3MA/4MA

Pneumatic Division North America

Parker

ENGINEERING YOUR SUCCESS.
3MA/4MA Portfolio Strategy

• **Tie Rod cylinders** typically have the following attributes:
  • Designed to be the **most rugged and fully-featured** version of all pneumatic cylinders
  • Includes the **largest possible bore sizes**
  • Common tie rod version standards include:
    • NFPA (typically only in North America)
    • ISO (worldwide)
    • CNOMO (France, some use in other EU countries)
    • JIS (Asia, mostly used in Japanese equipment)
3MA/4MA Portfolio Strategy

• 3MA/4MA Series follows the **NFPA standard** for air cylinders
  • Interchanges with other NFPA air cylinders from Parker and the competition
    • Applies to steel and aluminum air cylinders
  • Note on 1.125” Bore:
    • The major NFPA standard covers 1.50”-8.00” bores. The 1.125” bore belongs to a different NFPA standard. Interchanges with competition.
• Note on Rod Lock Versions (3MAJ/4MAJ):
  • There is no NFPA standard for rod lock versions. The base cylinder meets the NFPA standard.
The Next Generation

- Construction choices

3MA - Standardized Version

4MA - Removable Gland Version
1 ½ - 5” Bore 3MA

- Standardized product – not many specials can be done
1 1/8” Bore 3MA

- New Bore Size added
- 1100 psi hyd. capable
1 ½”- 5” Bore 4MA

- 2MA with additional features
- 5” bore is now extrusion
6” & 8” Bore 4MA

• Rod gland change only
3MAJ and 4MAJ Rod Lock

- Broadest offering in the industry
- Quick way to make your Push Product goal
- Manual override standard
The New – 3MA

- **Superior Performance** – Resulting from efficient design, reduced weight, low friction and advanced sealing technology
- **Flexible Mount** – Standard mount accommodates NFPA mounts as accessories
- **Sensor-Ready** – Magnetic piston ring is standard. Sensors “drop-in” to grooves in cylinder body for easy, inexpensive assembly and protection
- **Safety** – Rod lock version available
- **Environmentally Friendly** – Reduced noise from RoHS-compliant materials
- **2-D and 3-D CAD Files** – Immediately available at: [http://www.parker.com/pneumatics](http://www.parker.com/pneumatics)
The New, The Improved

- **Problem: Breakaway Friction**
  - 2MA has average breakaway psi for the industry (5-7 psi)
    - Primarily due to wiperseal
    - We are receiving more demands for “low friction” construction
    - Low friction construction requires special seals (Lubrithane)
  - 3MA/4MA has low friction construction as **standard**
    - All seals are rounded lip
    - Composite parts have low friction
    - Average breakaway < 1.5 psi
      - See Bulletin AU03-0929-B12
The New, The Improved

All moving components are designed for low friction. Low friction results in less wear, and we accomplish this with zero leakage.

- Rounded-lip rod seal and piston seals glide on the lubricant film instead of wiping it away
- Self-lubricating carboxylated nitrile material is used to maximize seal life
- Composite rod bearing and piston have an extremely low coefficient of friction and are formulated for high speed, low wear applications
- Rod material is hard chrome plated and polished to an extremely fine finish
The Improved

Although the 3MA is perfectly suited for many applications, there is an occasional need for something different. To accommodate these demands, we designed the highly versatile 4MA Series cylinder. The 4MA will provide the same fit as the 3MA, but its construction offers more flexibility for modification.

**General 4MA features include:**

- Available in 1½" – 8" bore sizes
- Machined head and cap from extruded aluminum bar stock, black anodized for corrosion resistance
- Externally removable bronze alloy gland/bearing for easy maintenance
  - Dual rod seals (separate wiper)
- Same piston rod assembly options and cylinder body as the 3MA
- Additional mounting options
- Standard and oversize rods
- Sensor-ready thru 5” bore
The New, The Improved

**3MA**
- Rod Gland part of the end cap

**4MA**
- Externally Removable Gland
The New

Carboxylated Nitrile, rounded-lip primary seal (from 2AN)

Molythane wiper

Urethane cushion seal (from 2MA)

Composite NVI (Needle Valve Insert)

Composite Rod Bearing
The Improved

**Molythane wiper**
*Options:*
- Fluorocarbon
- Polymyte
- Metallic Scraper

**New 4-flatted bronze gland design, meeting NFPA length (HI LOAD option)**

**Carboxylated Nitrile, rounded-lip primary seal (Fluorocarbon option)**

**Urethane cushion seal**

**Extruded, Machined and Black Anodized Head**

**SS Needle Valve**
The New, The Improved

- Composite bearing designed for side load is inserted into a hard bronze alloy gland (Ampco® 18)
  - Gland assembly is designed for side load conditions
  - Extends service life by at least 50% in our testing
    - Your results may vary
  - Available with standard, high and low temp seals for air (4MA) or hydraulic (4ML) service
  - Same wiper and seals as standard gland
  - Same external dimensions as standard gland

Note: a slide package is still recommended to maximize service life for applications with side load
The New, The Improved

The 4MA also offers these additional options:

- **Combination with the following as standard offerings:**
  - “HB” slide packages to become guided cylinders (HBC / HBT / HBR / HBB)
  - “B” Series air valves as an air cylinder/valve combination unit (ACVB Option)
  - Bolt-On Linear Transducer for continuous piston rod position sensing (LPSO Option)

- **And many more…**
The New, The Improved

General Specifications:

Standard Features common to both series for 1-1/2” to 5” bore:
- TEF Mount (NFPA MX5/MS4)
- Composite Piston (for standard rod sizes)
- Magnetic Piston Ring
- Extruded Aluminum Cylinder Body

3MA Standard Version
- 1-1/8” to 5” Bores
- Air Service
- Standard Rod Size
- Die Cast Aluminum Endcaps
- Composite Bearing
- Cushions Standard (free)
- Standard Temperature
- Most Economic Version

4MA Removable Gland Version
- 1-1/2” to 8” Bores
- Air and Hydraulic Service (4ML)
- Standard and Oversize Rods
- Extruded Aluminum Endcaps
- Machined Gland/Bearing
- Cushions Optional
- Standard, High and Low Temperatures
- Most Flexible Version
# The New, The Improved

## Configurable Mods in expanded model code

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Recurring Weakness – Rod Material

- Although many sizes of piston rod stock are available on the open market, they are only chrome plated, not case-hardened
  - Nearly all competitors purchase this type of rod material
- Pneumatic Division performs this process in our own domestic facility
- Rod over 1/2” diameter are case-hardened
- This is one recurring competitive disadvantage that we should definitely state during any performance, reliability or durability discussion
Recurring Weakness – End Seals

• End seals can be major contributor to cylinder leakage
• Most competitor cylinder’s end sealing ability is dependent on:
  • Sawcut or turned cylinder body faces that vary in surface finish and flatness
  • Non-uniform endcap fastener/tie rod torque, which can cause small gaps
• The 3MA/4MA is designed to seal on the cylinder body inner diameter, the optimal sealing surface
  • The cylinder body is always round, smooth and on-size
  • This design is unaffected by typical endcap fastener torque variation
• Overall, a more robust design