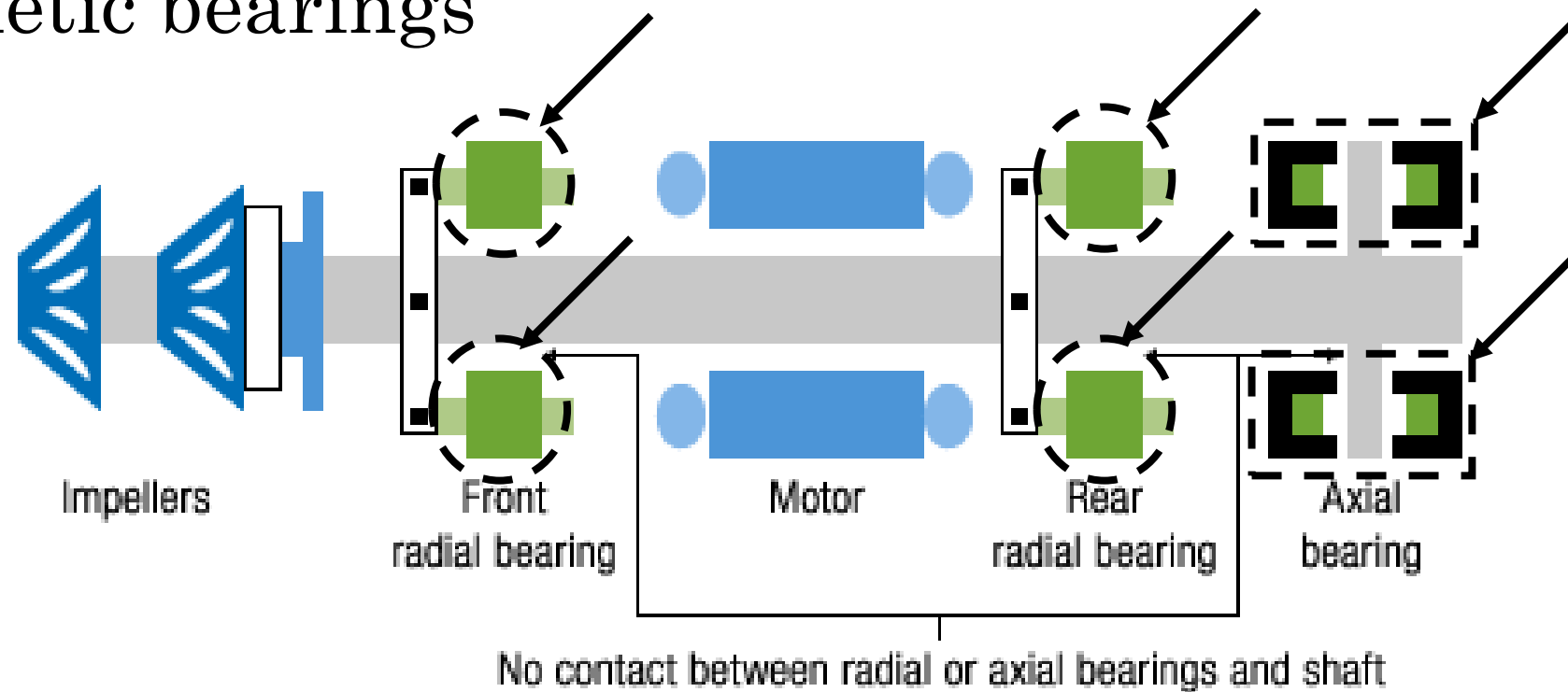


Courtesy: Danfoss Turbocor Compressors Inc.

Fig. 2. Danfoss Turbocor Compressor System

# WHY TURBOCOR'S COMPRESSORS ARE DIFFERENT

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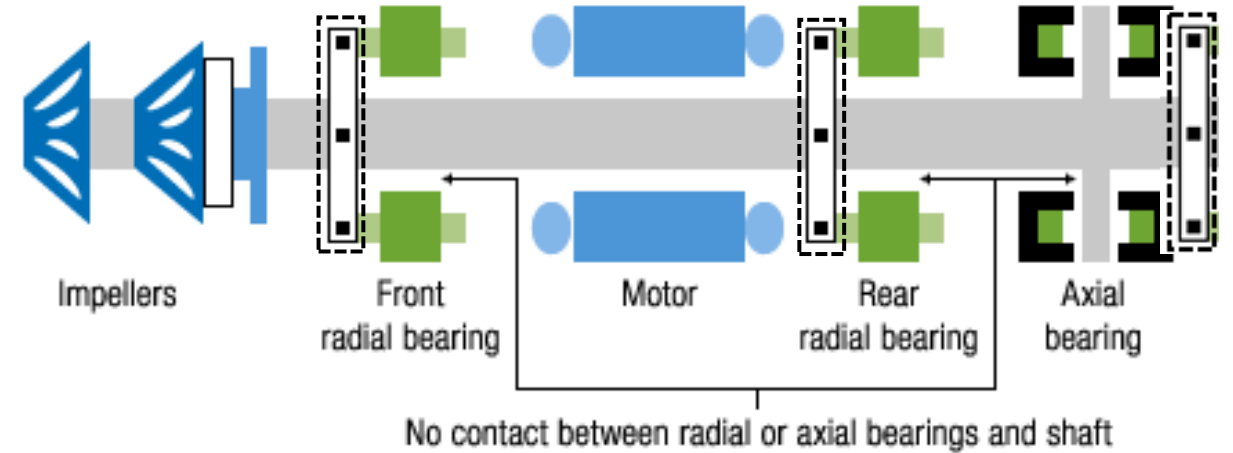


Courtesy: Danfoss Turbocor Compressors Inc.

Fig. 2. Danfoss Turbocor Compressor System

# WHY TURBOCOR'S COMPRESSORS ARE DIFFERENT

- Magnetic bearings
- Levitating shaft
- Oil-free coolant
- 9 extremely precise sensors
- Internal shaft has limited access



Courtesy: Danfoss Turbocor Compressors Inc.

Fig. 2. Danfoss Turbocor Compressor System

# APPROVED DESIGN

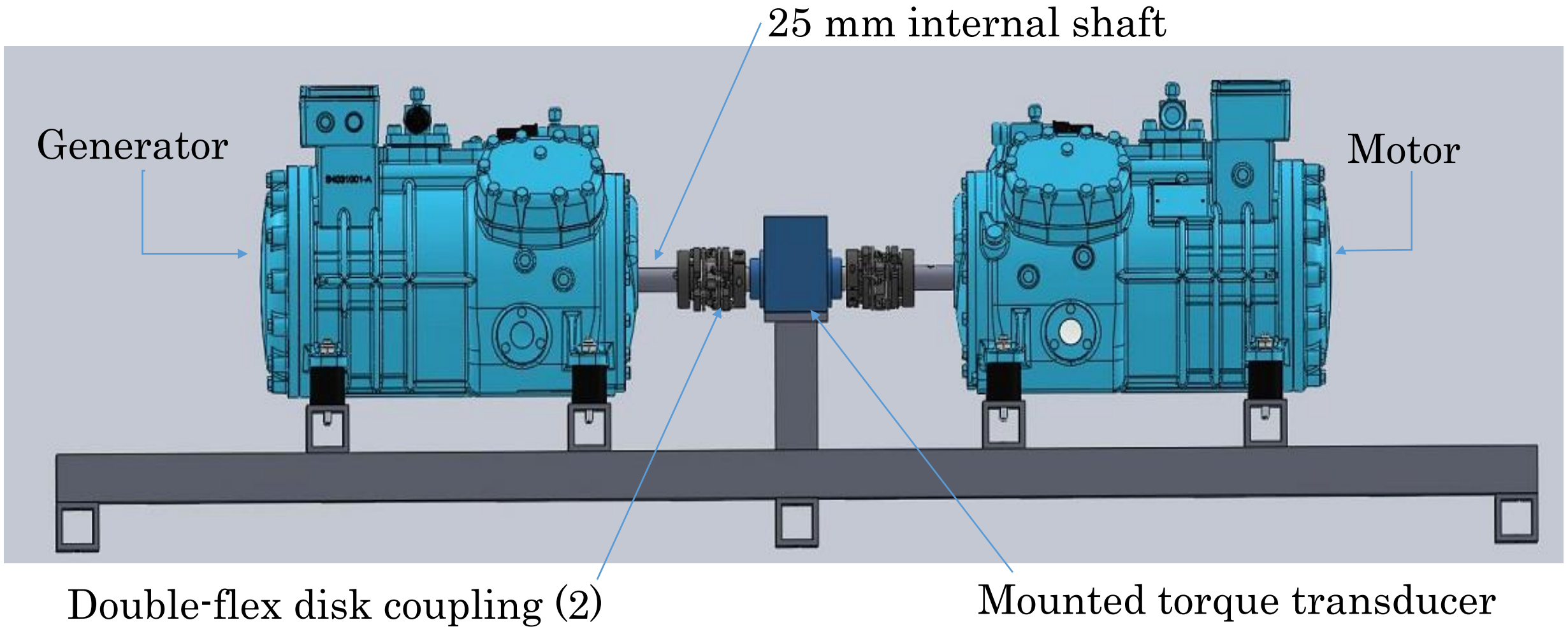


Fig. 3. Motor Test Rig

# LASER ALIGNMENT

- SKF Shaft Alignment Tool TKSA 31
- Price:\$4,192.10
- Accurate up to 5 microns
- Live position correction feed
- <2 week delivery



Fig. 4. Laser alignment tool



# ZERO-MAX DOUBLE-FLEX DISC COUPLING



Fig. 5. Double-flex disc coupling

- Approximately \$400 a piece, not including tax/shipping
- Quantity 2
- Approximately 3 week delivery upon purchase
- Adjustable Collar (not keyway)
- 25mm shaft connecting to 20h6 mm shaft
- Up to 9,500 rpm

# MAGTROL TORQUE TRANSDUCER

- Torque Rating: 50Nm nominal, 100Nm over range
- High Speed Applications: up to 32,000 rpm
- Stainless Steel Shaft Diameter: 20h6 mm
- Total Cost: \$10,861
  - Transducer: \$8,250
  - ER 113 Signal Cable: \$231
  - Power Supply: \$2,380
- Lead Time: Upwards of 10 weeks, with the transducer currently "Out of Stock"



Model TMHS 310

Fig. 6. Torque Transducer

# GANTT CHART

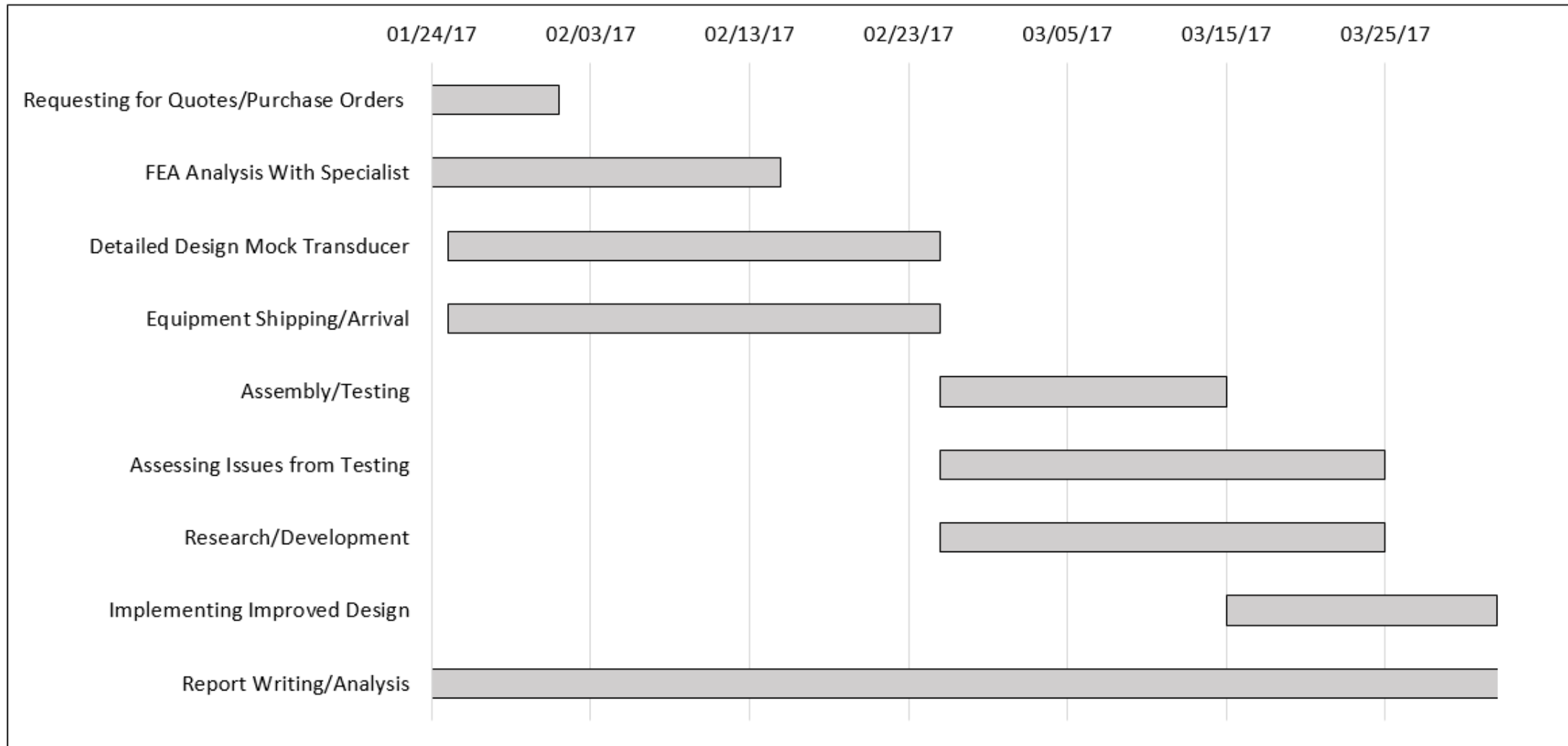


Table 1. Gantt Chart

# REFERENCES

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- <http://www.lovejoy-inc.com/content.aspx?id=544>
- <http://www.agroengineers.com/bearings/types-of-couplings-2.shtml>
- <http://www.rw-america.com/products/precision-couplings/metal-bellows-couplings/bk2.html>
- [http://eng.fsu.edu/me/senior\\_design/2016/team04/finalreport.pdf](http://eng.fsu.edu/me/senior_design/2016/team04/finalreport.pdf)

# QUESTIONS?