

SMARTCARD CONTACT BLOCK DESIGN KIT AND SPECIFICATIONS

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MAGTEK[®]

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TABLE OF CONTENTS

INTRODUCTION	1
CURRENT CONFIGURATIONS	1
FEATURES	1
REQUIREMENTS	2
DESIGN ASSISTANCE	2
SPECIFICATIONS	2
OVERALL DIMENSIONS	4
COMPONENTS	5
FLEX CABLES AND PIN LIST	6
ASSEMBLY DRAWINGS	7

TABLES OF FIGURES

Figure 1. Smartcard Contact Blocks, Cable And Contact Sides, Extended and Regular Cables	v
Figure 2. Overall Dimensions.....	4
Figure 3. Contact Block Components	5
Figure 4. Flex Cable Side of Smartcard Contact Block	6
Figure 5. Contact Side of Smartcard Contact Block	7
Figure 6. Flex Cable Pin Dimensions.....	7
Figure 7. Contact Assembly, ISO-8, No Flex Sheet 1	8
Figure 8. Contact Assembly, ISO-8, No Flex Sheet 2	9

TABLES

Table 1. Contact Block Specification	3
Table 2. Pin List for Flex Cable.....	6

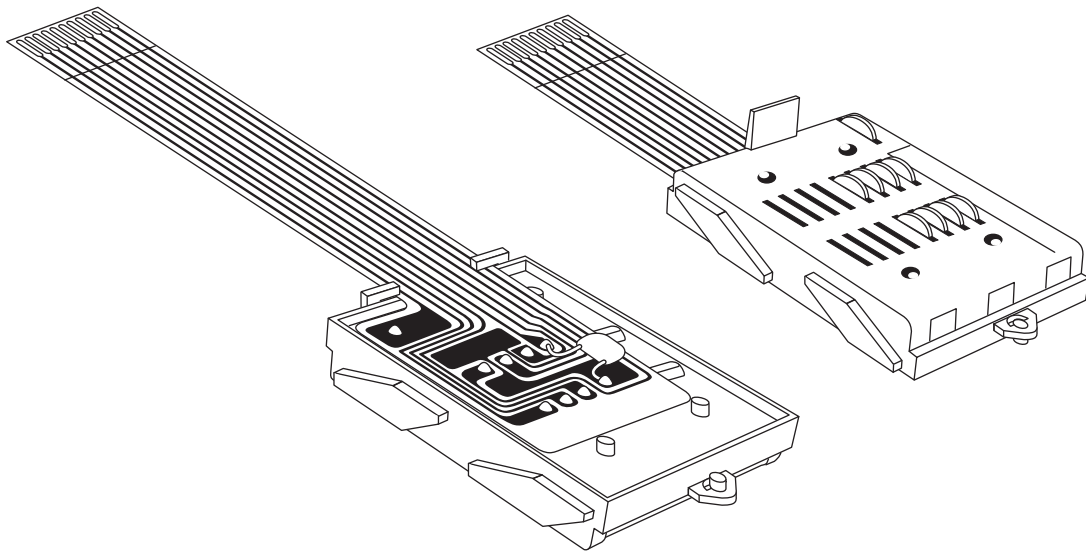


Figure 1. Smartcard Contact Blocks, Cable And Contact Sides, Extended and Regular Cables

INTRODUCTION

This specification is intended to describe the parameters and operation of the Magtek Smartcard Contact Block in order to enable customers to integrate the Contact Block into OEM reader designs.

The Magtek Smartcard Contact Block is a landing style; it is designed to retract to a safe position when no card is inserted. Landing contacts are vandal resistant and reduce wear on both the reader and card contacts while eliminating the risk of scratching the card graphics. When the Contact Block is retracted, only the tab at the end of the housing extends into the card path. As a card is inserted or swiped through the slot, the card engages the tab and begins moving the contacts toward the rear of the reader. As the Contact Block moves rearward, the angled ramps begin positioning the Contact Block toward the card surface. The Contact Block is designed so that all eight contacts come into contact with the IC card prior to the landing switch actuating. This design allows for maximum settling time of the contacts prior to the actuation of the landing switch and subsequent power up of the contacts and IC card. On withdrawal; the landing switch disengages prior to any of the eight IC card contacts lifting from the card surface, thereby making it easy to design a reader that meets EMV requirements for “tear out”.

The Contact Block is primarily used in smartcard readers for Point of Sale (POS) transactions, and self-service kiosks.

CURRENT CONFIGURATIONS

Current configurations of the Contact Block are as follows:

Part Number	Description
21161141	ISO 7816 8-contact block with standard flex cable
21161145	ISO 7816 8-contact block with extended flex cable

FEATURES

- Meets EMV Level 1 electrical and mechanical requirements
- Compliant with ISO 7816 requirements
- Rugged design and construction of the Contact Block permits reliability of one million cycles
- Contacts housed in the contact block to protect them from dirt, debris, and vandalism
- Card Seated switch integrated into the Contact Block ensuring the switch can never be out of calibration
- Regular and Extended flex cables provided (shown in Figure 1)

REQUIREMENTS

The following items are required for integrating the Smartcard Contact Block in a smartcard reader:

- This specification
- Smartcard Contact Block with standard flex cable or extended flex cable including spring
- Mechanical CAD Files of PRO-E or 3D-IGES that customers can use in their design drawings (files provided by MagTek)

DESIGN ASSISTANCE

The Contact Block needs to be integrated into the design of the terminal molding to provide the card guide and mating faces.

- MagTek offers design assistance in the form of Mechanical CAD Files of PRO-E or 3D-IGES that customers can use to integrate the Smartcard Block into their design
- MagTek will also provide advice on material specification and construction to ensure that the final design meets the reliability requirements.
- When the design is complete, MagTek offers a free Design Review Service to evaluate design integrity of the customer's design

SPECIFICATIONS

Specifications for the Contact Block are listed in Table 1-1. See drawings for details of dimensions and material.

Table 1. Contact Block Specification

MECHANICAL	
Dimensions	Length: See Figure 2 Width: See Figure 2 Height: See Figure 2
Card Type	ISO 7816 – 8 contacts
Contact	Force: 0.2N – 0.5N (20.4 gm – 51.0 gm) Material: ASTM B103 CDA51000 or equivalent Finish: Nickel Plate Entire Part SAE-AMS-QQ-N-290 Class 1, Low Stress or Equivalent, 0.000050 Min. Thick. Selective Gold Plate per MIL_G_45204 Type II, Grade C, Class 1 or Equivalent, 0.000030 Min. Thick.
Number of Contacts	8, with one Card Seated/Card Present switch
Housing Material	Polycarbonate glass-filled (UL94V0), Black
Contact Life	1,000,000 cycles
ELECTRICAL	
Contact Resistance	<200 milliohms measured per ISO/IEC 7816-1:1998
Insulation Resistance	1 x 10 ⁹ ohms
Rated Voltage	20 VDC max per contact
Rated Current	100 mA max per contact
Landing Switch	Normally Open
ENVIRONMENTAL	
Temperature	Operating and Storage: -40 °C to +80 °C
Humidity	Operating and Storage: 10% to 95% noncondensing

OVERALL DIMENSIONS

The overall dimensions are shown in Figure 2.

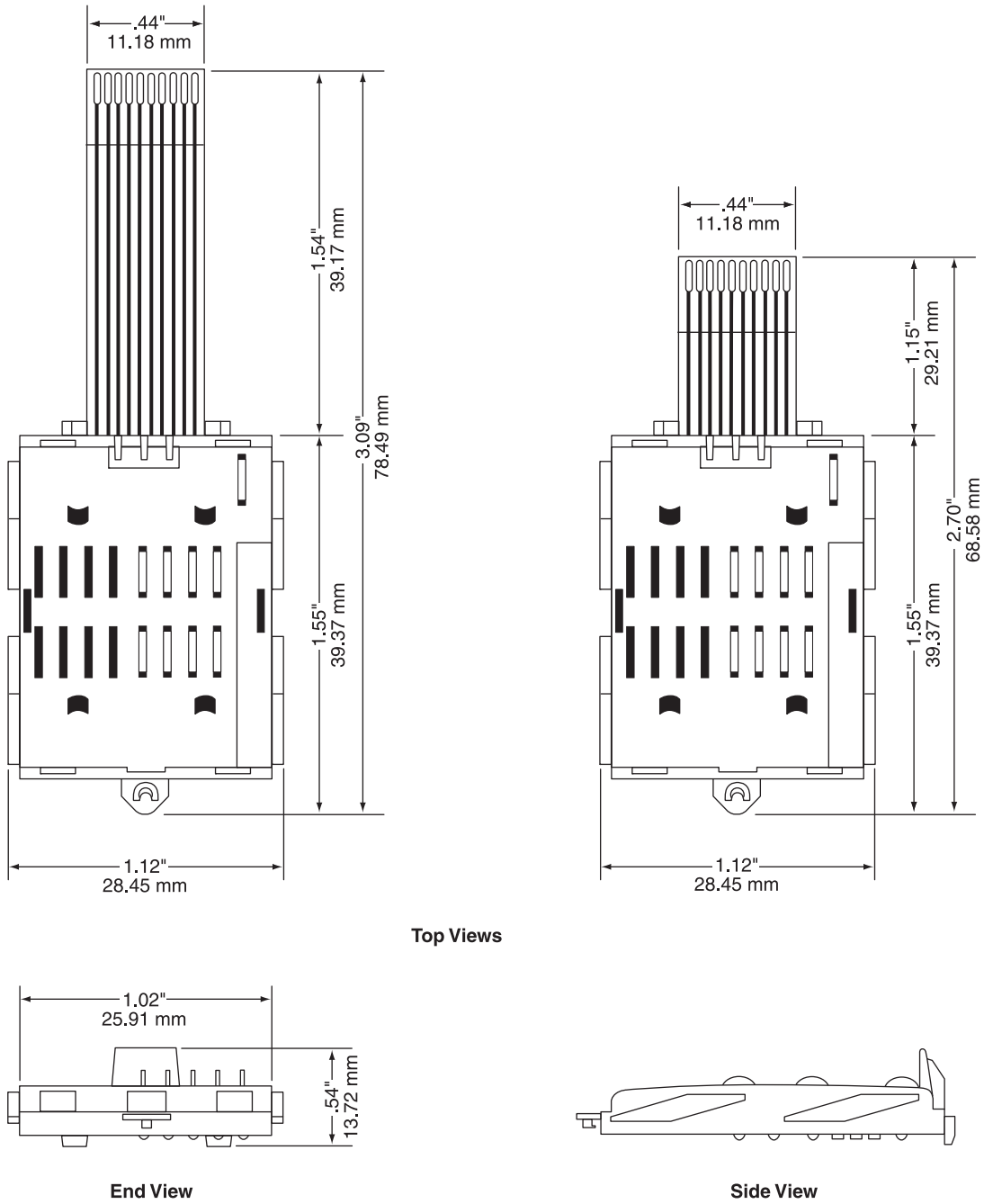


Figure 2. Overall Dimensions

COMPONENTS

The components are shown in Figure 3 and described below.

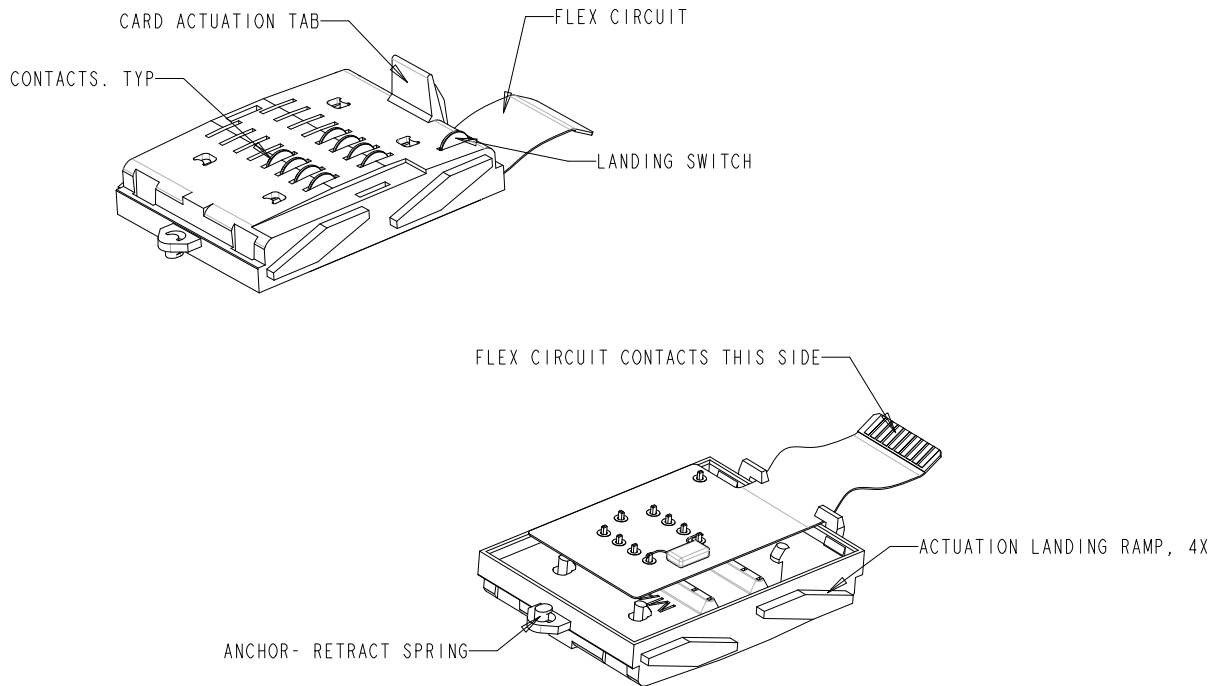


Figure 3. Contact Block Components

Contacts: ISO 7816 and EMV Level 1 compliant.

Card Actuation Tab: Card edge contacts this surface as card is inserted and withdrawn

Flex Circuit and Flex Circuit Contacts: Provides direct electrical interface to the smartcard contacts and landing switch

Landing Switch: Activated when the card is properly positioned for electro-mechanical interface to the smartcard

Actuation Landing Ramp: Surface which cams the contact block into the raised or retracted position

Anchor-Retract Spring: Anchor for spring on the Contact Block

FLEX CABLES AND PIN LIST

The contact side of the Smartcard Contact Block is shown in Figure 4, and the pin list is shown in Table 1.

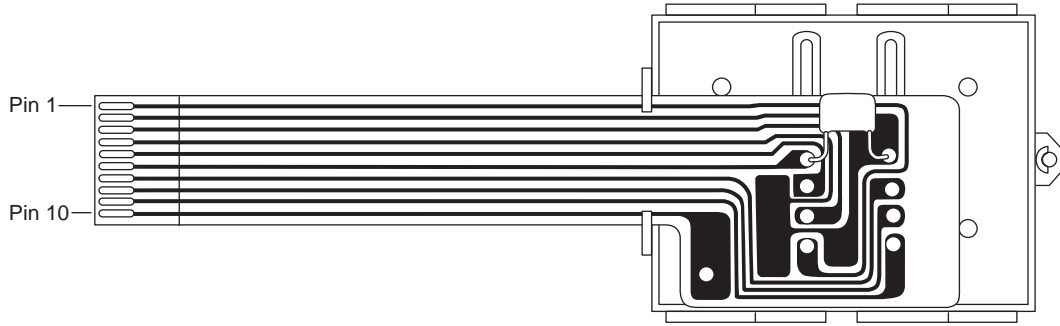


Figure 4. Flex Cable Side of Smartcard Contact Block

Table 2. Pin List for Flex Cable

Pin Number	Signal Name	I/O Direction
1	Card Seated*	OUT
2	ICC-C8	Undefined**
3	ICC-C7 Data	IN/OUT
4	ICC-C6 Programmable Power	IN
5	ICC-C1 Power	IN
6	ICC-C2 Reset	IN
7	ICC-C5 Ground	IN
8	ICC-C3 Clock	IN
9	ICC-C5 Ground	IN
10	ICC-C4	Undefined**

* Card Seated (Pin 10 is a normally-open switch, which connects to Ground when closed. The user design may need to provide an external pull-up resistor.

**Signals ICC-C8 and -C4 (pins 2 and 10) are undefined by ISO 7816. These contacts are often used with non-ISO memory-type cards.

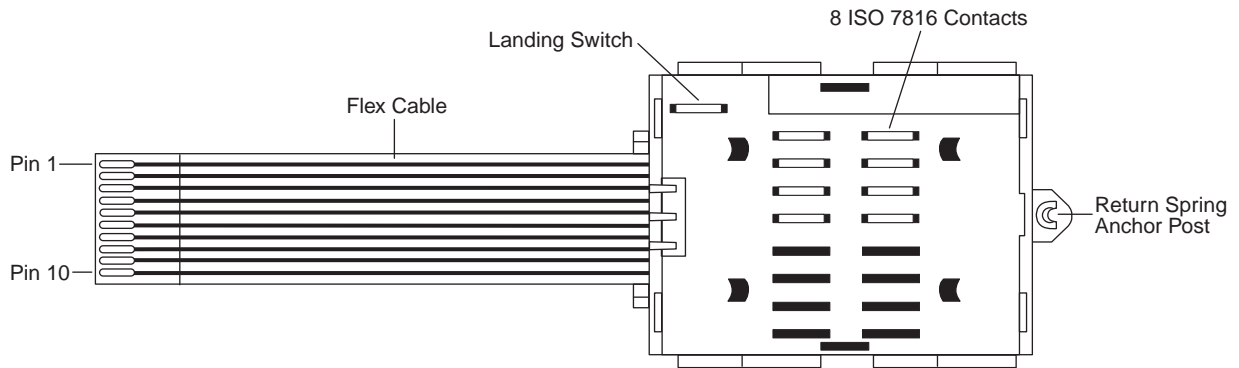


Figure 5. Contact Side of Smartcard Contact Block

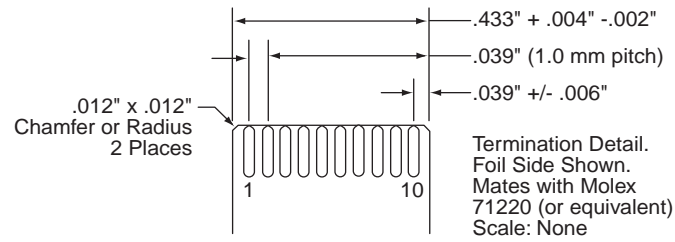


Figure 6. Flex Cable Pin Dimensions

ASSEMBLY DRAWINGS

Contact Assembly Drawings, ISO-8, No Flex Sheets 1 and 2 are shown in Figures 7 and 8.

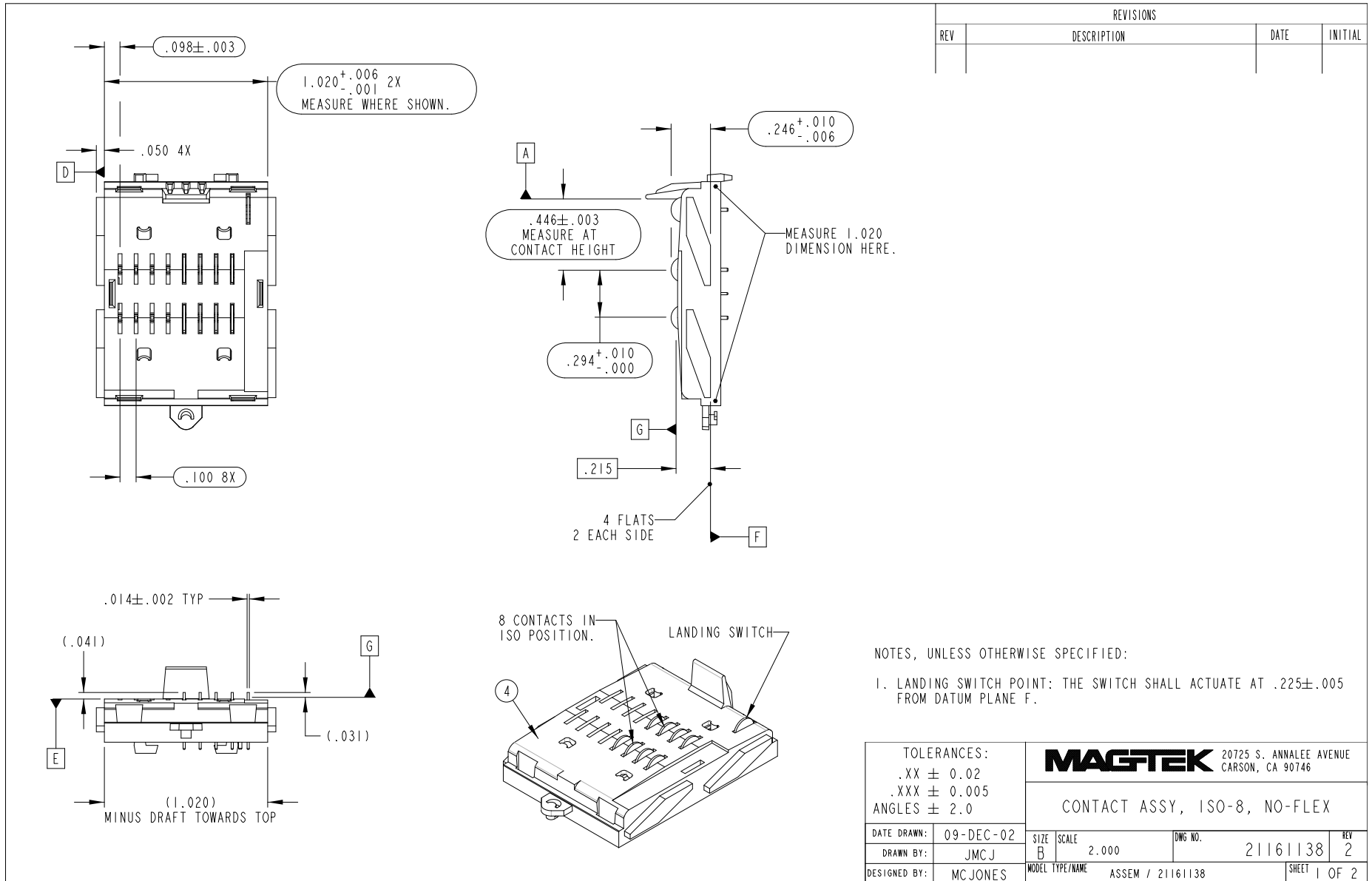


Figure 7. Contact Assembly, ISO-8, No Flex Sheet 1

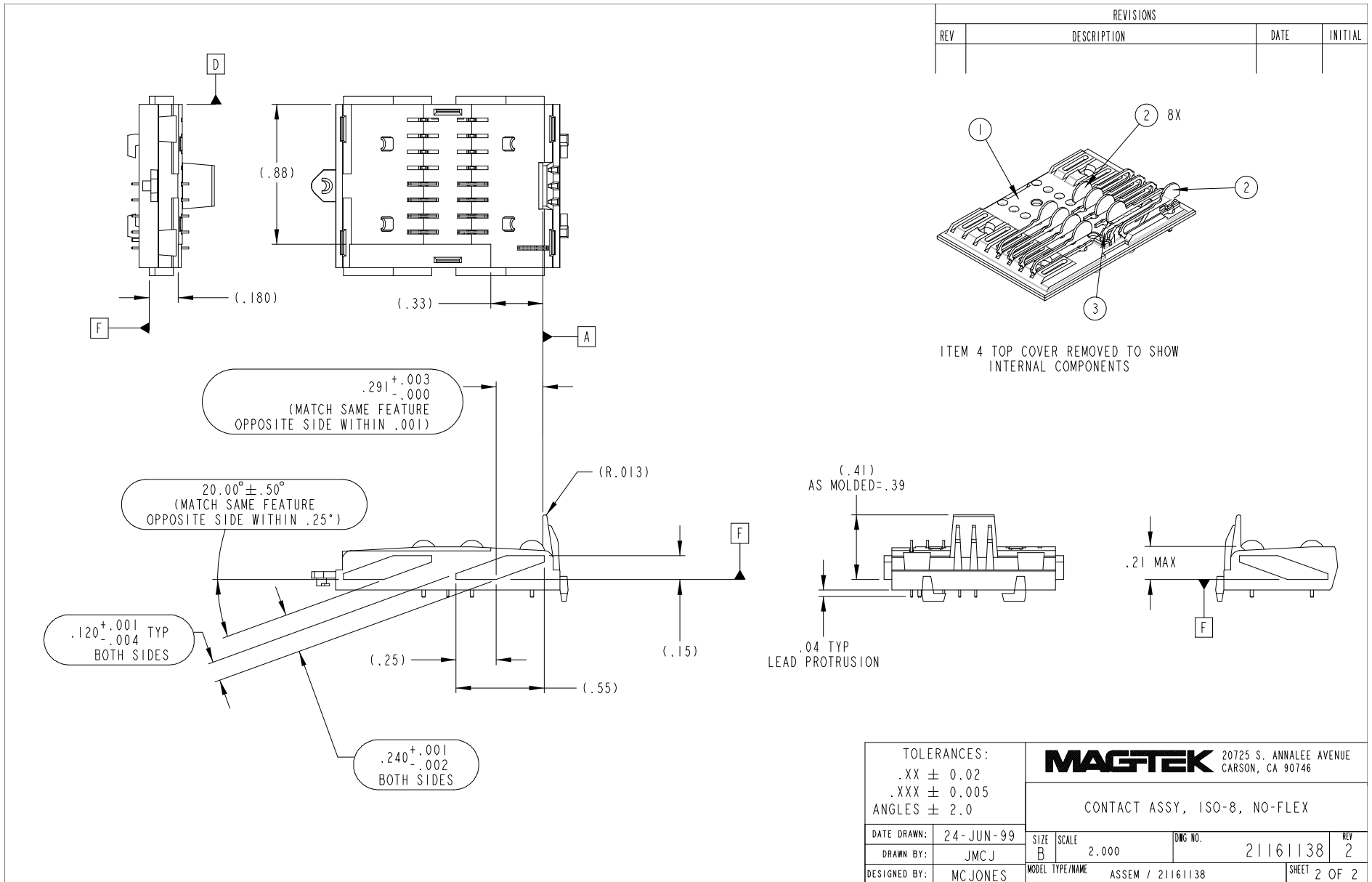


Figure 8. Contact Assembly, ISO-8, No Flex Sheet 2

