

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

MINI LINEAR UNIT TYPE

ML 33-...-0

ML 33-...-A

ML 33-...-B

ML 33-...-C

SERIES FROM 5-25

## 1. PRODUCT DESCRIPTION

### 1.1 Introduction

#### 1.1.1. Utilization

The mini linear unit ML 33-... (Type O,A,B,C) 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 33-... (Type O,A,B,C), 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 33-025	0-25mm	0-27mm	157mm	8.9 (4.05)
ML 33-050	0-52mm	0-52mm	182mm	9.4 (4.25)
ML 33-075	0-75mm	8-77mm	207mm	9.9 (4.50)
ML 33-100	0-100mm	33-102mm	232mm	10.4 (4.70)
ML 33-125	0-125mm	58-127mm	257mm	10.8 (4.90)
ML 33-150	0-150mm	83-152mm	282mm	11.45 (5.15)
ML 33-175	0-175mm	108-177mm	307mm	11.8 (5.35)
ML 33-200	0-200mm	133-202mm	332mm	12.2 (5.55)
ML 33-250	0-250mm	183-252mm	382mm	13.2 (6.00)
ML 33-300	0-300mm	233-302mm	432mm	14.1 (6.40)
ML 33-350	0-350mm	283-352mm	482mm	15.1 (6.85)

ML 33-400	0-400mm	333-402mm	532mm	16.0 (7.24)
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### 1.2.2. Performance Characteristics

Type	Piston force at 5 bar	Lifting force static/dynamic				Ma (Nm)	Mb (Nm)	Air Consumption per stroke
		F1	F2	F3	F4			
ML 33-025	300N	823N	861N	982N	1013N	38.0	64.0	0.23 NL
ML 33-050	300N	499N	522N	982N	1013N	32.5	54.5	0.45 NL
ML 33-075	300N	340N	355N	865N	892N	28.5	47.5	0.67 NL
ML 33-100	300N	281N	295N	865N	892N	28.5	47.5	0.90 NL
ML 33-125	300N	203N	213N	728N	750N	24.0	40.0	1.12 NL
ML 33-150	300N	178N	186N	728N	750N	24.0	40.0	1.35 NL
ML 33-175	300N	148N	155N	680N	702N	22.5	37.5	1.57 NL
ML 33-200	300N	125N	131N	637N	657N	20.5	34.5	1.79 NL
ML 33-250	300N	100N	105N	610N	628N	20.0	33.5	2.24 NL
ML 33-300	300N	79N	83N	561N	578N	18.5	30.5	2.69 NL
ML 33-350	300N	66N	69N	532N	549N	17.5	29.5	3.14 NL
ML 33-400	300N	57N	59N	512N	528N	16.5	28.0	3.59 NL

NL: Normal Liter

Repetition accuracy                    +/-0.0004" (0.01mm)

### 1.2.3 Operating Source

40mm filtered, unoled 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                    R 1/8 (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 12/60 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 33-...O	No cushions	----
ML 33-...A	Elastomer cushions	PM25MF, KB08/M14X1
ML 33-...B	Oil cushions	OB 15/10K
ML 33-...C	Oil cushions with compensation reservoir	OB 15/10K with KOB 50

#### 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 screw AS 12/60 (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 flow control valves DV-R1/8" (see sheet 5.021). Unused air connections must be covered with the R1/8 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.2) by loosening the set screw (Pos.202).
- Remove the cylinder tube (Pos.7) with the special wrench. Don't loosen the brass cover.
- 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 (Pos.2), the cylinder tube and extract the piston rod as described in chapter 6.3.
- Extract the housing.

- Press out the linear ball bushings (Pos.208).



