



Specification for Remanufacture US&S M3 and M23 Switch Machine



US&S M23 Motor Compartment



US&S M23 Gear Compartment



US&S M23 Contact Compartment



US&S M23 Switch Machine

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1 SCOPE AND INTENT

This document describes Patco Industries, Inc. remanufacturing standards for a US&S M3 and M23 switch machine. Work shall be performed in a manner that is consistent with the requirements of US&S Service Manual SM-6263

2 GENERAL

2.1 Receiving Cores

2.1.1 Units received are to be physically inspected upon arrival for physical damage that may have occurred in service or shipment.

2.1.2 All units shall be tagged to identify specific customer ownership.

2.2 Inspection

2.2.1 Machines are to be completely disassembled and inspected for worn, damaged, and defective components per O.E.M. specifications.

- a.) All components are degreased and sand blasted in accordance with procedures acceptable to component makeup.
- b.) All castings shall be checked for cracks and/or breaks.
- c.) Contact compartment and all contact blocks shall be checked for grounds and cracks.
- d.) Complete machining of frame as needed and all bearings and bushings replaced.
- e.) Locking components of machines shall be inspected to insure that the machine is capable of properly locking.
- f.) All grease and oil fittings will be replaced with new.
- g.) All roller bearings and seals shall be replaced with new.
- h.) All grease, oil, lubricants, adhesives, and paint shall be specified to operate properly throughout the temperature range for switch machines (-40° to +85° Celsius).
- i.) All tapped holed and threaded fasteners that are reused, shall be cleaned with the appropriate tap or die.
- j.) Hand throw (if equipped) shall be inspected to insure it is not broken or bent, and that it is functioning properly.
- k.) All gears and gear shafts shall be inspected for wear and broken teeth.
- l.) All bars shall be inspected for excessive wear and straightness.

- m.) Circuit controller parts shall be inspected to insure that they are capable of being rebuilt in accordance with the following sections and that no major parts are broken or missing.
- n.) Standard machine hardware shall always be replaced with new. Finishes shall be stainless steel or zinc with yellow chromate.

2.3 Internal Components

The following section outlines the requirements for remanufacturing of the internal components within the machine. During the remanufacturing process, care shall be taken to insure that critical machined surfaces on parts are not damaged by cleaning or contaminated with paint. O.E.M. parts or approved equivalent should be used.

2.3.1 Motor

- a.) All motors will be replaced with a Permanent Magnet Motor.

2.3.2 Clutch

- a.) The clutch housing shall be completely disassembled, sandblasted, and inspected.
- b.) Clutch housing shall be painted as required.
- c.) Packing seals shall be replaced with new.
- d.) All discs, metal and friction, shall be replaced.

2.3.3 Hand Throw (if equipped)

- a.) The hand throw assembly shall be completely disassembled, degreased, sandblasted, inspected, and painted.
- b.) The hand throw ball detent components shall be inspected and if necessary, replaced and refurbished.
- c.) The hand throw shall be reassembled, lubricated, and tested for proper operation.

2.3.4 Gear Box

- a.) The gear case shall be disassembled completely, degreased, sandblasted, inspected, and painted.
- b.) The bushing shall be inspected for excessive wear and shall be replaced if necessary.
- c.) The oil seal shall be replaced on all machines.
- d.) Gear teeth and worm shaft shall be inspected and dressed with a file if necessary.
- e.) Gear case shall be reassembled, lubricated, and tested for proper operation.

2.3.5 Base Casting

- a.) Base casting shall be degreased, sandblasted, inspected, and painted.
- b.) Prior to sandblasting and painting, lock rod wear pads shall be replaced if necessary.

2.3.6 Circuit Controller

- a.) The circuit controller shall be disassembled, cleaned, and inspected for excessive wear.
- b.) Circuit controller shall be reassembled, adjusted, and tested per O.E.M. requirements.
- c.) All components shall be inspected for defects and replaced if necessary.

2.3.7 Selector Clutch

- a.) The selector clutch shall be disassembled, degreased, sandblasted, and inspected.
- b.) The selector clutch shall be reassembled, greased, and adjusted to O.E.M. specifications.

2.3.8 Wiring Harness

- a.) The wire harness shall be replaced with new.
- b.) Wire shall be #12 AWG for current carrying circuits, and #14 AWG for indication carrying circuits.
- c.) All wire tags and terminal post tags shall be replaced with new.

2.3.9 Covers

- a.) All switch machine throw bar and lock rod covers will be inspected and replaced if necessary with new.
- b.) Cast iron covers will be replaced with aluminum covers, if requested by customer.

2.3.10 Paint

- a.) Machines will be powder coated black, unless customer specification require otherwise.

2.3.11 Lubrication

- a.) Machines will be lubricated according to O.E.M. lubrication instructions found in US&S Service Manual SM-6263.

2.4 Adjustment and Testing

- 2.4.1 All machines must be fully assembled and tested per O.E.M. specifications.
- 2.4.2 Upon final assembly suitable grease shall be applied to wear surfaces and unpainted surfaces that are not composed of naturally corrosion resistant material.
- 2.4.3 Each machine shall undergo a functional test that verifies the proper operation of the circuit controller, point detector, hand throw, and cut out switches.
- 2.4.4 Each machine shall be tested under simulated field load conditions.

2.5 Documentation

- 2.5.1 All switch machines will be identified with a serial number located near the mounting holes of the machines footprint, and on the motor.
- 2.5.2 A copy of the switch machine inspection documents shall be included.

2.6 Shipping

- 2.1.1 Each machine shall be individually palletized. Pallets are made to size to accommodate the size of the switch machine; the machine is secured to the pallet with 4 carriage bolts and the appropriate hardware.
- 2.1.2 Each machine will be supplied with one gallon of Lubriplate 5555, if desired by the customer.

2.7 Quality Assurance

- 2.7.1 Each switch machine and internal components shall be inspected for defects. A technician other than the technician who performed the remanufacturing of the machine shall perform the inspection.

3 Ordering Information

Patco Industries, Inc. will need the *US&S order form* to be filled out prior to remanufacture.

4 Warranty

Patco Industries, Inc. warranty information can be found on page 9 of this specification.

Warranty Information

We warrant that goods remanufactured or manufactured by Patco Industries, Inc. will, when delivered to you conform to our product specification or original equipment manufacturer specification and be free from defects in material and workmanship. Warranty period shall be three years for relays and/or seven years for switch machines and all other products one year from the date of shipment. Goods fail to function under normal and proper use and service because of defects in material or workmanship demonstrated to our satisfaction to have existed at the time of delivery, we will, reserving the right to either inspect them in your hands or request return to us, at our option, repair or replace the defective good(s) at our expense, FOB our plant. In any event, all dismantling, reassembly, and packaging are assumed by you and transportation costs will be collect to Patco Industries, Inc. If upon inspection it is found to not be a warranty issue you will be charged for any collect shipping.

We shall not warrant any part, or parts of any type of equipment sold by us to you that have been installed without proper inspection or testing prior to installation. We shall not warrant relays, switch machines or any other product or products sold to you if they are not installed properly, not properly inspected and/or maintained, altered or damaged while installing or by other equipment.

We shall not be liable for the cost or expense, including labor, in connection with removal or reinstallation; for the indirect incidental or consequential damages of any kind nor for any claim or claims arising out of the supply or use of our products. You will hold us harmless and indemnified against any and all claims, demands, liabilities, damages, costs and expense resulting from our sale of products or parts or any goods sold to you.

No goods may be returned more than thirty days after the date of delivery except with our written consent. Standard goods may be returned within thirty days after delivery, subject to a cancellation and restocking fee of 15% of total order value. If the box, container or packaging has been opened, standard goods may be returned within thirty days after delivery, subject to cancellation charge of 25% of the total order.

The rights and duties of the parties shall be governed by the laws of the state of Wisconsin.