

# OPERATING MANUAL METO-FER<sup>®</sup> AUTOMATION AG

MINI LINEAR UNIT TYPE

ML 13-...-0

ML 13-...-A

SERIES FROM 5-25

## 1. PRODUCT DESCRIPTION

### 1.1 Introduction

#### 1.1.1. Utilization

The mini linear unit ML 13 is able to execute linear movements in any position. This linear movement can be adjusted in its working area (stroke).

#### 1.1.2. Safety Precautions

Before starting to operate the mini linear unit ML 13, it is necessary to check that no body parts are within the working range of the element.

The maximum supply pressure of 8 bar must not be surpassed.

#### 1.1.3. Danger Area

Any body parts are to be kept out of the working area (stroke area) of the unit in order to avoid mangling.

### 1.2 Technical Data

#### 1.2.1 Weights and Measurements

See also Sheet 5

Type	Stroke	Adjustment Range Between	A (See Sheet 5)	Weight Lb.(kg)
ML 13-025	0-25mm	0-25mm	115mm	1.5 (0.70)
ML 13-050	0-50mm	13-50mm	140mm	1.7 (0.76)
ML 13-075	0-75mm	38-75mm	165mm	1.8 (0.82)
ML 13-100	0-100mm	63-100mm	190mm	1.9 (0.88)

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### 1.2.2. Performance Characteristics

(Nm)

Type	Piston force at 5 bar	Lifting force static/dynamic				Ma (Nm)	Mb (Nm)	Air Consumption per stroke
		F1	F2	F3	F4			
ML 13-025	32N	131N	137N	167N	196N	4.5	9.5	0.03 NL
ML 13-050	32N	84N	88N	190N	196N	4.5	9.5	0.06 NL
ML 13-075	32N	62N	65N	190N	196N	4.5	9.5	0.09 NL
ML 13-100	32N	41N	43N	190N	196N	4.5	9.5	0.12 NL

NL: Normal Liter

Repetition accuracy                    +/-0.0004" (0.01mm)

### 1.2.3 Operating Source

40mm filtered, unoiled or oiled air (dew point 6°C)

Operating pressure                    P<sub>min</sub> 3 bar

P<sub>max</sub> 8 bar

### 1.2.4 Connections

Air connections                    M-5 (see sheet 6)

### 1.2.5 Environment

Temperature                    50°F to 122°F (+ 10°C to + 50°C)

Relative humidity                    95% (without condensation of water)

Purity of the environment air                    regular working place atmosphere

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### 1.3 Features

#### 1.3.1 Standard Features (included in delivery)

The unit delivered will have two patented end screws type AS 08/40 with fine thread. These end screws adjust the stroke within its working area. According to the type, the units are equipped with the following cushions:

Mini Linear Unit	Cushions	Type
ML 13-...O	No cushions	----
ML 13-...A	Elastomer cushions	KB 06/M 8X1

#### 1.3.2 Special Equipment

The end screws can be fitted with the patented sensing elements (see Meto-Fer<sup>®</sup> Electronic catalog, pages 22 and 23) in order to check the end position.

## 2. SAFETY REGULATIONS

### 2.1 In general

See chapters            1.1.1  
                                  1.1.2  
                                  1.1.3

### 2.2 Specifically

Do not make any changes or modifications to the unit (voids warranty).

## 3. CONSTRUCTION AND FUNCTION

The stroke adjustment can be made infinitely variable with the end screws AS 08/40 (Pos.101) in order to check the occurred movement, the end screws can be fitted with our sensing elements (see Meto-Fer<sup>®</sup> Electronics catalog).

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### **4. INITIAL OPERATION**

#### **4.1 Compressed Air**

Remove the safety caps from the air connections. In order to regulate the velocity of the movement, we recommend our one-way flow controls DV-M5 (see sheet 5.021). Unused air connections must be covered with the M5 caps.

#### **4.2 Stroke Adjustment**

- loosen security nut on the end screw
- adjust the required stroke with the end screw (Pos.101)
- tighten security nut on the end screw

#### **4.3 Cushion Adjustment**

The basic adjustment of the cushions has to be optimized by the user upon his special requirements.

The position of the cushions can be seen on the construction drawing.

The brake resistance can be changed by adjusting the length of the brake path.

When using oil and elastomer cushions, it must be checked that the end stop is not made by the cushions. The cushions should show a remainder stroke of 0.039" (1mm).

### **5. MAINTENANCE**

#### **5.1 Introduction**

The mini linear unit does not require any special maintenance procedure. Never use any type of solvents in order to clean the unit.

#### **5.2 Air Supply**

The mini linear unit is equipped with **oil-free seals** and can be operated with dry and non-oiled compressed air. If oiled compressed air is used, we recommend:

- Airpress compound SAE 5 (Klueber Order No. 063027)



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### **6. REPAIR**

#### **6.1 Introduction**

If the unit no longer meets the requirements (leakage, wear, etc.) the defective parts must be replaced.

#### **6.2 Safety Precautions**

Before dismantling the unit, it is necessary to check that the compressed air supply is turned off. It is best to disconnect the compressed air supply from the unit.

When repair work is done, only the original spare parts and lubrication must be used.

#### **6.3 Replacing the Seals**

- Remove the end plate (Pos.5) by loosening the set screw (Pos.201).
- Remove the cylinder tube (Pos.7) with special wrench. Don't loosen the brass cover (Pos.3).
- Loosen and extract the piston rod (Pos.8).
- Extract the housing (Pos.1).
- Replace the seals.
- Lubricate the cylinder bore and piston rod with grease (see chapter 7.2).
- The parts are then assembled in reverse order as described above.

#### **6.4 Replacing the linear ball bushings**

- Remove the end plate, the cylinder tube and extract the piston rod as described in chapter 6.3.
- Extract the housing (Pos.1).

- Press out the linear ball bushings (Pos.205).

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- Press in the new greased linear ball bushings. Make sure that the piston seal rings lie on the outside of the housing.
- The parts are then assembled in reverse order as described above.

### 7. SPARE PARTS LIST

#### 7.1 Spare Parts

When ordering spare parts, the type and serial number of the unit must be supplied.

Position	Part Number	Description	Amount
*203	025.140.0054	Rod Seal	1 piece
*204	025.140.1010	Piston Seal	1 piece
205	045.100.0005	Linear Ball Bushings	4 pieces
*211	025.100.0405	O-Ring	1 piece
*212	015.100.0040	Washer	1 piece
*213	010.100.0040	Nut	1 piece

Seal Kit                      Order No. **460.100.0247** all items marked with (\*)  
 Repair Kit                    Order No. **460.110.0107** kit includes Pos.205

#### 7.2 Lubrication

Grease for seals	Staburag NBU 4 Atemp. (Klueber Order No. 005 040)
Grease for spherical liners	Staburag NBU 4 Atemp. (Klueber Order No. 005 040)



