

ICC-ES Evaluation Report

ESR-4824


Issued June 2024

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<p>DIVISION: 05 00 00—METAL LADDERS</p> <p>Section: 05 51 23—Metal Fire Escapes</p> <p>Section: 05 51 33—Metal Ladders</p> <p>Section: 05 51 33.13—Vertical Metal Ladders</p>	<p>REPORT HOLDER:</p> <p>MODUM ApS</p>	<p>EVALUATION SUBJECT:</p> <p>MODUM FOLDABLE FIRE ESCAPE LADDERS</p>	
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1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2021, 2018 and 2015 [International Building Code® \(IBC\)](#)
- 2021, 2018 and 2015 [International Residential Code® \(IRC\)](#)
- 2021, 2018 and 2015 [International Fire Code® \(IFC\)](#)

Properties evaluated:

- Structural
- Durability
- Weather Resistance
- Corrosion Resistance

2.0 USES

The Modum Foldable Fire Escape Ladders are intended for use as emergency escape fixed ladders for use with the operable emergency escape and rescue openings prescribed by IBC Section 1031, IRC Section R310, 2021 IFC Section 1031, and 2018 and 2015 IFC Section 1030, for installation on the exterior of new and existing buildings and dwellings. The ladders are for use when escaping from a code-complying, operable emergency escape and rescue opening located on the second or third floor of a building or dwelling where the length of climb is 24 feet (7315 mm) or less above grade (ground level). See Section 5.0 for conditions of use.

3.0 DESCRIPTION

3.1 General:

The Modum Foldable Fire Escape Ladders are constructed of corrosion-resistant aluminum in lengths up to 32.8 feet (10 m). The ladders are intended to be stored in an unopened position against the exterior wall of the building or dwelling. A release mechanism with release pin is provided on the side of the ladder adjacent to the code-complying, operable emergency escape and rescue opening located on the second or third floor of a building or dwelling. Manually releasing the pin allows the outer rail and rungs of the ladder to swing

downward into an open position ready for use by the occupants. The ladders are available in straight ladder sections, with or without a release station, for connection together during installation at the jobsite.

3.2 Straight ladder sections:

Straight ladder sections consist of the components described in Sections 3.2.1 through 3.2.11.

3.2.1 Cover: Aluminum alloy, EN AW-6060 TF/T66, EN AW-6063 TF/T66, EN 537-3, EN515 surface treatment, anodizing E6 15 micron natural, according to ISO 7599. Measures approximately 80 mm by 50 mm by 40 mm, 4 mm thick. Attached to the top inner rail of exposed ladder sections or an option on the outer rail of exposed bottom section. Secured with two 4.8 mm diameter by 16.2 mm long stainless steel bolts.

3.2.2 Inner rail: Aluminum alloy, EN AW-6060 TF/T66, EN AW-6063 TF/T66, EN 537-3, EN515 surface treatment, anodizing E6 15 micron natural, according to ISO 7599. C-shaped with outer dimensions measuring approximately 47 mm wide by 40 mm deep by 3 mm thick with inner dimensions measuring approximately 34 mm wide by 33 mm deep. When the ladder is retracted in the closed undeployed position, the inner rail houses and supports the rungs. When the ladder is deployed, the inner rail remains in the same fixed position and does not move.

3.2.3 Outer rail: Same material and dimensions as the inner rail. When the ladder is deployed, the outer rail moves outward and downward allowing the rungs to rotate 90 degrees to a horizontal position.

3.2.4 Rung: Aluminum alloy, EN AW-6060 TF/T66, EN 537-3, EN515 surface treatment, anodizing E6 15 micron natural, according to ISO 7599. Square-shaped tubes, approximately 34 mm wide by 31 mm deep by 384.5 mm long, connected to the rails, at 30 cm spacings, with a 6 mm diameter stainless steel bolt measuring either 50 mm long when installed without mounting bracket or 64 mm long when installed with mounting bracket.

3.2.5 Mounting bracket: Aluminum alloy, EN AW-6063 T66, EN 537-3, EN515 surface treatment, anodizing E6 15 micron natural, according to ISO 7599. The mounting bracket is used to secure the inner rail to building structure. One mounting bracket is located at either the first or second rung from the top of the section and at the last rung in the section with one additional bracket at least every fourth rung. See [Figure 2](#) for additional details on locations for mounting brackets. See [Figure 3](#) for additional mounting bracket details.

3.2.6 Screw and Nylon Locking Nut: Stainless steel screw, ISO 4014 Grade A4-0, M6 x 60 mm, 1 mm course threads, overall length 60 mm with 18 mm threaded length and 10 mm wide hex head. Stainless steel nut, M6, DIN 985 Class A4-80, with 1 mm course pitch threads. The screw and locking nut are used to secure the mounting bracket to the inner rail. See [Figure 4](#) for additional details.

3.2.7 Release pin: Stainless steel, Grade 1.4301, DIN 1772, EN 10270-3-1. Overall length approximately 100 mm, with a 43 mm long by 5 mm diameter pin at one end and a 39 mm high grip at the other end. A stainless steel chain connects the grip end of the release pin to the inner rail with a self-tapping screw. When the ladder is retracted in the closed undeployed position, the other end of the release pin is inserted into a 5.7 mm diameter hole in the inner rail and a 5.7 mm hole in one of the retracted rungs.

3.2.8 Top release station: Top release station is the straight ladder section located at the top of the ladder that includes a release mechanism. The top release section is installed at the operable emergency escape and rescue opening located on the second floor or third floor of a building or dwelling.

3.2.9 Joined release station (optional): When installed in a ladder that is also equipped with a top release station, the joined release station with release mechanism is positioned adjacent to an operable emergency escape and rescue opening located on the second floor of a building or dwelling.

3.2.10 Inner joining plate: Aluminum alloy, EN AW-6060 TF/T66, EN AW-6063 TF/T66, EN 537-3, EN515 surface treatment, anodizing E6 15 micron natural, according to ISO 7599. Overall dimensions are approximately 80 mm long by 34 mm wide by 6 mm thick. The inner joining plate is used to connect straight sections of the ladder together at the inner rail with four 5 mm diameter by 19.9 mm long stainless steel screws. The inner joining plate is used to connect straight sections of the ladder together at the inner rail.

3.2.11 Outer joining plate: Aluminum alloy, EN AW-6060 TF/T66, EN AW-6063 TF/T66, EN 537-3, EN515 surface treatment, anodizing E6 15 micron natural, according to ISO 7599. Overall dimensions are approximately 80 mm long by 34 mm wide by 6 mm thick. The outer joining plate is used to connect straight sections of the ladder together at the outer rail with four 5 mm diameter by 16.2 mm long stainless steel screws.

4.0 DESIGN AND INSTALLATION

4.1 Design: All connections, fasteners, and structural integrity of the supporting structure must be designed by a registered design professional to resist all dead and live load conditions in accordance with Chapter 16 of the International Building Code® (IBC) and must not exceed the published values shown in [Table 1](#) of this report. The supporting structure must be structurally sound, free of any loose or compressible materials, and be consistent with the manufacturer's published installation instructions.

4.2 Installation:

The Modum Foldable Fire Escape Ladders must be installed in accordance with the manufacturer's published installation instructions, this report and the applicable code using the mounting brackets and corrosion-resistant fasteners supplied with the ladder. The top release section is installed at the operable emergency escape and rescue opening located on the second floor or third floor of a building or dwelling. When installed in a ladder that is also equipped with a top release station, the joined release station with release mechanism is installed at an operable emergency escape and rescue opening located on the second floor of a building or dwelling.

The ladder is to be installed and remain in the retracted undeployed position, with the rungs housed and supported by the inner and outer rails, until manually deployed for use with the operable emergency escape and rescue opening. Installation must allow for the ladder to function as intended so that when the ladder is deployed, the inner rail remains in the same fixed position while the outer rail moves outward and downward allowing the rungs to rotate 90 degrees to a horizontal position. The screw and locking nut shown in [Figure 4](#) must be used to attach the mounting bracket to the inner rail of the ladder.

After installation, if the ladder is damaged, it must be repaired and reinstalled in accordance with the manufacturer's published installation instructions, this report, and the applicable code.

5.0 CONDITIONS OF USE:

The Modum Foldable Fire Escape Ladders described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1** The Modum Foldable Fire Escape Ladders must be installed in accordance with the manufacturer's published installation instructions, this report, and the applicable code. In the event of conflict between this report and the manufacturer's published installation instructions, this report governs.
- 5.2** The ladders are intended for use as emergency escape fixed ladders, with the operable emergency escape and rescue openings prescribed by IBC Section 1031, IRC Section R310, 2021 IFC Section 1031, and 2018 and 2015 IFC Section 1030, for installation on the exterior of new and existing buildings and dwellings, under the following conditions:
 - A. The code-complying, operable emergency escape and rescue opening is located on the second or third floor of a building or dwelling where the length of climb is 24 feet (7315 mm) or less above grade (ground level).
 - B. The ladder serves an occupant load of 10 or less or a single dwelling unit or guest room.
 - C. The building or dwelling does not exceed three stories in height.
 - D. Access is adjacent to an opening specified for emergency escape and rescue opening.
 - E. The ladder must not pass in front of any building opening below the unit being serviced.
 - F. The ladder release mechanism is accessible only from the opening served.
 - G. Installation will not cause a person using the ladder to be within 6 feet (1829 mm) of exposed electrical wiring.
 - H. The emergency escape fixed ladder must be free from obstructions that would prevent its use and be maintained in accordance with the manufacturer's published instructions.
- 5.3** Emergency escape fixed ladders installed where the length of climb is greater than 24 feet (7315 mm) above grade (ground level), where a cage or ladder safety system is required, are outside the scope of this report.
- 5.4** Use of an operable emergency escape fixed ladder as a component of a required means of egress or an accessible means of egress is outside the scope of this report.
- 5.5** Durability of the ladders when exposed to corrosive atmospheres in the air, other than salt, has not been evaluated.
- 5.6** Use of the operable emergency escape fixed ladder where compliance with OSHA Standard 1910.23 is required is outside the scope of this report.

- 5.7 Connection of the ladder to the supporting structure is outside the scope of this report and must be determined by a registered design professional and submitted to, and approved by, the code official. The registered design professional must also verify the structural integrity of the structure that will be supporting the ladder.
- 5.8 The ladders are manufactured in Nakskov, Denmark, under a quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

Data in accordance with the [ICC-ES Acceptance Criteria for Emergency Escape Fixed Ladders for Installation on the Exterior of New and Existing Buildings and Dwellings \(AC539\)](#), dated October 2022.

7.0 IDENTIFICATION

- 7.1 The ICC-ES mark of conformity, electronic labeling, or the evaluation report number (ICC-ES ESR-4824) along with the name, registered trademark, or registered logo of the report holder (Modum ApS) must be included in the product label.
- 7.2 In addition, the Modum Foldable Fire Escape Ladders must be identified with a label bearing the Modum ApS name and address, the product name, and serial number.
- 7.3 The report holder's contact information is the following:

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TABLE 1- LADDER WEIGHT, MOUNTING BRACKET SPACING AND MAXIMUM ALLOWABLE LOAD

Ladder Length feet (m)	Ladder Weight lbs (kg)	Maximum Mounting Bracket Spacing (inches) ¹	Maximum Ladder Rung Capacity (lbf)	Maximum Allowable Load (lbf)
15.8 (4.8)	32.7 (14.9)	36 or 48	250	2,000
16.7 (5.1)	34.8 (15.8)			
17.7 (5.4)	36.8 (16.7)			
18.7 (5.7)	38.9 (17.7)			
19.7 (6.0)	40.9 (18.6)			
20.7 (6.3)	42.0 (19.5)			
21.7 (6.6)	45.0 (20.5)			
22.7 (6.9)	47.1 (21.4)			
23.6 (7.2)	49.1 (22.3)			
24.6 (7.5)	51.1 (23.3)			
25.6 (7.8)	53.2 (24.2)			
26.6 (8.1)	55.2 (25.1)			
27.6 (8.4)	57.3 (26.0)			
28.6 (8.7)	59.3 (27.0)			
29.5 (9.0)	61.4 (27.9)			
30.5 (9.3)	63.4 (28.8)			
31.5 (9.6)	65.5 (29.8)			
32.5 (9.9)	67.5 (30.7)			
32.8 (10.0)	68.2 (31.0)			

For SI: 1 inch = 25.4 mm; 1 lb. = 2.2 kg, 1 lbf = 4.45 N.
¹See Figure 2 for locations of mounting brackets.

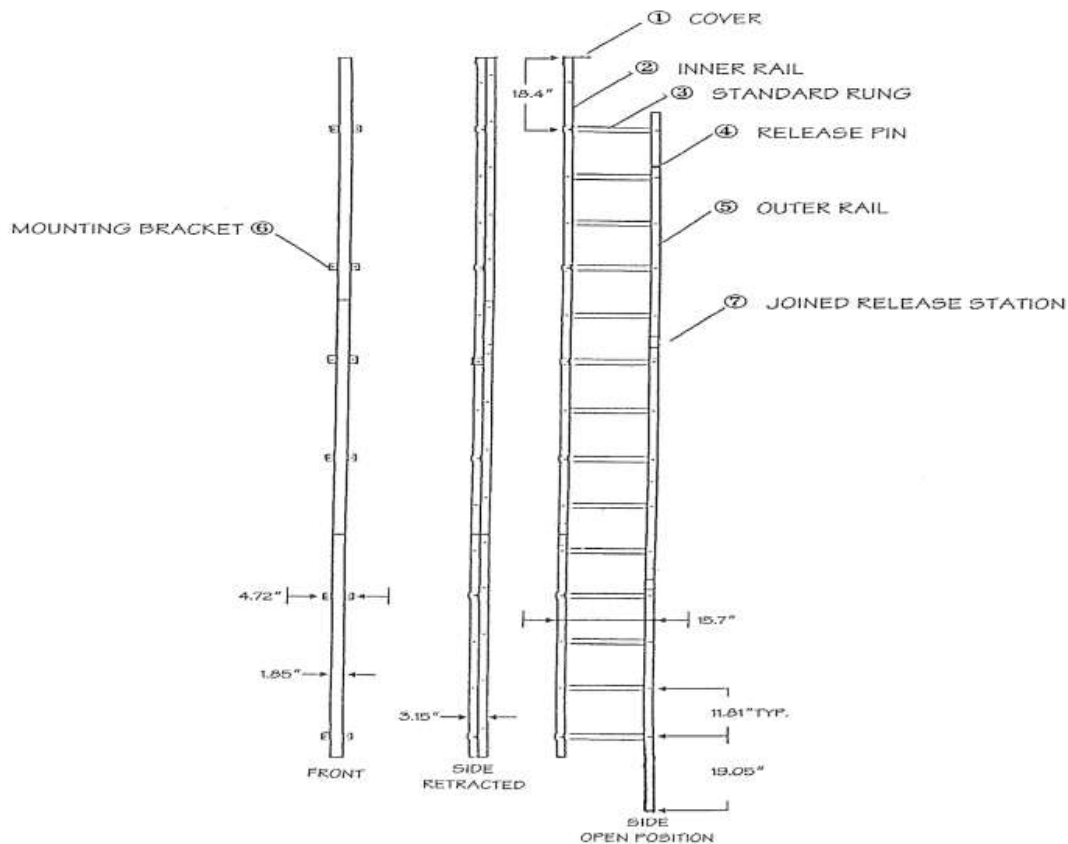


FIGURE 1 – TYPICAL LADDER

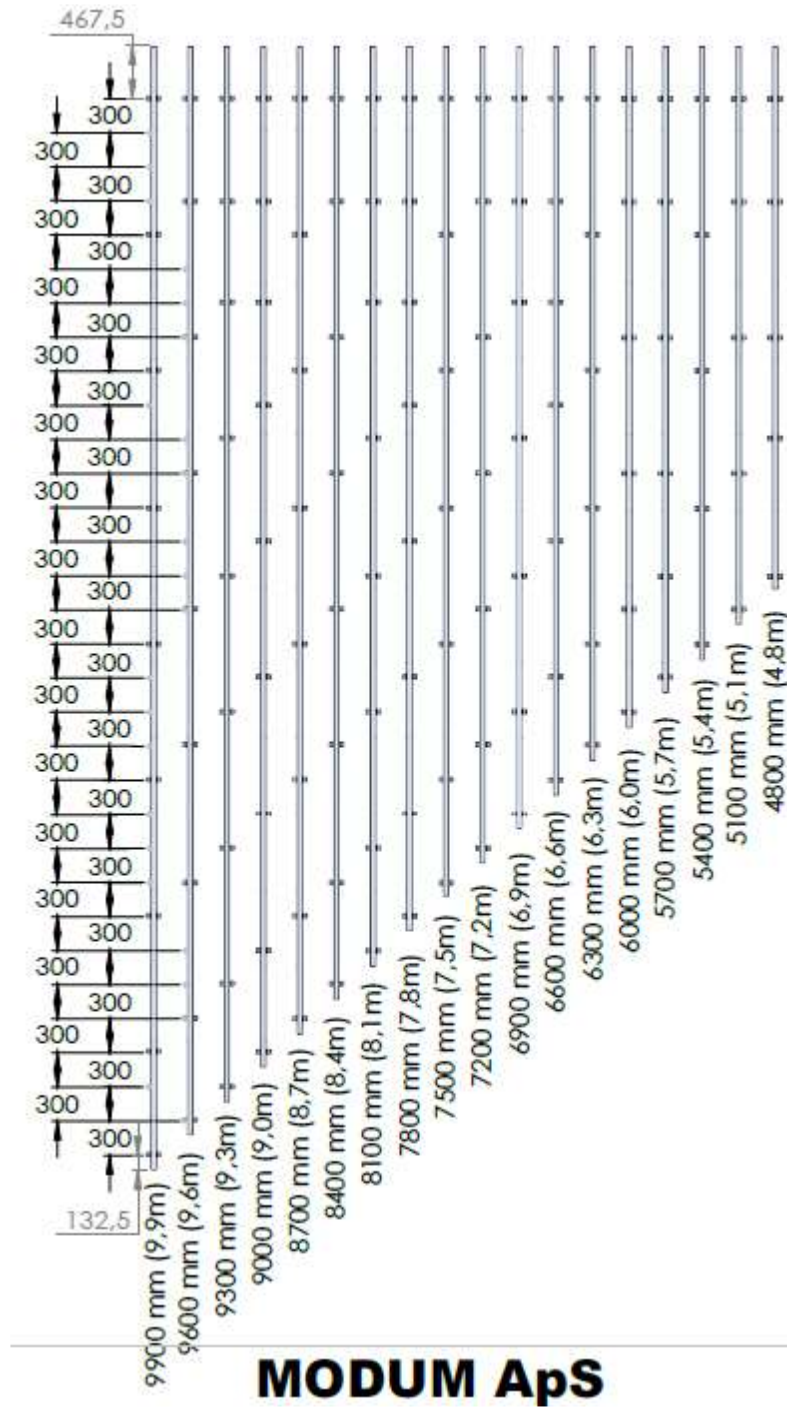


FIGURE 2 – SAMPLE LADDER SIZES AND BRACKET LOCATIONS [dimensions in mm (m)]

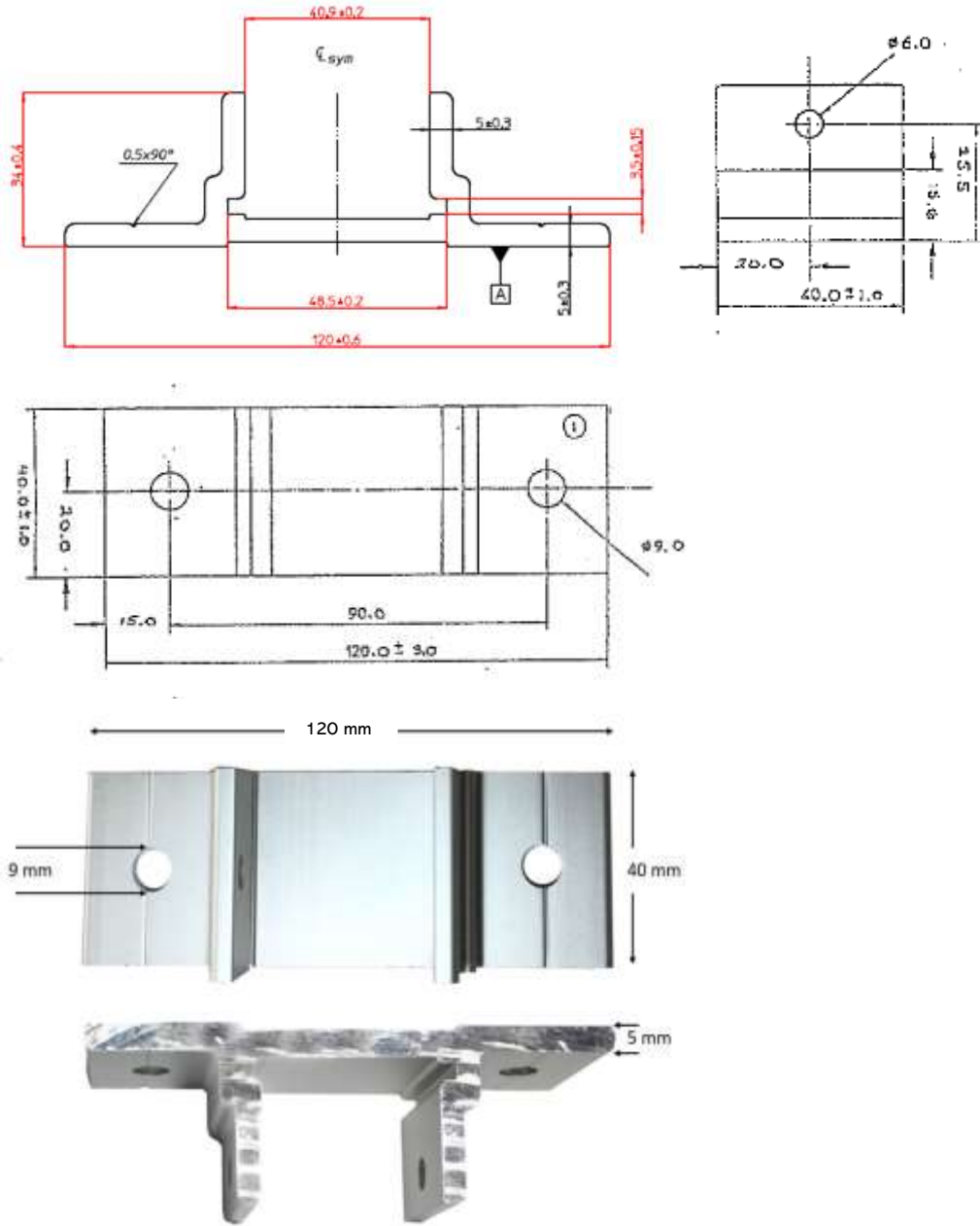
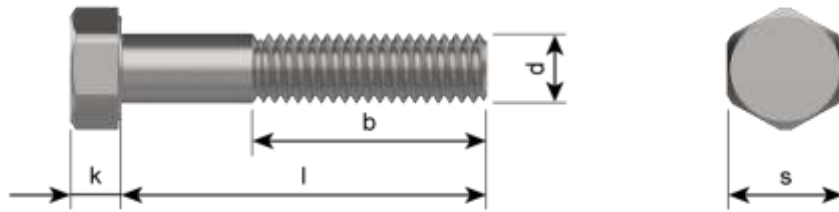
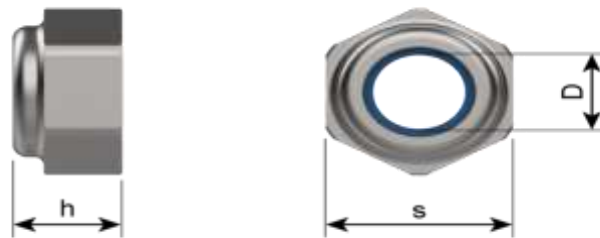


FIGURE 3 – ONE-PIECE MOUNTING BRACKET



M6 x 60 Stainless Steel ISO 4014 Class A4-70

b = 18 mm, d = 6 mm, k = 4 mm, l = 60 mm, S = 10 mm, 1 mm Course Pitch



M6 Stainless Steel DIN 985 Class A4-80

D = 6 mm, S = 10 mm, h = 6 mm, 1 mm Course Pitch

FIGURE 4 – SCREW AND NYLON LOCKING NUT FOR USE WITH MOUNTING BRACKET