

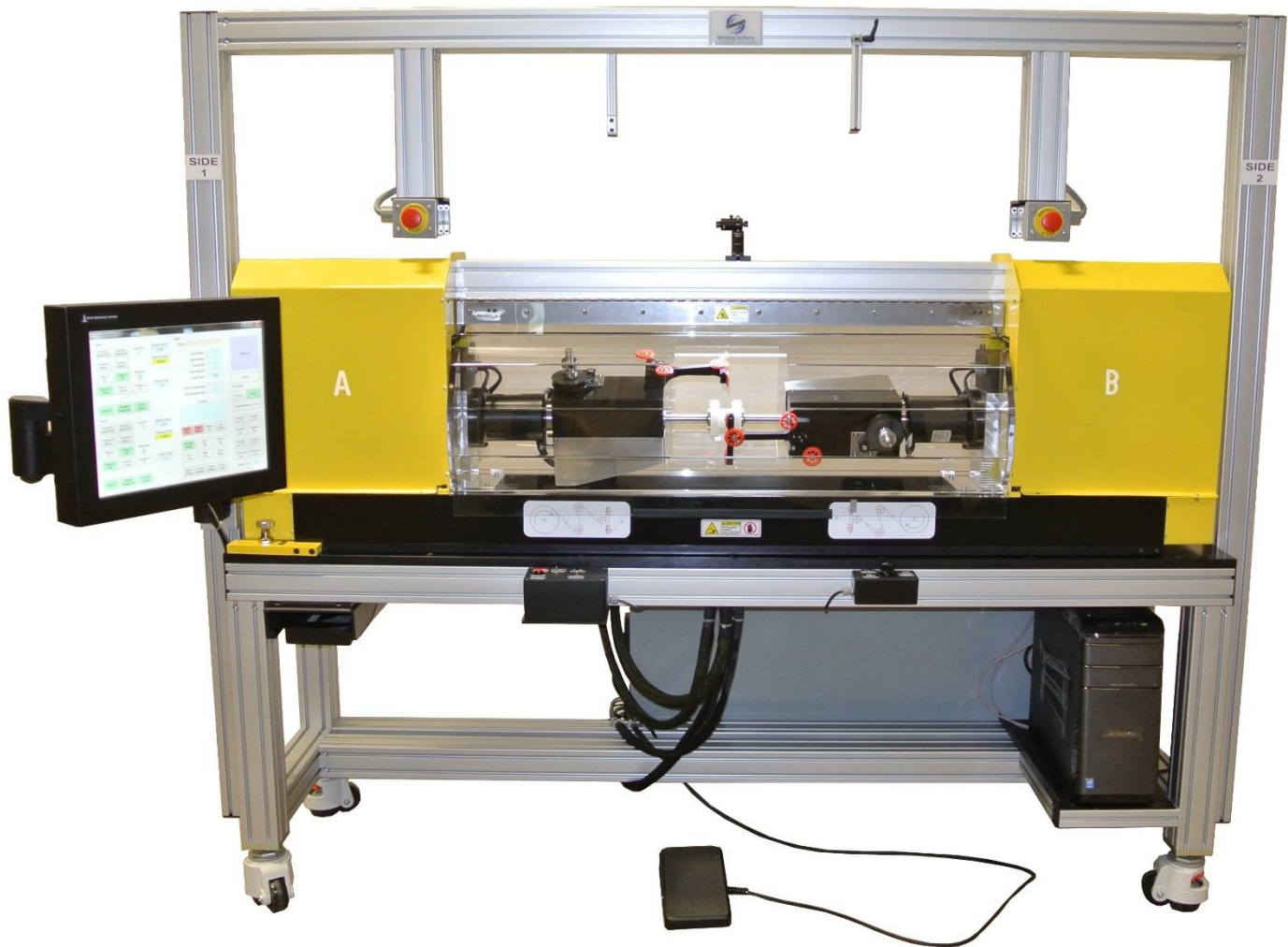
Coil Master

Fiber Optic Gyroscope Coil Winder



High Precision Quadrupole, Octupole and Custom FOG Coils

The Coil Master is a high precision semiautomatic system designed to wind commercial and satellite grade Fiber Optic Gyro (FOG) coils. It produces wet or dry wound quadrupole, octupole, and other user designed coils. The coil is wound from a length of fiber shared by two supply spools. No spool swapping is required.



In Control Yet Flexible

All of the motions and actions of the Coil Master are preprogrammed into a recipe manager making it easy to produce a gyro coil with the correct winding pattern. The machine moves automatically and keeps track of all parameters. Because of the nature of optical fiber and the requirements of gyro winding, the operator is given full control over the winding rate and incrementing forward or back through the winding steps. Precise tension control is maintained at all times. The operator can even override the recipe if desired.

Recipe Manager

The motions of the Coil Master are controlled by steps preprogrammed into a simple to use recipe management system on the touchscreen interface. Thousands of recipes can be stored. The recipe manager allows full control over the various winding parameters for each layer of the coil including: active side, winding direction, number of turns, and winding tension. Recipe steps can also be included for specific actions such as applying adhesive to a layer on a wet wound coil. Special instructions or messages to the operator can be included in each step. The machine will not begin a new line of the recipe until the operator has confirmed that the previous step was completed successfully. The recipe can also be stepped through in reverse if unwinding is necessary.

Line #	Layer #	Active Side	Trav Dir.	Synch A/B	Wind Dir.	Tums	Comment
1	1	A	Retract	No		180.000	Base Layer
2	2	A	Retract	No		1.000	
3	2	B	Extend	No		Base - 1.000	
4	3	B	Retract	No		Base	

A portion of the Recipe Entry Screen



Button Box for most operations while winding

Easy to Use Interface and Controls

The Coil Master includes a comprehensive touchscreen interface for setup, messaging, and error recovery.

While winding, the operator only needs to use a simple button box to control the machine and step through a recipe. The position of the box is adjustable. The speed is controlled using a foot pedal. This frees the operator's hands while winding and allows them to maintain focus on the results.

Powerful Visual Aides

The Coil Master comes with standard magnifying lenses positioned over the winding mandrel. The optional Digital Microscope provides higher magnification and can capture digital still images and high definition video for documentation and training purposes. The user may view the coil through the microscope eyepiece and on the included high definition video monitor. The microscope is mounted on a highly adjustable arm that allows the operator to position it for their optimum comfort.

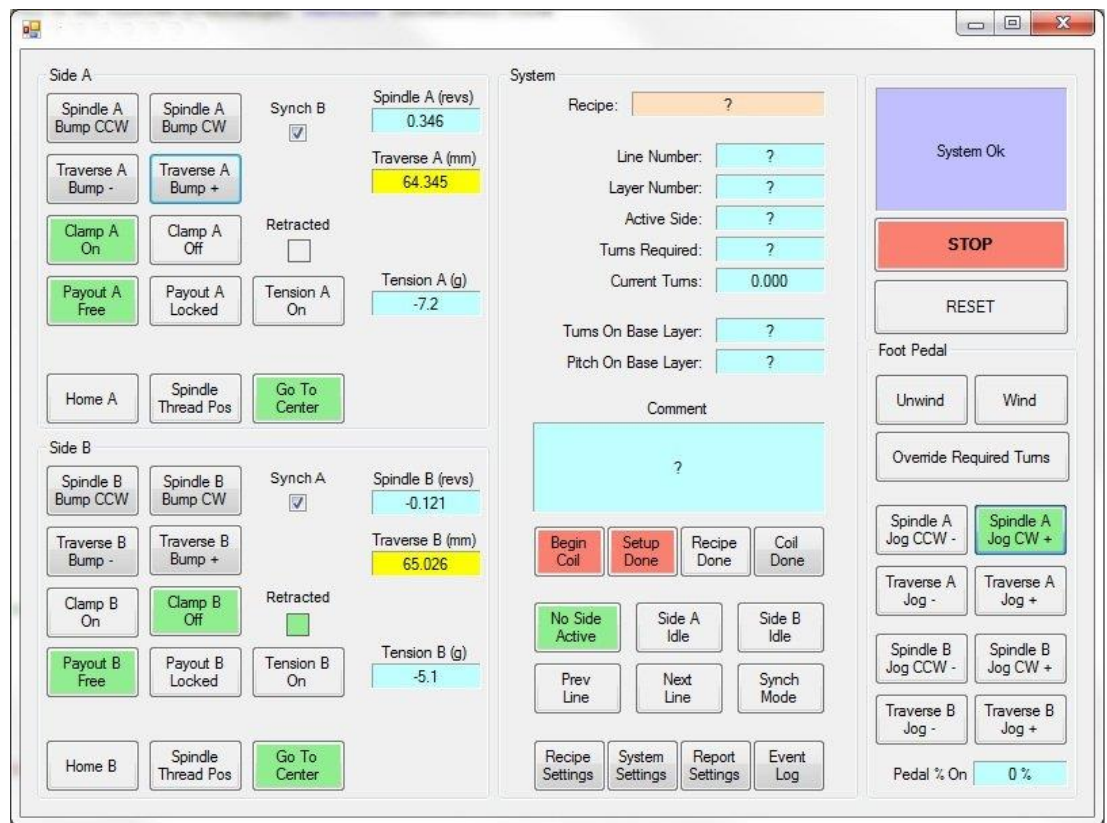


Optional Digital Microscope

Other Features

- The included Fume Extraction System assures a safe working environment for wet wind applications requiring volatile adhesives.
- A Backup and Restore Algorithm provides a controlled shutdown in case of a power failure or overnight shutdown. This function protects a partially wound coil during a power failure and allows a controlled restart after power is reapplied. Requires an Uninterruptable Power Supply (not included).
- Many Safety and Crash Prevention features ensure the safety of the operator, the fiber coil, and the machine.
- The machine provides a detailed winding report and event log for each coil produced.

Most motions and actions of the Coil Master are automatic, but the operator interface allows complete control of the system if desired.



Specifications:

Model Number	Coil Master 1
Wind Types	Wet or Dry
Maximum Coil Diameter	150mm/5.90 inches
Maximum Coil Height	75mm/2.95 inches
Maximum Coil Length	5.5Km
Fiber Diameter Range	100-250µm (coated)
Winding Speed	Estimated 1.5Km per 8hour shift (wet wound with adhesive applied after each layer)
Tension Control Range	3-50 grams, +/-0.50g
Safety Features	Machine guards with safety interlocks, software based crashed prevention, fume extractor (for wet winding)
Footprint	221.9 x 51.5cm/87.4 x 20.3 inches
Optional	Microscope with monitor and picture/video capture

Showmark can provide detailed training on the use of the Coil Master.

Suggested Companion Machine

Coil Master Supply Spools

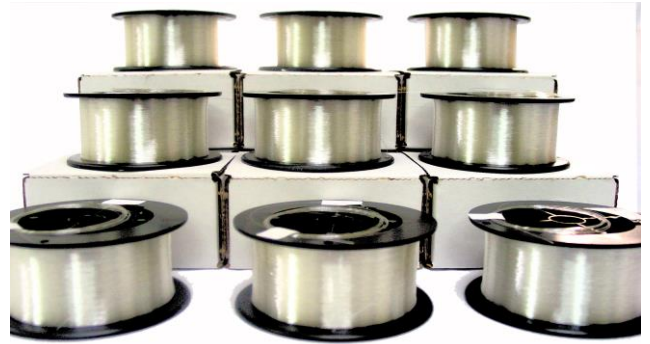
The Coil Master includes four 5Km capacity supply spools. Additional supply spools may be purchased.

The gyro coils produced on the Coil Master typically require the use of two supply spools that share the total length of optical fiber. A separate winding machine is recommended for producing the supply spools. The spools should be wound very neatly and with light and even tension control.

Showmark DigiSpooler

The DigiSpooler is a bidirectional winding machine that is recommended for producing supply spools for the Coil Master.

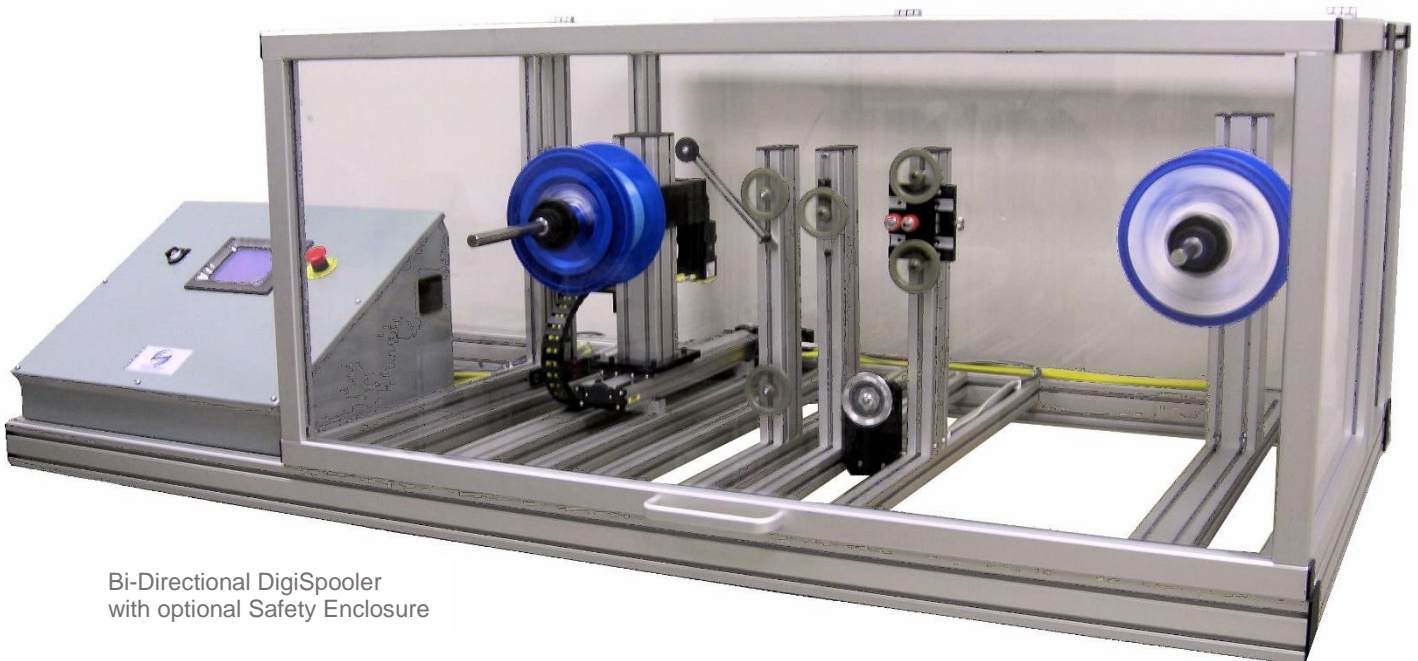
It is a precision servomotor driven tabletop respooler designed for optical fiber and other fine wires and filaments.



Precision Wound Supply Spools

Typical features and specifications include:

- Color touchscreen interface includes a password protected Recipe Manager for storing all setup parameters for several hundred spool and fiber combinations. Standard traverse ranges (= spool width) are available up to 350mm (14 inches)
- Winding pitch is settable between 10 μ m and 25mm with 1 μ m resolution
- A variety of shaft sizes or chucks for holding a wide range of spool sizes and mandrels
- Most systems include Universal Spool Adapters for mounting a variety of spool sizes without additional tooling
- The winding speed is adjustable from approximately 0-400rpm. The speed can be entered in rpm, meter/minute, or feet/minute
- Bidirectional winding capability
- Several closed-loop tension control options are available with ranges from 10-1000grams (.35 – 35 ounces)
- Typical stopping repeatability is within 100mm for each kilometer wound
- Wire break detection
- Flange Detect option automatically senses and maps the flange locations of each spool
- All contact surfaces are very low friction rollers
- CE-Mark option includes an interlocked safety enclosure, power reset circuit, and appropriate documentation. 120 or 230 VAC operation



Bi-Directional DigiSpooler
with optional Safety Enclosure