

Stinger®

The **Stinger® & Stinger® Hornet** deliver chemical solutions to fix switch issues safely and effectively on energized switches. They are controlled by a small, handheld remote and come with a GoPro® camera to relay a view to a smartphone or tablet.

The Stinger® & Stinger® Hornet are an integral part of a switching maintenance program: Penetrate to eliminate corrosion, lubricates switches, and clean insulators.



Free Corroded Disconnect Switches

Improve switching ergonomics and reduce downtime from frozen switches. Customer field tests have shown treating switches with Stinger Fluid 1FR can reduce pull force 2 to 5 times.



Reduce Force Required to Open a Switch by 50%

By applying 1FR fluid before opening a stuck switch, it is proven to reduce the peak exertion by half based on the Ergonomic EMG (electromyography) Test.



Targeted Stream

Provides pinpoint accuracy. No spray or mist.



Capable of Single Person Operation

Effective as a “Trouble Tool”. Eliminates need for bucket truck.



The Stinger® Hornet (left) & Stinger® (right) are safe for energized switches.

stingertool.com

FirstPower Group LLC | 8941 Dutton Drive | Twinsburg, OH 44087

SAN82920-1



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Stinger[®]

PATENTED



Stinger[®]
Hornet

PATENTED

Enclosed in Dielectric Material	✓	✓
ASTM Tested for use up to	250 KV	280 KV
Dimensions	10 in by 14.6 in	10 in by 11 in
Weight (with full can)	4 lbs	2 lbs
Radio Controlled Remote	✓	✓
GoPro [®] Camera	✓	✓
Battery Operated	✓	✓
Universal Hot Stick Attachment	✓	✓

For more information, ordering details, or to schedule a demonstration, contact sales@firstpowergroupllc.com or call 330-963-2050

We also welcome new ideas and questions on Stinger Fluids.

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Stinger® Fluids



All **Stinger® Fluids** sold by FirstPower are non-flammable and dielectric strength tested to ASTM D877 standard. Stinger Fluids are safe to use on energized switches and reduce pull force to open switches. The Stinger fluid cans are designed to fit the Stinger and Stinger Hornet only.

The Stinger® & Stinger Hornet® deliver chemical solutions to fix switch issues safely and effectively. By dissolving corrosion, lubricating switches, and cleaning insulators, the Stinger & Stinger Hornet are definitely an integral part of a switch maintenance program.



PATENTED

1FR Penetrant

- 1 FR dissolves corrosion on stuck components to make them operational again
- Designed for use with corroded parts, 1FR is an excellent choice for freeing Disconnect Switches and Rusty bolts
- Dielectric Strength 35 KV



2NP Switch & Contact Cleaner

- Cleaner & degreaser for removing Contaminants, Oils, Adhesives, Tar, Sludge, or Corrosion
- Great for cleaning insulators
- Dielectric Strength 37 KV



3PAO Lubricant

- Polyalphaolefin oil purposed for switch maintenance
- Excellent lubricity to assist in aligning switches during closing
- Medium-life, high quality synthetic oil
- Recommended for disconnect switches
- Dielectric Strength 45 KV

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Penetrant



Free Stuck & Corroded Parts!

- Apply 1FR Penetrant on rusted or corroded components to make them operational again
- 1FR is an excellent choice for freeing:
 - Disconnect Switches
 - Bushings
 - Rusty Bolts
 - Other Moving Parts



Lubricant

Superior Lubrication!

- Use 3PAO Lubricant to provide protection and lubrication for a range of moving components in mechanisms
- Contains rust and corrosion inhibitors and anti-wear additives



HC-08141

Safety Data Sheet available on FPG website

Which Grease?

Use Lube by Number!



All the Necessities!

Each kit is stocked with industry leading synthetic grease and oil for on-site maintenance of circuit breakers.



Easy to Use!

The included LubeGuide instructions make it easy to know the right lubricant for each component and how to apply it.



Created for You!

Created to give your technicians and maintenance people an easy and long-lasting lubrication solution!





#1 Penetrant *FirstPower 1FR*

Multi-purpose penetrant to loosen rust. Aids in disassembling parts and freeing stuck moving parts.



#2 Cleaner *FirstPower 2S*

Cleaning agent for plastics, fiberglass and metal components, pre-cleaning & degreasing surfaces before painting, sealing, or bonding. VOC-Free.



#3 Lubricating Oil *FirstPower 3PAO*

Synthetic PAO lubricating oil to stop squeaks, lubricating locks, hinges, chains, gears, and other lightly loaded moving surfaces and parts.



#4 Rolling Surface *Molykote® 3451*

Fluorosilicone grease that provides lubrication on needle bearings and other roller bearings in circuit breakers. Resistant to chemicals, long-lasting.



#5 Sliding Surface *Molykote® G-n Paste*

Dry film lubricant to provide protection against fretting and corrosion in sliding metal on metal applications.



#6 O-Ring, Gasket Seal *Molykote® 111*

Silicone grease recommended for lubricating and dressing flange gaskets, o-rings, and seal applications. Resistant to chemicals, long-lasting.



#7 Contacts *Molykote® 33 Medium*

Silicone grease ideal for protecting and lubricating moving contacts in a substation environment.



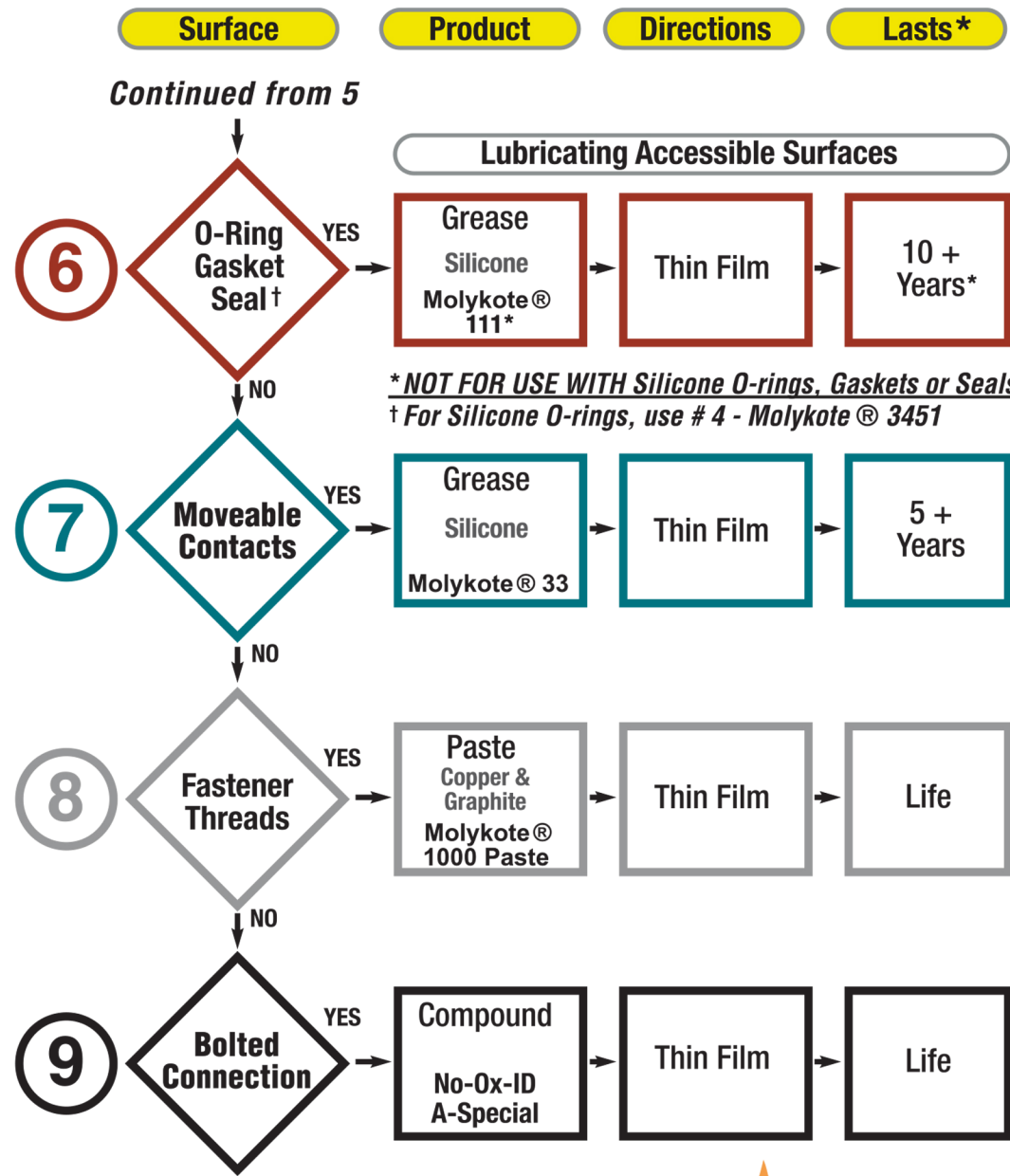
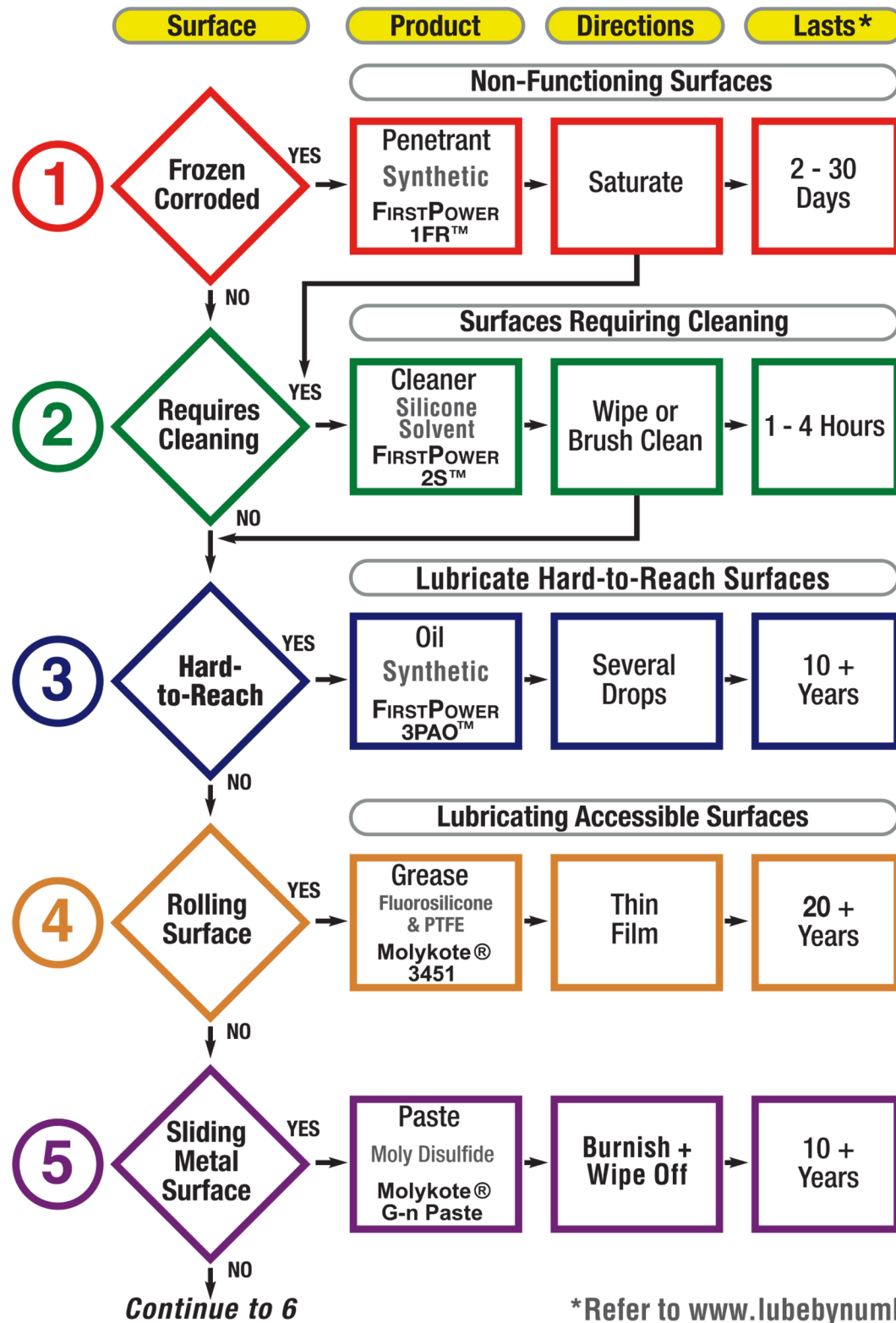
#8 Fastener Threads *Molykote® 1000 Paste*

Anti-Seize paste recommended for faster threads and bolted connections to improve coefficient of friction.



#9 Bolted Electrical Contacts *No-Ox ID A-Special*

Electrically conductive grease helps keep metals free from rust or corrosion.



* NOT FOR USE WITH Silicone O-rings, Gaskets or Seals
 † For Silicone O-rings, use # 4 - Molykote® 3451



*Refer to www.lubebynumber.com for additional information



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MDL *Circuit Breaker Minimal Disassembly Lubrication* KIT

2

MDL *Specialized Cleaner*

Apply to mechanism bearings, pins, shafts, chains & sliding surfaces

- Cleaning agent safe for plastics, fiberglass and rubber
- Non-flammable



3

FSL *Special Fluorosilicone Oil*

Apply to mechanism bearings, pins & shafts

- Long Life special formulation Fluorosilicone Oil
- Creeps into tight clearances and revitalizes existing grease
- Formulated for application in low and high temperature extremes



- Simple Three Step Process, Approximately 1-hour per Mechanism
- Requires Limited or No Disassembly
- Clean, Lubricate and Restore Dependable Operation
- Supports Limited Budgets & Extended Maintenance Time Frames

M

Molykote 3451 Grease

Apply to mechanism shafts, chains, gears, & trip latch areas

- Long Life Fluorosilicone and Teflon grease
- Resists chemical sprays and water washout
- Proven effective life of at least twenty years in circuit breakers



HC-08142

Safety Data Sheet available on FPG website

The following Minimal Disassembly Lubrication (MDL) Procedure is to be used with only slight variations caused by local situations:

- 1 Obtain and Record** using First Trip Device **(a)** on-line first trip of close time, **(b)** after breaker is isolated, offline three sets each of trip and close times if the situation permits, **(c)** trip coil current and **(d)** close coil current.
- 2 Inspect Visually** for broken or worn components that need immediate attention.
- 3 Clean:** Apply two rounds of #2 MDL cleaner on all identified bearings and moving surfaces on the mechanism. Use the cleaner and a small brush to remove as much old grease, oil and dirt as possible.
 - Operate breaker close-open three times after each round of cleaner is used
 - This is to work the cleaner into the bearing
- 4 Lubricate:** Apply two rounds of FirstPower #3 FSL fluorosilicone oil on all identified moving bearings and surfaces. Use a conservative amount of oil and cleaner and rags to collect excess oil.
 - Operate breaker close-open three times after each round of oil is used
 - For easily reached parts such as trip latch rollers, sprockets, gears or cams, use Dow Corning 3451 grease after cleaning. Rub the grease into surfaces with brush or gloved finger; leave only a thin film
- 5 Wipe Excess Oil** and grease off the mechanism and bottom of cabinet before closing the breaker cabinet.
- 6 Obtain and Record Final Readings** using First Trip Device **(a)** offline three sets each of trip and close times if the situation permits.
- 7 Remove Grounds;** return breaker to service; capture on-line close -trip- close times, trip coil current and close coil current for records.
- 8 Notes:** If variations from expected performance are found during cleaning or lubrication, additional time and effort should be taken to understand and document the cause.

Do

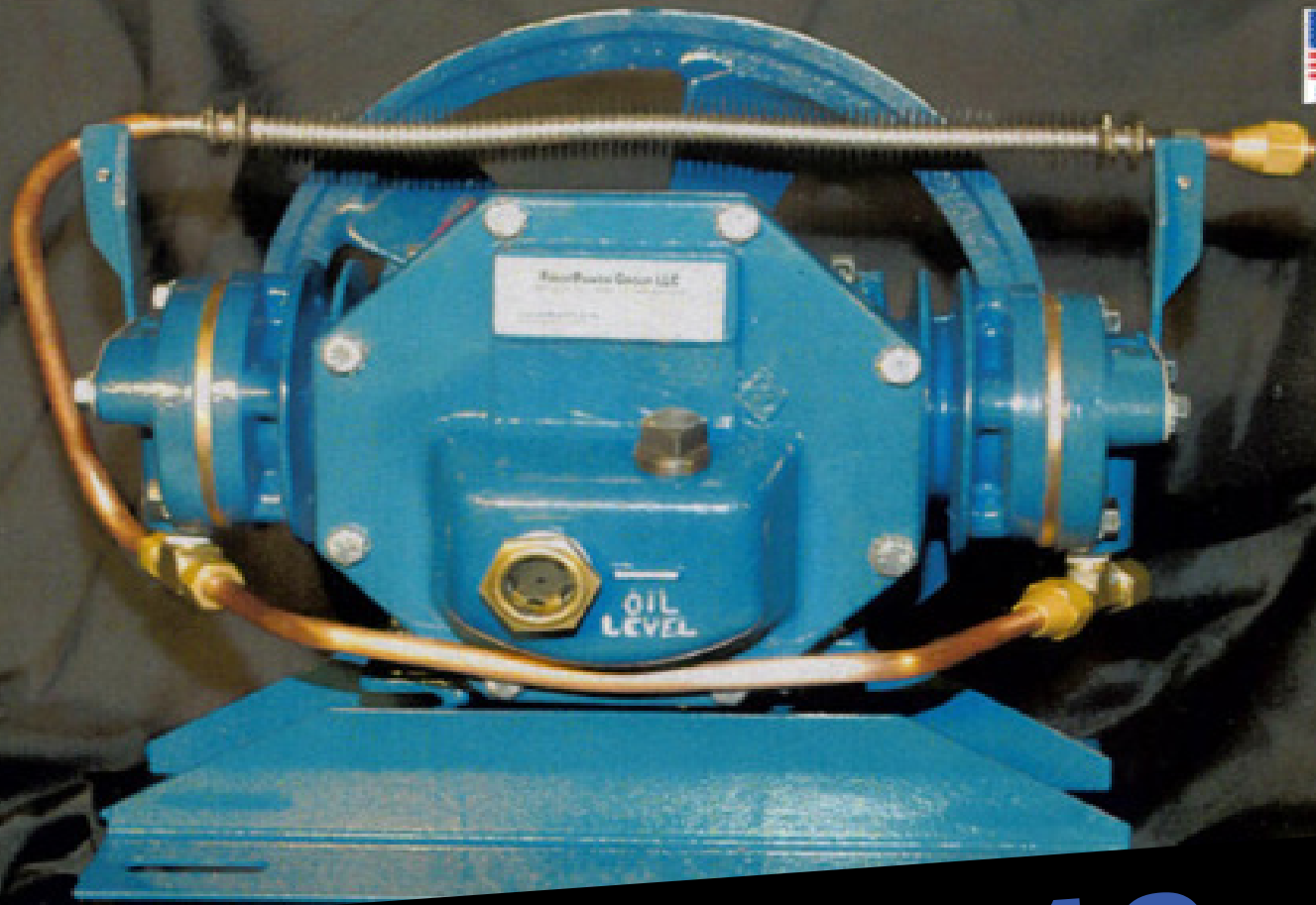
- Use the solvent supplied in the MDL kit. The solvent must be compatible with the fluorosilicone oil or the oil will not penetrate tight spaces
- Rub grease into external surfaces; leave only a light film
- Wear gloves—the solvents, oils, and grease are chemicals and will penetrate skin
- When additional lubricant is needed in the future, use the oils and greases in the MDL kit to renew the original application

Don't

- Pack bearings with grease or leave large quantities of grease on surfaces
- Use spray solvents—they wash out lubricating oils and greases
- Use greases with different thickeners. They may make the greases incompatible, resulting in poor lubricating properties. Clean surfaces thoroughly if changing grease

Lubricant Knowledge

- Grease is characterized by the oil from which it is made. A grease consists of 80-95% oil, 2-15% thickener and 0-10% additives
- There are 4 broad categories of oil:
 - Petroleum or mineral oil: do not use this on circuit breaker mechanisms. It oxidizes rapidly and has narrow temperature range. It is too viscous to penetrate tight spaces.
 - Synthetic hydrocarbon oil: PAO most common, e.g, Mobil 28. Estimated life 8–10 years. Do not use esters—limited life
 - Synthetic silicone oil- ok for very light loads only
 - Synthetic fluorinated oil: e.g. FPG 3FSL oil and Dow Molykote 3451 grease. Long life, good lubricant, resistant to aerosol sprays and salt environment. Estimated life 15–25 years



CircuitAir210

- Doubled Oil Storage Volume
- Expanded Air Output
- Cooler Operating Temperatures
- 100% Used Oil Drainage
- Convenient Sight-Glass Oil Gauge
- Increased Air Flow to Cylinders & Wear Surfaces
- Oil & Air Leak Free Design
- Eliminates Pulley Rib Cracking

The CircuitAir 210 is the result of years of applied experience servicing, repairing & testing oil circuit breaker compressors. Accumulated expertise since 1979, has led to the production of this enhanced compressor.

A direct replacement for most Keystone compressor models (A, D, Y & BY) and other similar compressors, the CircuitAir 210 boasts innovative design improvements to overcome common compressor problems. Improve operating efficiency & performance, extend the service life & reduce overall maintenance & cost with CircuitAir 210.

Compressor Specifications:

Cylinders	2
Stages	1
Max Pressure	210 PSI
Free Air Delivery	2.7 SCFM
Minimum Speed	620 RPM
Maximum Speed	875 RPM

Suggested Motor Specifications:

Power	1 HP-1 Phase
Voltages	115/208-230 VAC

Circuit Breaker Compressor Remanufacturing



FPG proudly offers compressor remanufacturing service for air & SF6 compressors. Repairing compressors for the electric power industry since 1979, our technicians and engineers have seen firsthand the common causes of compressor failure and applied their knowledge to develop enhancements & improvements to common compressor designs resulting in exceptional equipment performance.

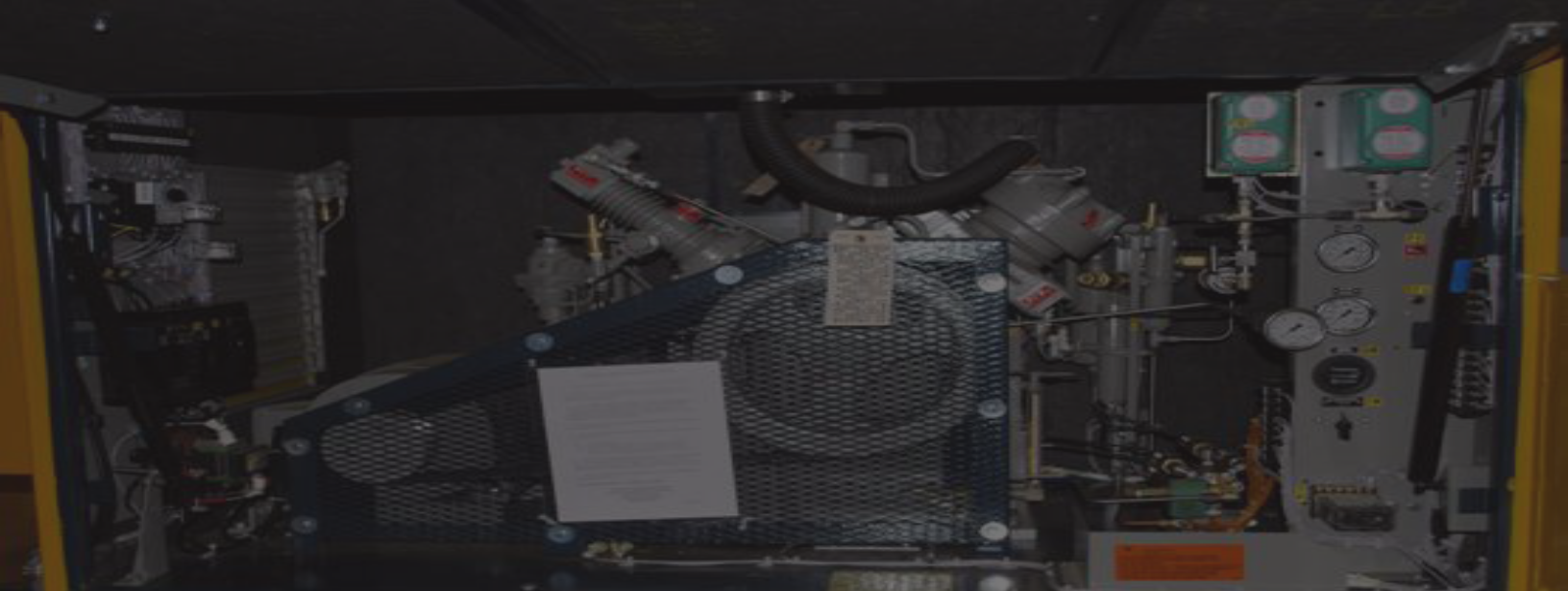
Each compressor is completely disassembled, cleaned, and inspected for damage. The unit is reassembled with new components as needed; new seals & o-rings are installed.

V2A4 Remanufacturing includes all of the above and also servicing of the dryer, check and safety valves, unloader, all new wiring and piping. The housing is also completely cleaned and re-painted and new insulation installed.

Each compressor also undergoes a minimum 10-hour test run to insure operation & quality of service before being returned.

Circuit Breaker Service & Repair Also Available





Compressor - Remanufactured and New Units

FIRSTPOWER

Refurbished - Rec'd, cleaned, inspected, new maintenance parts (bearings, valves, gaskets, seals) installed, tested for pump up, blowby, thermal performance
Some units are in stock, other available on 1-2 week turnaround of customers core

Manufacture	Alt Manuf	Model	Typical OCB Applications / Fits Mechanisms
Westinghouse	LeRoi/Dresser	1BYC	Westinghouse OCB AA10/AA14, also ITE : 2 stage compression
Westinghouse	LeRoi/Dresser	1XBYC	Westinghouse AA10/AA14, 2 stage compression
Westinghouse	LeRoi/Dresser	1XBYS-3	Westinghouse AA10/AA14, 2 stage compression
Westinghouse		2G1	Westinghouse AA10/AA14, 2 stage compression
Westinghouse		2GA	Westinghouse AA10/AA14, 2 stage compression
Worthington		CM	
Copelmatic		SF6	Single Stage SF6 gas compression
Dresser	LeRoi	1VC	Westinghouse AA10/AA14, 2 stage compression
Dresser	LeRoi	2VC	Westinghouse AA10/AA14, 2 stage compression
Emgo	Jenny	FGE	Westinghouse AA7, Single stage compression
Emgo	Jenny	GTHVB	Westinghouse AA10/AA14, 2 stage compression
Emgo	Jenny	KGBB	Westinghouse AA10/AA14, 2 stage compression
Emgo	Jenny	KHVB	Westinghouse AA10/AA14, 2 stage compression
Emgo	Jenny	KU	Westinghouse AA7, Single stage compression
Keystone		A	GE OCB MA 13 Mechanisms
Keystone	Harley	D	GE OCB MA 13/14/15 Mechanisms
Keystone		BY	GE OCB MA 18/19 Mechanisms
Worthington	Atlas Copco	V2A4	2000/3700 psi models

New Compressors

Some units in stock, others available in 1-2 weeks

FirstPower	*	CircuitAir210	GE OCB MA 13/14/15 Mechanisms
Kaeser	**	K150	GE OCB MA 13/14/15 Mechanisms
Kaeser	**	K175	Westinghouse OCB AA10/AA14, also ITE: 2 stage compression
EMGLO		60T	Westinghouse AA7, Single stage compression
EMGLO		GTHVB	Westinghouse AA10/AA14, 2 stage compression
EMGLO		BTW300T	Westinghouse AA10/AA14, 2 stage compression
EMGLO		KHVB	Westinghouse AA10/AA14, 2 stage compression
EMGLO		KU	Westinghouse AA7, Single stage compression

* Direct replacement for Keystone Models

** Also available as complete units (motor base plate, etc) for additional cost