

Pneumatic cylinder unit

Series CS

Installation, maintenance and
operating instructions

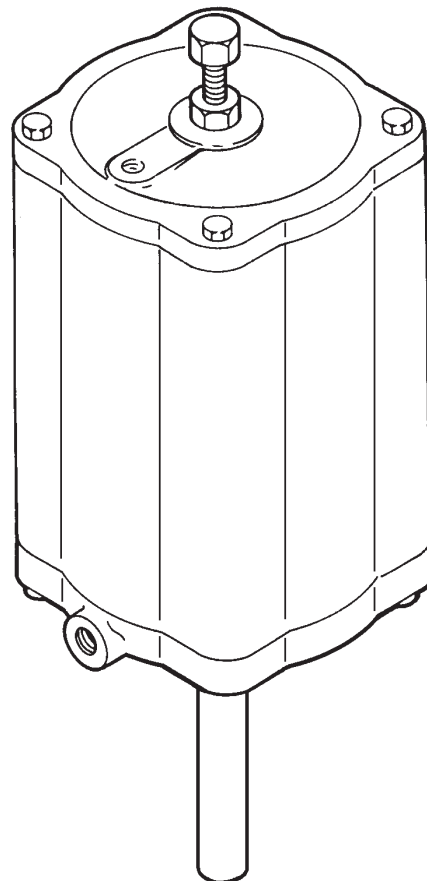


Table of Contents

GENERAL 3

Scope of instructions 3
Cylinder unit description 3
Cylinder markings 3
Technical data 3
Recycling and disposal of a rejected cylinder unit 3
Safety precautions 3

TRANSPORTATION, RECEPTION AND STORAGE 4

MOUNTING 4

Cylinder unit supply pressure 4
Mounting the cylinder unit 4
Operating directions 4
Mounting the positioner 4

MAINTENANCE 4

General 4
Replacement of piston seals 4

MALFUNCTIONS 6

TOOLS 6

ORDERING SPARE PARTS 6

DRAWINGS AND PARTS LISTS 7

Exploded view, cylinder units CS8-16 7
Exploded view, cylinder units CSA8-16 8
Mounting parts for positioners 9

DIMENSIONS AND WEIGHTS 10

Cylinder unit CS 10
Cylinder unit CSA 11

TYPE CODING 12

READ THESE INSTRUCTIONS FIRST!

These instructions provide information about safe handling and operation of the cylinder unit.
If you require additional assistance, please contact the manufacturer or manufacturer's representative.
Addresses and phone numbers are printed on the back cover.

SAVE THESE INSTRUCTIONS!

Subject to change without notice.

All trademarks are property of their respective owners.

1 GENERAL

1.1 Scope of instructions

These instructions contain the main information needed by users of Neles™ CS cylinder units. Additional information on positioners and other fittings are available from the instructions on installation, operation and maintenance of the model in question.

1.2 Cylinder unit description

CS series cylinder units are designed for linear movement service. The cylinders are pneumatic and single-acting.

The attachment dimensions used for of CS cylinder units are in accordance with the manufacturer's standard.

In the CS type, the spring is located on the piston rod side, i.e. the spring pulls the piston rod into the cylinder.

In the CSA type, the spring is located in the cylinder end side, i.e. the spring pushes the piston rod out of the cylinder.

A screw is located in the end of the cylinder to regulate the length of the piston stroke.

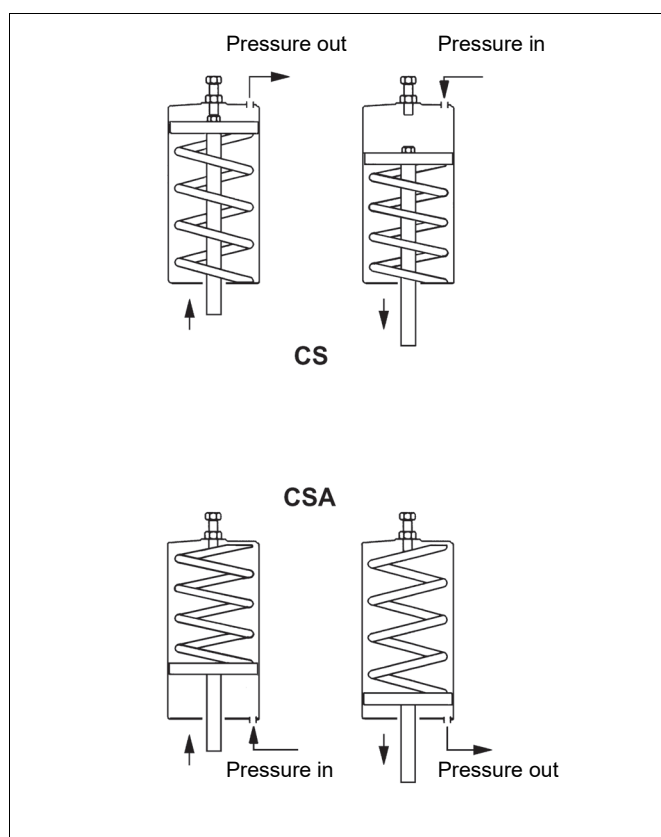


Fig. 1 Operation of the cylinder units

1.3 Cylinder markings

An identification plate containing the following information is attached to the cylinder:

- 1.Type
- 2.PO number
- 3.Manufacturing date
- 4.Checked by
- 5.Max. supply pressure

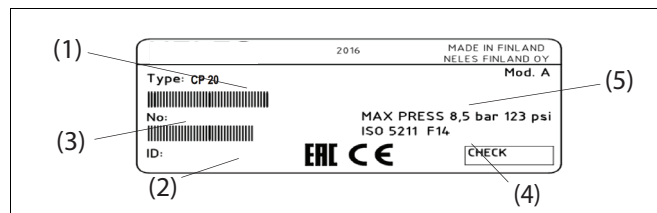


Fig. 2 Example of identification plate

1.4 Technical data

Operating temperature:

standard structure -20 °C to +70 °C

low temperature structure -40 °C to +70 °C

high temperature structure -20 °C to +120 °C

Max. supply pressure: 8,5 bar / 850 kPa

Stroke volume, dm³ (liters)

CS 8	0,9
CS 10	1,8
CS 12	3,6
CS 16	6,7

1.5 Recycling and disposal of a rejected cylinder unit

Most cylinder parts can be recycled if sorted according to material. Most parts have material labeling. A material list is supplied with the cylinder unit. In addition, separate recycling and disposal instructions are available from the manufacturer. A cylinder unit can also be returned to the manufacturer for recycling and disposal against a fee.

1.6 Safety precautions

CAUTION:

Don't exceed the permitted values!

Exceeding the permitted pressure value marked on the cylinder unit may cause damage and lead to uncontrolled pressure release in the worst case. Damage to the equipment and personal injury may result.

CAUTION:

Don't dismantle a pressurized cylinder unit!

Dismantling a pressurized cylinder unit leads to uncontrolled pressure release. Shut off the supply pressure and release pressure from the cylinder before dismantling. Otherwise, personal injury and damage to equipment may result.

CAUTION:

Take the weight of the cylinder or combination into account when handling it!

Do not lift the combination from the cylinder or its piping. Lift the cylinder as directed in Section 2, lifting ropes for a combination should be fastened around it. The weights are shown on pages 10-11.

Dropping may result in personal injury or damage to the equipment.

2 TRANSPORTATION, RECEPTION AND STORAGE

Check the cylinder unit and the accompanying devices for any damage that may have occurred during transport. Store the unit carefully before installation, preferably indoors in a dry place. Do not take the unit to the intended location and do not remove protection plugs from the pipe connections until the cylinder unit is installed.

Lift the cylinder unit according to Figure 3: vertically from a lifting eye-bolt which has been fitted instead of the stop screw. See page 9 for weights.

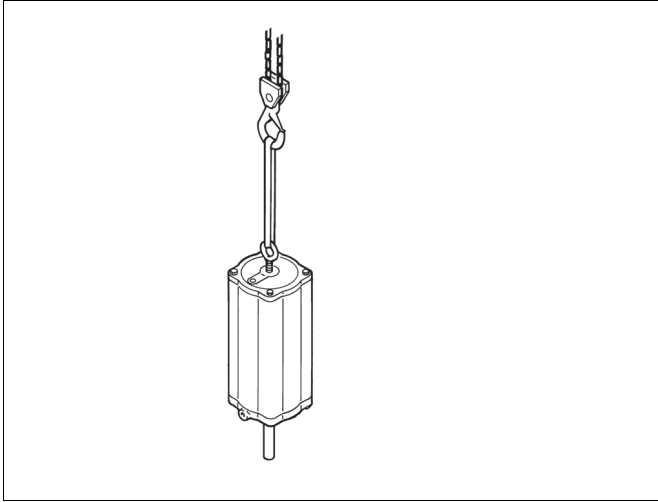


Fig. 3 Lifting the cylinder unit

3 MOUNTING

3.1 Cylinder unit supply pressure

Dry compressed air or natural gas can be used in single-acting cylinder units; oil lubrication is not needed. Clean, dry and oil-free compressed air must be used in cylinder units equipped with a positioner. The air inlets are shown in the dimensional drawing on page 9. The maximum permitted supply pressure is indicated on the identification plate. See also section 1.4 'Technical data'.

3.2 Mounting the cylinder unit

CAUTION:
Take the weight of the cylinder or combination into account when handling it!

The cylinder unit is installed using an optional mounting bracket (91). The bracket is fastened around the neck of the cylinder base (6) with a lock nut (35). The lock nut must be secured with e.g. Loctite 225 or equivalent thread locking compound. The fastening holes should be drilled by the customer according to the requirements of equipment to be actuated.

The installation position can be chosen freely, although Neles recommends one in which the cylinder is vertical. This is the best way to protect the unit from impurities in the supply air or damage caused by water.

The cylinder unit must not touch any surrounding equipment, because possible vibration may damage it or interfere with its operation.

There is an adjustable stop screws (26) in the cylinder unit, see Figure 4. This screw in the cylinder end (44) limits the stroke length of the piston. Use thread locking compound, for example Loctite225, for sealing the stop screw.

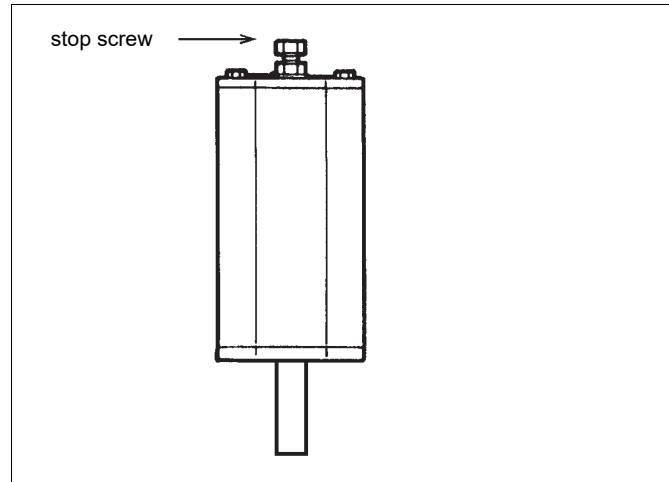


Fig. 4 The stop screw in the cylinder end

3.3 Operating directions

A sticker on the actuator cylinder indicates the spring action direction.

CS cylinder unit

The spring pulls the piston into the cylinder.

CSA cylinder unit

The spring pushes the piston rod out of the cylinder.

3.4 Mounting the positioner

CAUTION

Keep your hands off from the positioner linkage protection cover when the unit is operated!

The cylinder unit can be equipped with a positioner. When the unit with positioner is delivered from the manufacturer, mounting parts shown in 8.3 are used. On-site assembly is possible using the same mounting parts.

4 MAINTENANCE

4.1 General

CAUTION:

Note the precautions in section 1.6 before beginning work!

Under normal circumstances cylinder units do not require regular maintenance. Maintenance that can easily be performed by the end user is presented below.

The part numbers in the text refer to the exploded view and to the parts list in Section 8, unless otherwise stated.

4.2 Replacement of piston seals

CAUTION:

Don't dismantle a pressurized cylinder unit!

Replacement of all seals and soft bearings is recommended when the cylinder unit has been disassembled for maintenance.

- Strip any auxiliaries and remove the cylinder unit from the mounting bracket.
- Release the pressure from the cylinder.
- Loosen screws (31) and remove the cylinder end (44) and the cylinder base (6).

- Remove the the piston and the spring package from the cylinder.

CAUTION:

Do not dismantle the spring package!

- Remove the old seals and the O-rings (24, 18, 19).
- Remove the O-ring (16) and the bearing (22). Clean the seal space. Lubricate the seal space and the new O-ring with Unisilikon L250L or Molykote III. Install the new bearing and O-ring. See Figure 5.

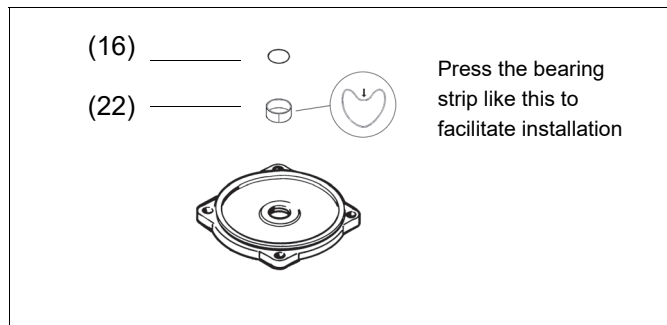


Fig. 5 Mounting the piston rod bearing and seal

- Clean the piston seal groove and lubricate with a thin layer of Cortec VCI 369.
- Place the O-ring (18) under the piston seals.
- Locate the seals (24) around the piston so that the ends of the strips come on opposite sides. Tighten the strips with the tie ring as shown in Figure 6. The strips marked with an asterisk (*) may be cut 1.5-3 mm shorter to facilitate assembly.

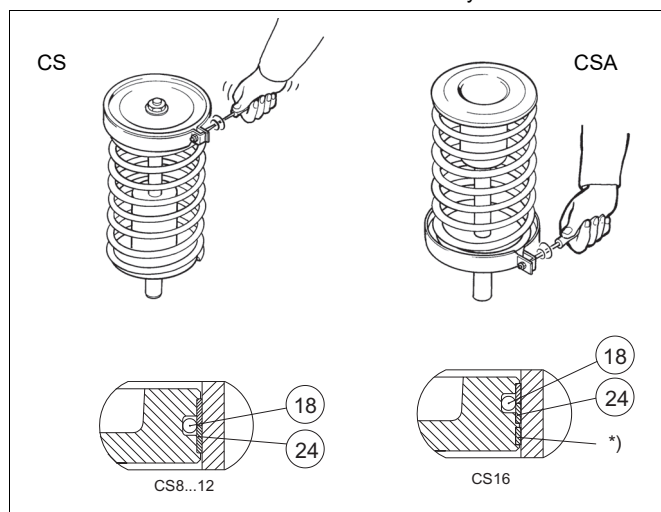


Fig. 6 Tightening the piston seals with a tie ring

NOTE:

The inside surface of the cylinder must be free of grease!

- Knock or press the piston through the tie ring with a press, Fig. 7.

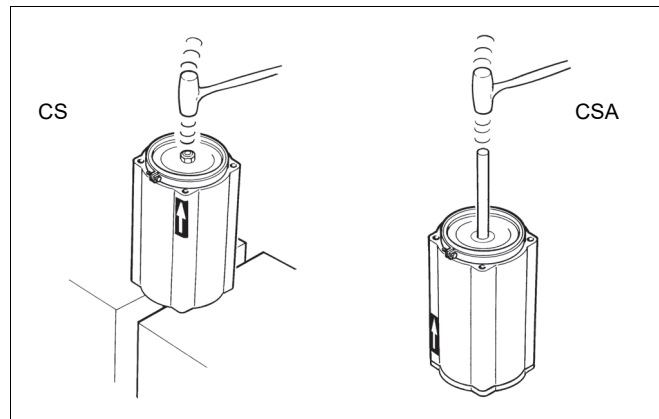


Fig. 7 Placing the piston in the cylinder

- Mount the O-rings (19) and the cylinder end (44) and the cylinder base (6). Note the location of the air inlet. Tighten the screws (31). See Table 1 for torques.
- Check the assembly of the cylinder to the cylinder base and end. Connect the supply air to the cylinder temporarily via a shut-off valve.
- Operate the cylinder unit and check the functioning of the cylinder. Remove the air supply and release pressure from the cylinder.
- Remount the cylinder unit

Table 1 Tightening torques for screws

Torque, Nm		
Item	31	35
CS8	12	150
CS10	18	180
CS12	40	200
CS16	80	400

5 MALFUNCTIONS

Table 2 presents the malfunctions that sometimes result from long-term use and external factors.

6 TOOLS

Cylinder unit maintenance requires both conventional and special tools. The following tools can be ordered from the manufacturer:

- Mounting pistons seals
 - tie ring
- Removing the cylinder base
 - lock nut wrench

Table 2 *Malfunctions*

Malfunction	Possible cause	Action
Operation jerky or slow	Supply pressure too low	Check that the supply pressure meets the minimum requirement. Check that the supply air pipes are large enough.
	Positioner malfunction	Check the operation of the positioner.
	Wrong size cylinder	Contact the manufacturer for checking the size.
	Leakage in piston seal or piston rod seal	Replace seals, see section 4 .2.
	Cylinder damage due to possible impurities	Note the installation position recommendation. Cylinder damage always requires replacement.
	Play in the joint between cylinder unit and actuated equipment	Fasten the joint.

7 ORDERING SPARE PARTS

NOTE:
Use only original spare parts. This ensures proper functioning of the cylinder unit.

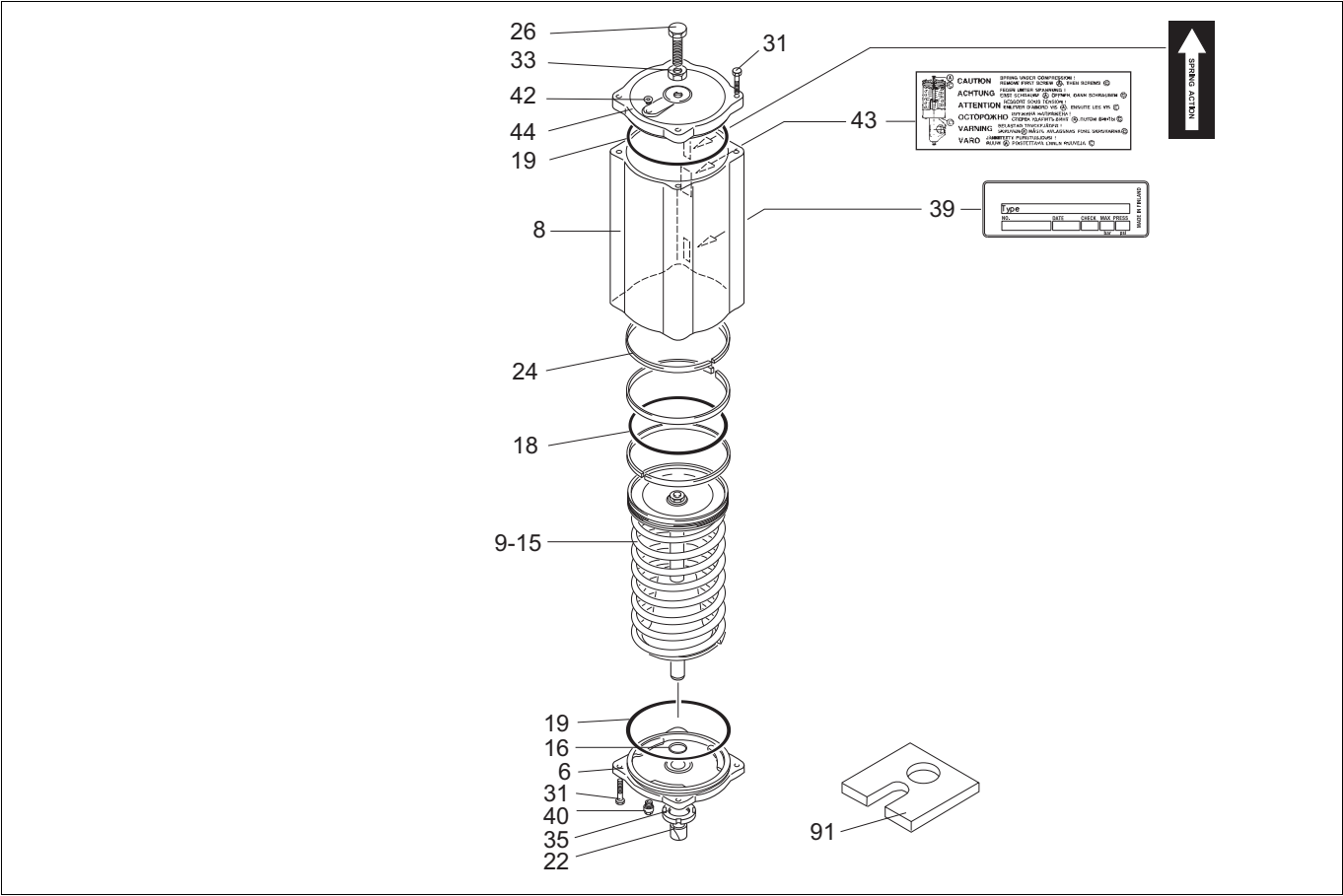
When ordering spare parts, always include the following information:

- type code, sales order number, serial number
- number of the parts list, part number, name of the part and quantity required

This information can be found from the identification plate or documents.

8 DRAWINGS AND PARTS LISTS

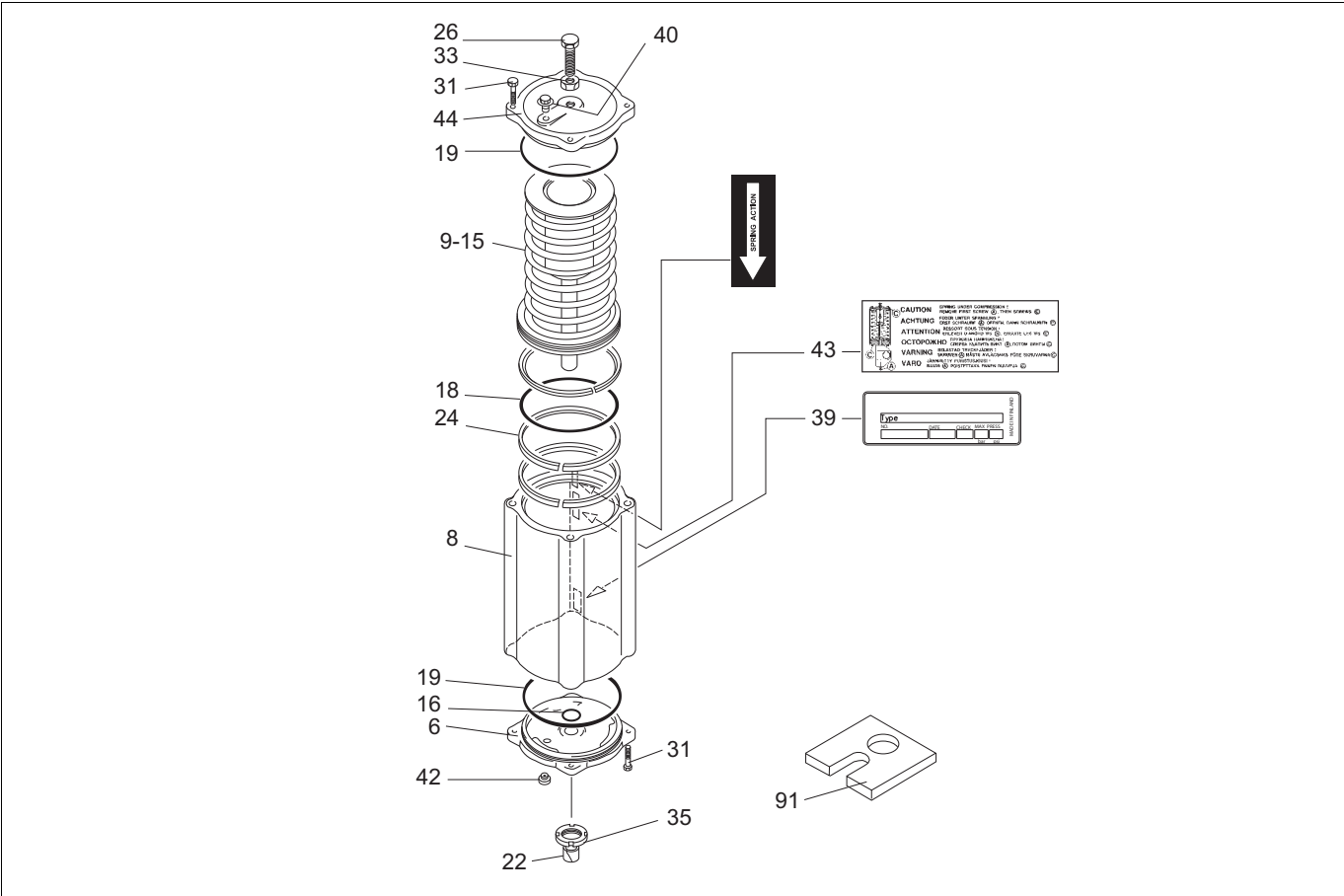
8.1 Exploded view, cylinder units CS8-16



Item	Qty	Description	Recommended spare
6	1	Cylinder base	
8	1	Cylinder	
9*)	1	Piston	
10*)	1	Piston rod	
11*)	1	Spring	
12*)	1	Spring plate	
13*)	1	Clamping tube	
15*)	1	Hexagon nut	
16	1	O-ring	x
18	1	O-ring	x
19	2	O-ring	x
22	1, 2	Bearing	x
24	2, 3	Piston seal	x
26	1	Stop screw	
28	1	Screw	
31	8, 12	Screw	
33	1	Nut	
35	1	Lock nut	
39	1	ID plate	
40	1	Filter	
42		Plug	
44	1	Cylinder end	
45	6	Hexagon nut	
46	2	Washer	
91**	1	Mounting plate	

*) Delivered as a set **) Only on customer order

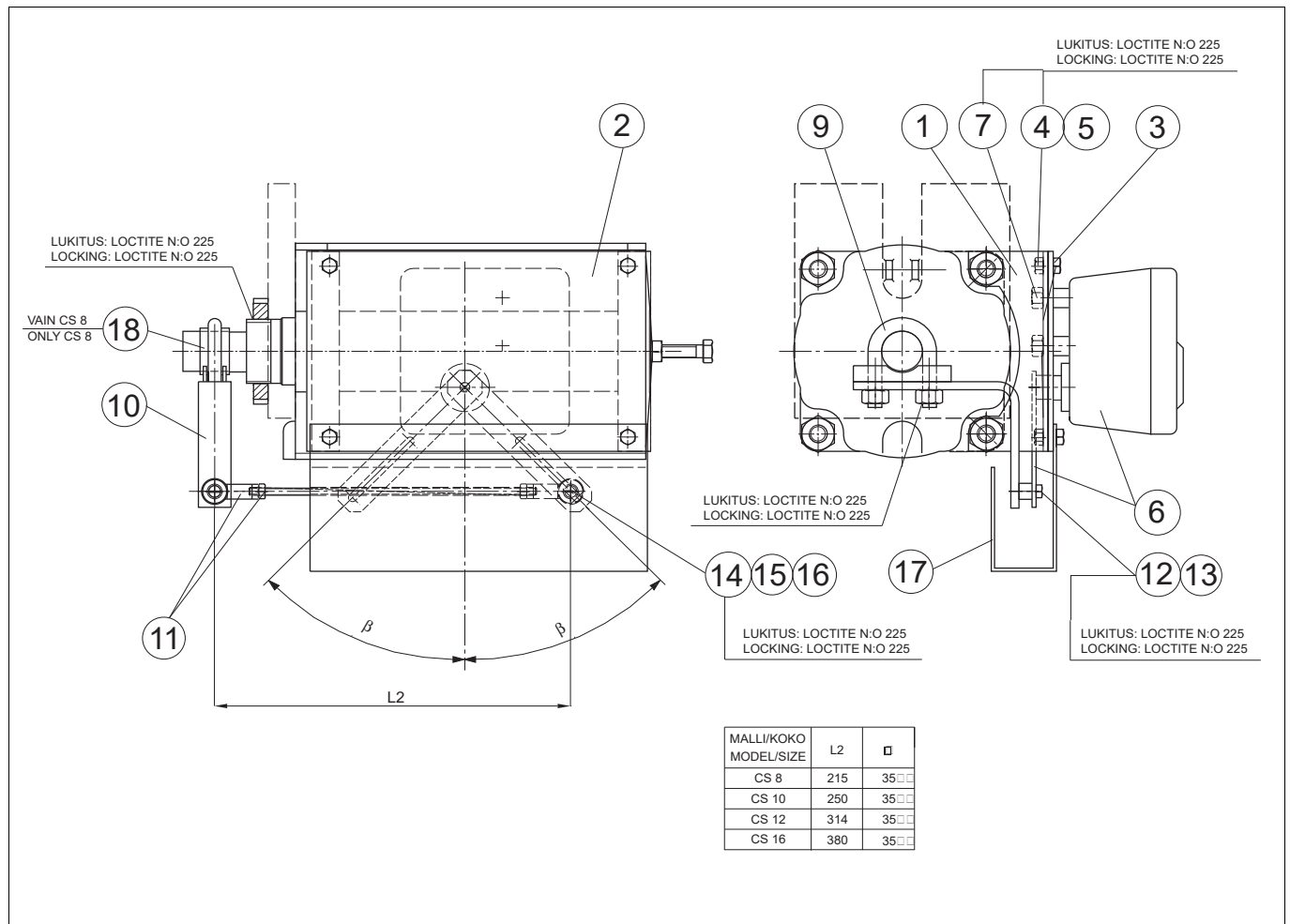
8.2 Exploded view, cylinder units CSA8-16



Item	Qty	Description	Recommended spare
6	1	Cylinder base	
7	1	Pointer cover	
8	1	Cylinder	
9*)	1	Piston	
10*)	1	Piston rod	
11*)	1	Spring	
12*)	1	Spring plate	
13*)	1	Clamping tube	
15*)	1	Hexagon nut	
16	1	O-ring	x
18	1	O-ring	x
19	1	O-ring	x
22	1	Bearing	x
24	3	Piston seal	x
26	1	Stop screw	
31	8, 12	Screw	
33	1	Nut	
35	1	Lock nut	
39	1	ID plate	
40	1	Filter	
42	1	Plug	
43	1	Warning plate	
44	1	Cylinder end	
91**)	1	Mounting plate	

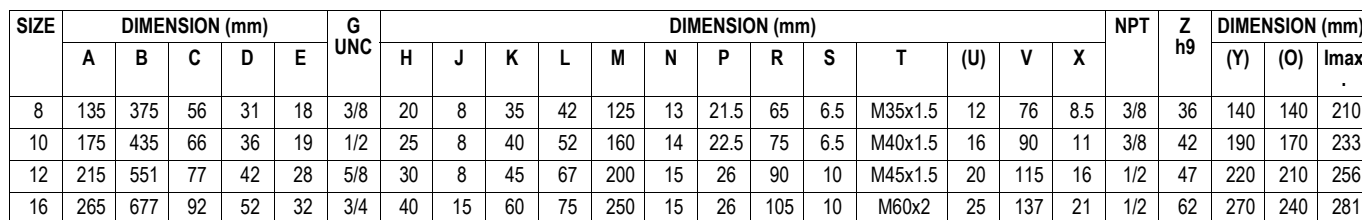
*) Delivered as a set **) Only on customer order

8.3 Mounting parts for positioners



Item	Qty	Description
1	2	Bracket
2	1	Plate
3		Hexagon screw
4		Washer
5		Hexagon nut
6		Shaft and feedback lever

9.1 Cylinder unit CS



SIZE	F	Q	UL	W	LE	AK	WEIGHT OF CYLINDER KG	TOTAL WEIGHT KG
8	95	138	40	96	93	32	11.5	17
10	118	170	40	112	116	37	20	28.5
12	140	190	40	132	139	39	39	55
16	166	246	40	170	164	-	72	95

10 TYPE CODING

PNEUMATIC CYLINDER UNIT, Series CS

1.	2.	3.	4.	5.	6.	7.
CS	K	A	X	20	H	E

1. sign	PRODUCT GROUP
CS	Pneumatic, spring-return cylinder unit
2. sign	SPRING OPTIONS
-	Standard construction without sign
K	Light spring
V	Strong spring
3. sign	FUNCTION CODE
-	Spring pulls piston rod into cylinder, without sign
A	Spring pushes piston rod out of cylinder
4. sign	CYLINDER MATERIALS
-	Aluminium, standard, without sign
X	Steel cylinder
5. sign	CYLINDER SIZE
-	8, 10, 12, 16
6. sign	MATERIALS OF SEALS AND BEARINGS
-	For temperatures -20° to +70 °C, standard without sign - O-rings: Nitrile (NBR) - bearings and piston seals: PE-HD
H	For temperatures -20° to +120 °C - dynamic O-rings: Fluorocarbon rubber (Viton) - bearings and piston seals: PTFE + C25
D	For temperatures min. -40 °C - dynamic O-rings: Epichlorhydrin rubber (ECO) - bearings and piston seals: PTFE + C25
7. sign	SCREW MATERIAL
-	Steel, zinc coated and passivated (standard), without sign
E	Stainless steel

Subject to change without prior notice.

Neles, Neles Easyflow, Jamesbury, Stonel, Valvcon and Flowrox, and certain other trademarks, are either registered trademarks or trademarks of Valmet Oyj or its subsidiaries in the United States and/or in other countries.

For more information www.neles.com/trademarks

Valmet Flow Control Oy

Vanha Porvoontie 229, 01380 Vantaa, Finland.

Tel. +358 10 417 5000.

www.valmet.com/flowcontrol

