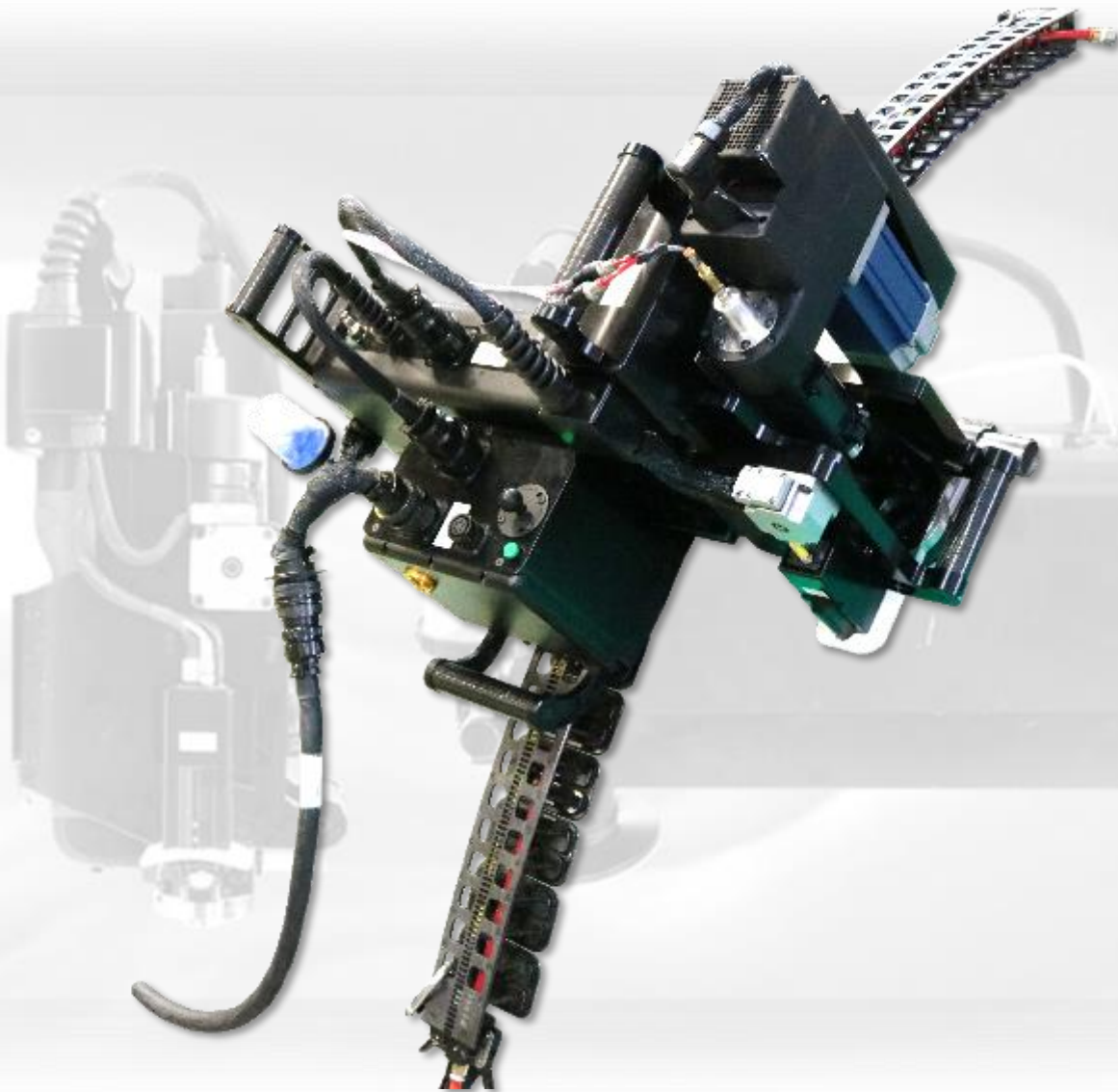




MTM ROBOTICS

Mini Flextrack (MFT) System



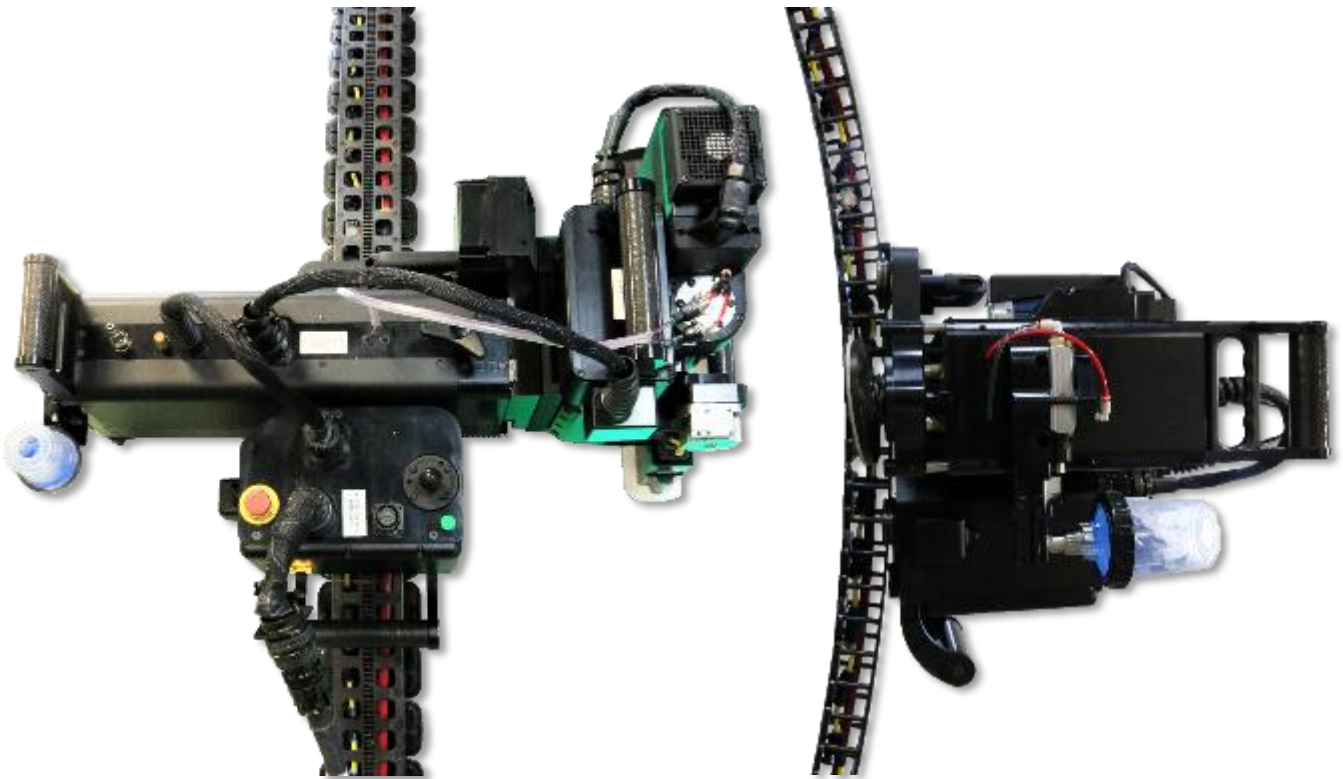
Delivering New Technology to the Factory Floor



Mini Flextrack (MFT) System

Product Overview

The Mini Flextrack (MFT) is a modular 5-Axis robotic system that is used to drill holes on aircraft surfaces. The MFT system is supported by a singular Flextrack rail and uses a pressure foot on the opposite side of the drill head to stabilize the driller. Due to the light modular design the MFT can be disassembled and reassembled by one person in a short period of time. Microprocessors are located in the robot modules so only one small diameter umbilical cord is required to power and command the robot. The software interface is intuitive and user friendly to operate.



Working Surfaces

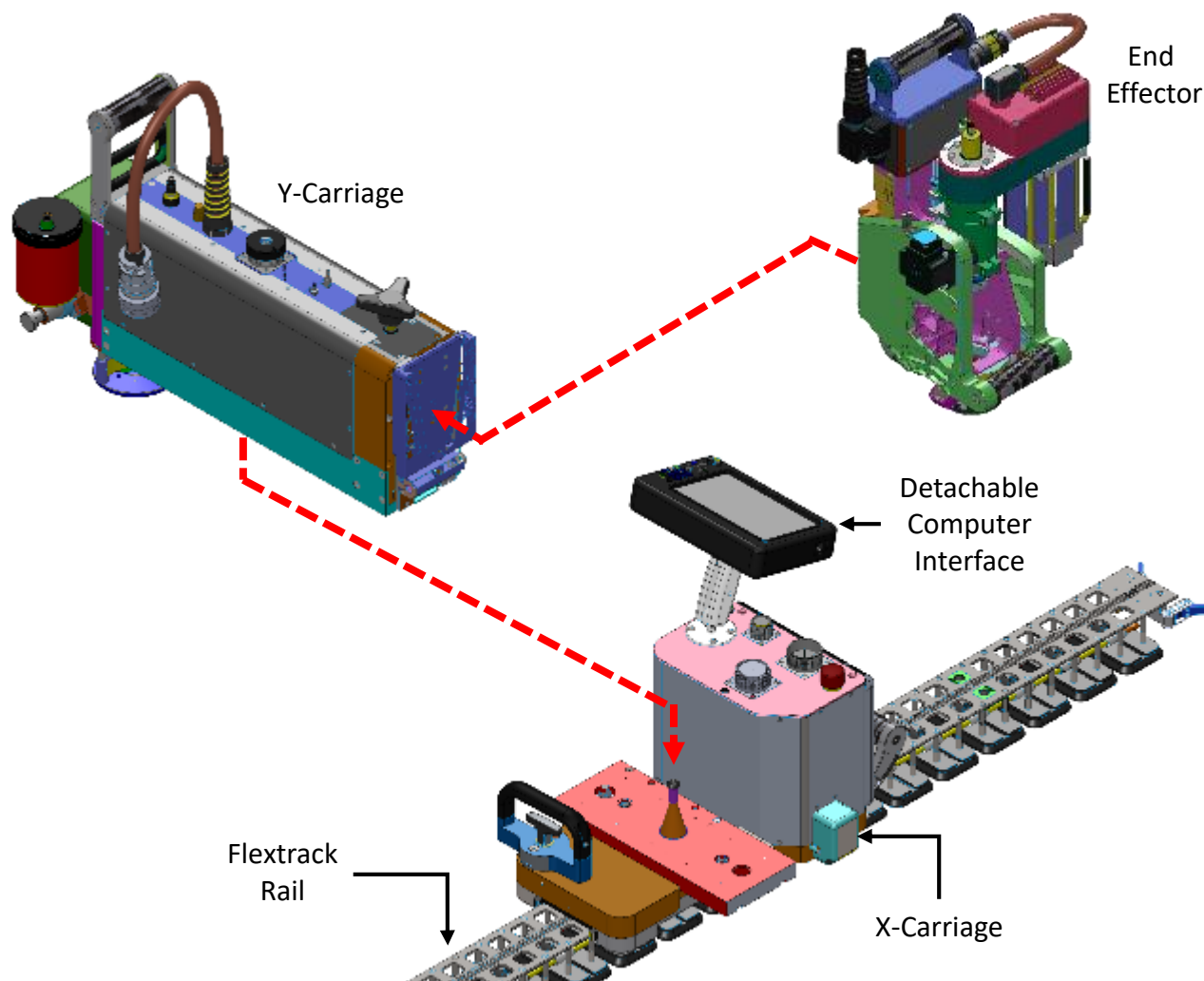
Surface Finish	Typical aircraft skin finishes including smooth, painted, raw metal, high gloss and raw finishes.
Surface Geometry	Panel edges up to 5mm in thickness, flush fasteners
Materials	Aluminum 2024-7075 and Carbon Reinforced Plastic. Other materials upon review by MTM.
Drill Distance to 5mm Lap Joint	20mm from panel edge (less for thicker panels)



Mini Flextrack (MFT) System

Module Design Overview

- Ability to disassemble and reassemble by one person in less than 5 min
- No module weighs more than 33 pounds (15kg)
- Easily transported across factory without having to use a crane, in creasing productivity.
- Modules can be replaced without having to repair the entire robot or perform expensive repairs
- Unlimited X-axis travel using linked vacuum rails
- Broken and worn drill bit sensing





Mini Flextrack (MFT) System

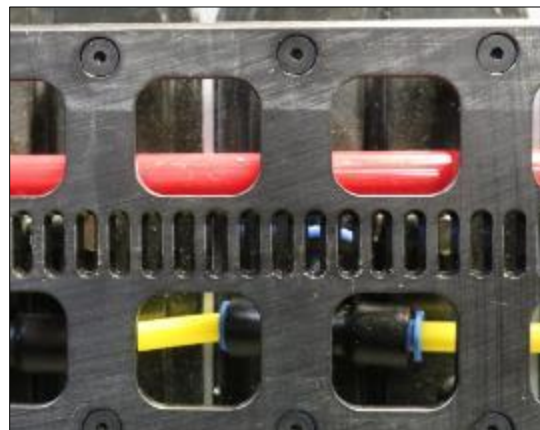
Flextrack Overview

The Flextrack system is essentially a flexible rack and pinon rail system that a robotic carriage uses to travel on to preform drilling operations. Specialty suction cups designed by MTM Robotics are integrated under the Flextrack rail and hold robotic carriages acutely to the fuselage skin. Flextrack rails have the ability to conform to flat or curved surfaces in convex or concave positions.



Key Features

- Quick and easy single operator setup
- Simple addition of rails using rail splices
- Works on up to a 80in radius (2000mm)
- Non-marking vacuum cup for use on Alclad aluminum surface



Dimensions & Working Envelope

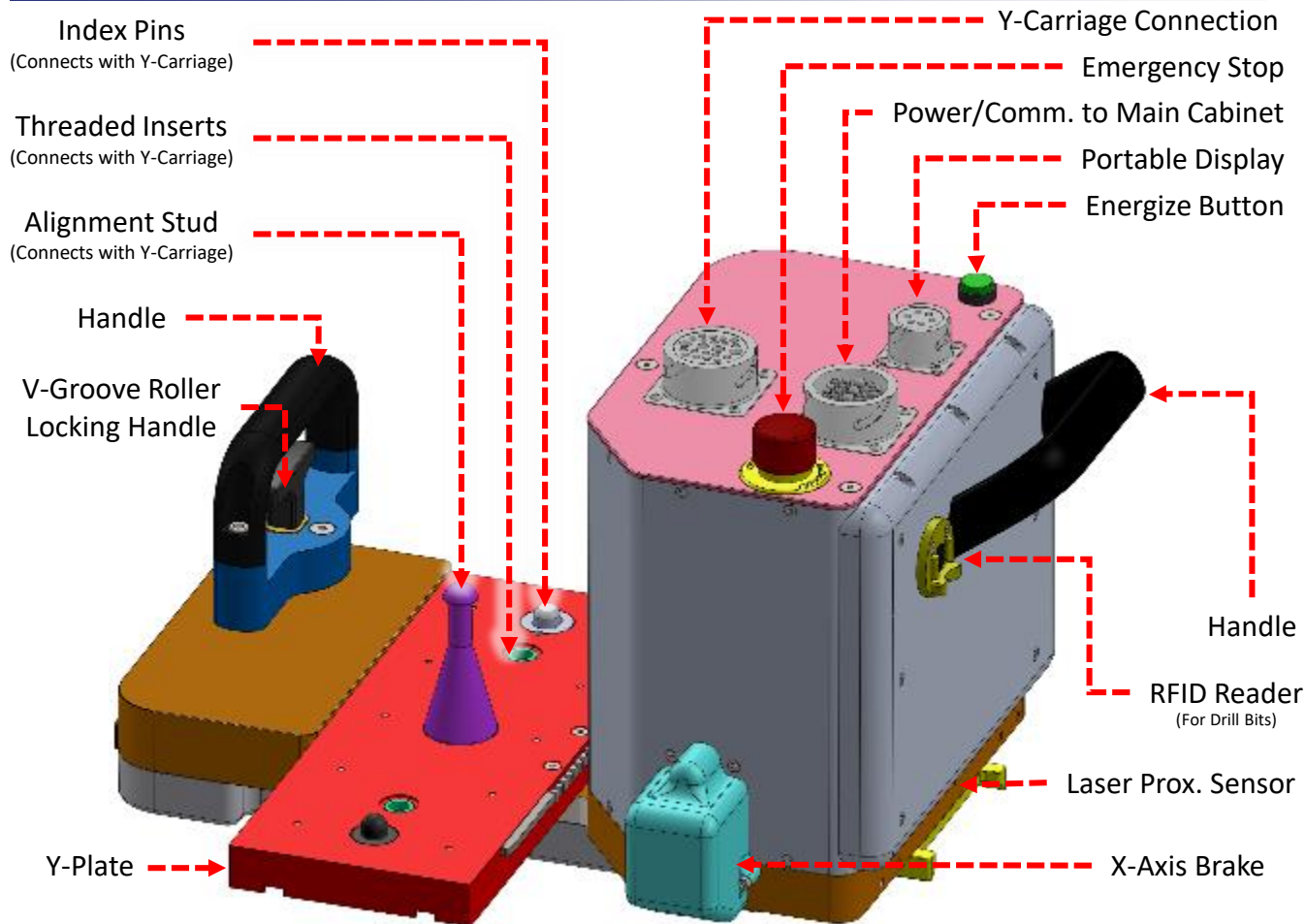
Standard rail length (Custom sizes upon request)	72 in (1.8m)
Typical rail weight	2.6 lbs per ft (1.2 kg per 305mm)
Vacuum cup size	5 in x 3 in (127mm x 76mm)
Air supply (Based on standard 72in rail)	6 cfm (170 lpm) per rail segment @ 90psi



Mini Flextrack (MFT) System

X-Carriage Module

This module contains the drive components that are used to precisely travel along the Flextrack rails and has a motorized plate that the Y-Carriage gets attached to. The X-Carriage also contains a X-Axis brake and the brake is activated when no power is supplied to the module.



Key Features

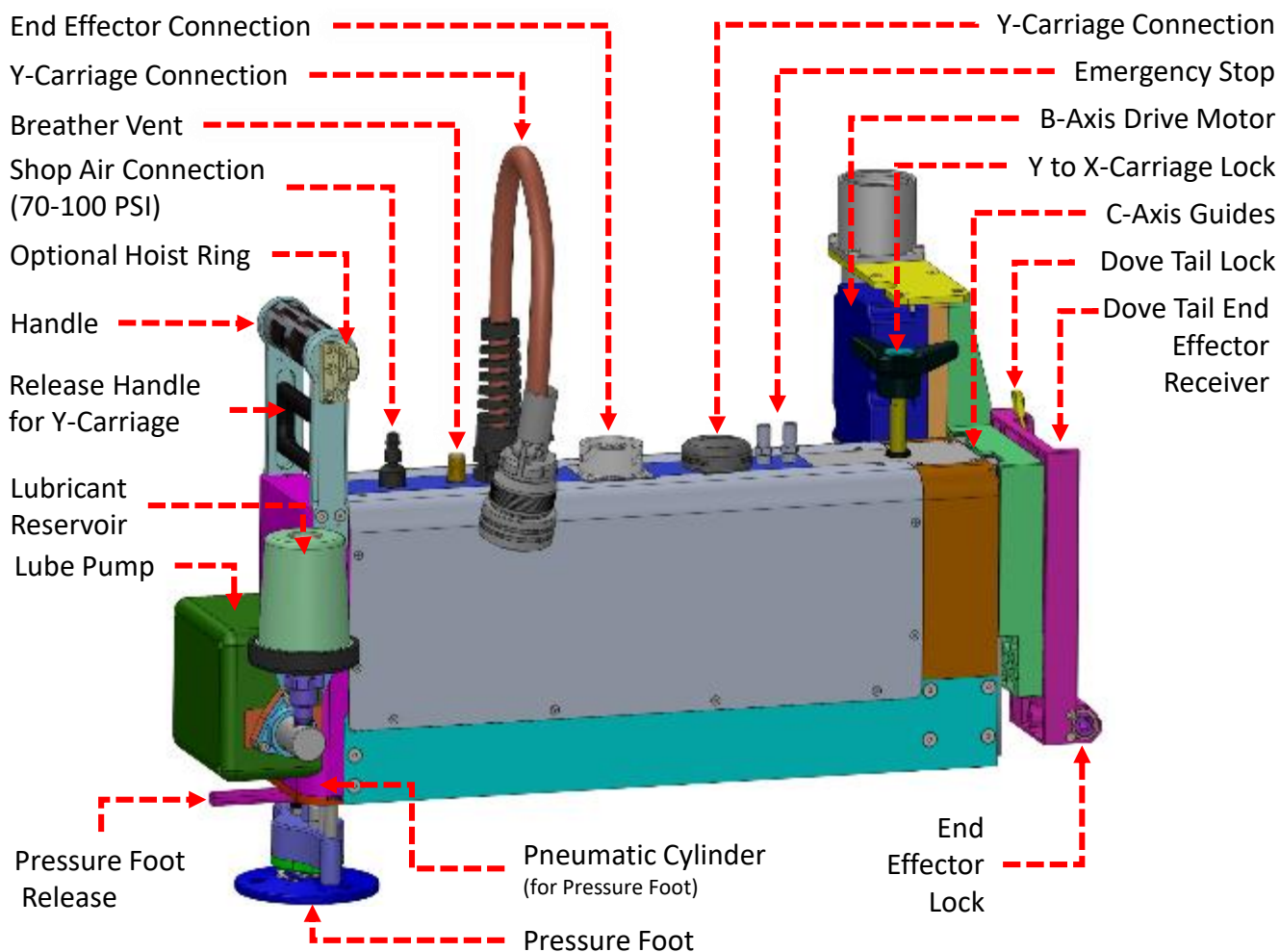
- Carriage Rack & Pinon drive motors provide precise Flextrack movement.
- Emergency Stop (E-Stop) instantly cuts power to all high voltage circuits.
- RFID Reader scan and verify drill bits for ease of setup.
- Incorporated Safely lock module that applied a brake to the FlexTrack even when no power is applied.
- Laser Proxy Sensor provides collision detection along the Flextrack rail.



Mini Flextrack (MFT) System

Y-Carriage Module

The Y-Carriage module two key features are the Pressure foot and the Dove Tail End Effector receiver. The Pressure foot stabilizes the End Effector during operation. The Dove Tail End Effector receiver firmly holds the End Effector and also has a C-Axis linear travel. This module also contains a Lubricant reservoir with a pump that can be connected to the End Effector when lubrication is required.



Key Features

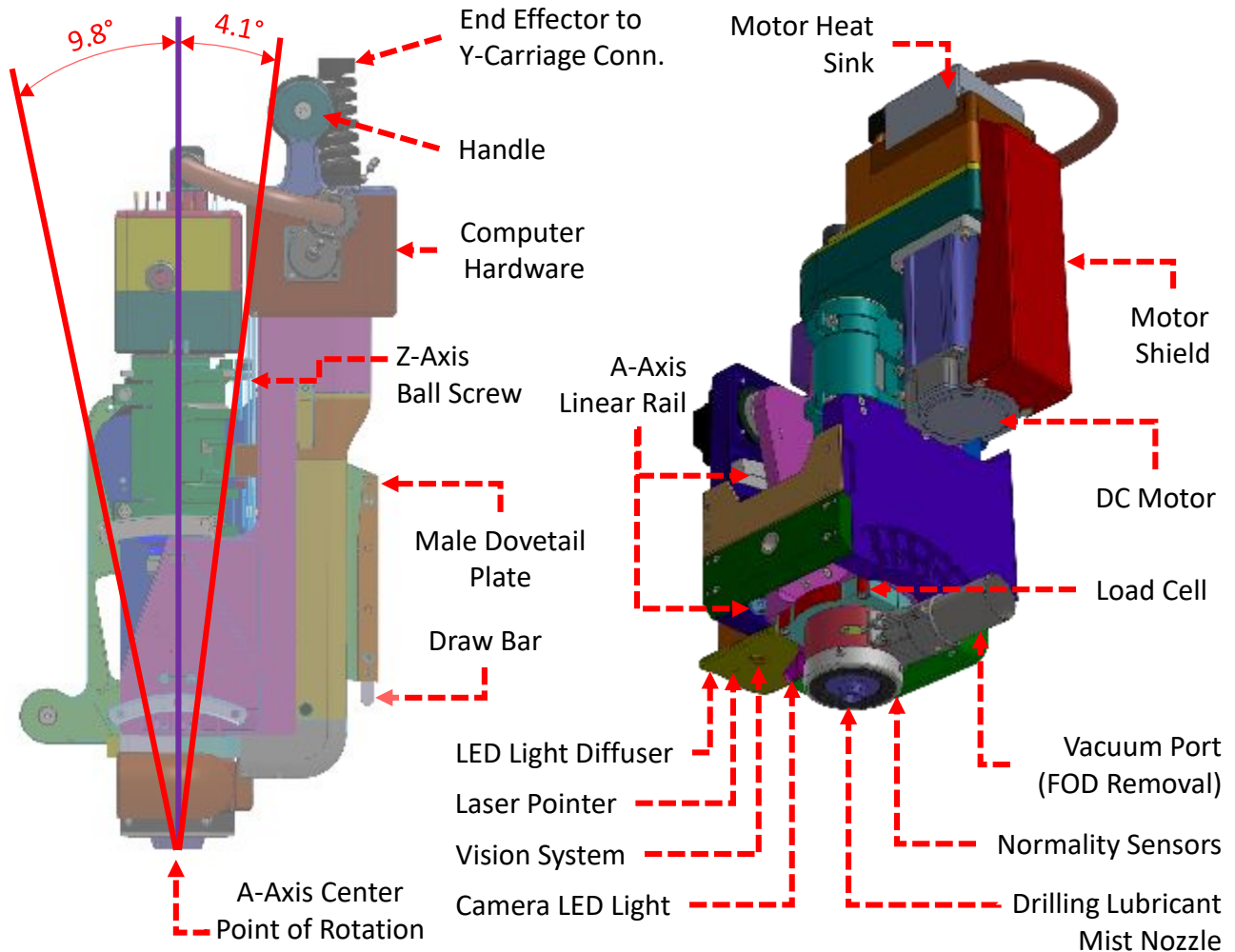
- Pneumatic actuated Pressure Foot stabilizes assembly during drilling
- Rack & Pinon drive motors provide precise movement of the End Effector
- Uses standard shop compressed air (70-100 PSI)



Mini Flextrack (MFT) System

Drilling End Effector

This module contains drive components that are used to precisely travel along the Flextrack rails and has a motorized plate that the Y-Carriage gets mounted to. The X-Carriage also contains a X-Axis brake and the brake is activated when no power is supplied to the module.



Key Features

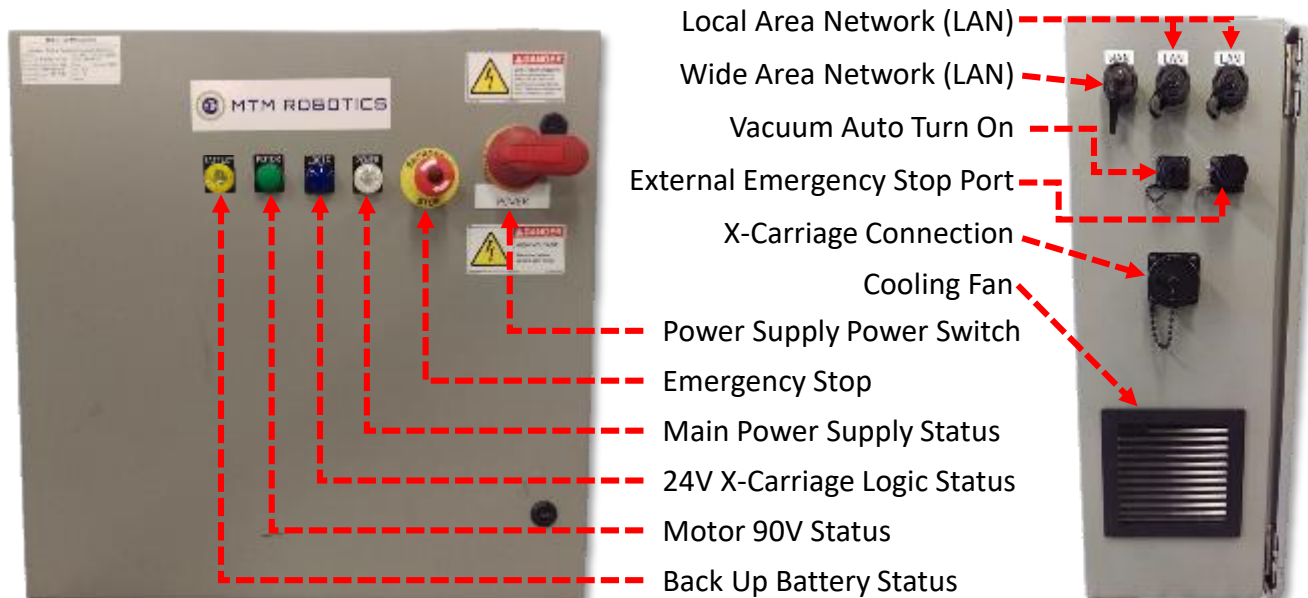
- Pneumatic actuated Pressure Foot stabilizes assembly during drilling
- Rack & Pinon drive motors provide precise movement of the End Effector
- Broken bit detection identified through software by voltage/load drops
- Motor is capable of drilling 7/16" and smaller holes.
- Ball Screw design provide precise Z-Axis movement



Mini Flextrack (MFT) System

Power Supply

- Light weight and portable.
- Interchangeable with MFT systems (not matched to a specific Mini Flex Track drilling system).
- Includes Ethernet router for stand-alone command and control, or within a factory/enterprise network environment.
- Small and flexible low-voltage DC umbilical cable that can be up to 80ft (24m) long.
- (ETL) and (CE) health, safety, and environmental certified.



Dimensions & Working Envelope

Input Power	Universal AC: 85-264VAC, 1-phase 50/60Hz, 15A-30A
Output Power	48VDC or 90VDC
Communication Interface	Ethernet
Emergency Stop	Daisy-chain feature allows E-Stop for single machines or for multiple machines on a master Emergency Stop circuit in the factory.
FOD Vacuum	Can be fully automated and under control of machine
Umbilical Length	Up to 80ft (24M)
Weight	65 lbs (29.5 kg)
Positioning Carriage Size (LxWxH) (without touch screen attached)	24in x 20in x 9in (610MM x 508MM x 229MM)



Mini Flextrack (MFT) System

Dimensions & Working Envelope

Dimensions	851mm(33.5") W, 534mm(21") H, 508mm(20") L (Doesn't include module connection cables)
Weight	45kg (100lbs)
Working Envelope	
Along Rail (X direction)	15m (48ft) (software limit)
Normal to Rail (Y direction)	150mm (6in)
End Effector Fly Height	Flat: 58mm (2.25in) // 1.8m radius: 70mm (2.75in)
Skin Curvature	Flat to 1800mm radius
Orientation	Robot will work in any orientation
Degrees of Freedom	X (15m) Y (150mm) Z (150mm) A +2deg/-9.8deg, B +/-3deg
Clamp Force in Z	158kg (350lbs) MAX

Top View

