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CAGE CODE: **12522**

***Part of the M7 Family of  
MET Data Entry Products***

***Series M75***

# **PC-COMPATIBLE KEYBOARDS**

*In Ruggedized Enclosures*

61-Key with Encoder  
Optional Built-in Cursor Control,  
LED Lighting and NEMA 4 Sealing

SERIES M75 CODED

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D

SHEET 1 OF 22



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PRODUCT LINE SPECIFICATION

SERIES M75

**PC-COMPATIBLE KEYBOARDS**

**In Ruggedized Enclosures**

**1.0 SCOPE**

This Specification Control Document (SCD) describes the detailed characteristics of one of the M7 Family of data entry devices utilizing Molded Elastomer Technology (MET). The products emanating from this SCD are designated as product series M75.

Specifically, the M75 includes a Qwerty keypad, and an optional built-in pressure sensitive cursor control, installed in a hard elastomer enclosure with threaded inserts. LED lighting of the keyboard is also available as an option. The keyboard has 61 physical keys with 23 additional functions so as to be equivalent to an 84-key PC-compatible keyboard. Incorporated into the keyboard is an encoder to translate key strokes into standard PS/2 codes through the commonly used PS/2 connector. The cursor control has two control buttons and interfaces through the PS/2 "mouse" port. The keyboard and cursor control are PS/2 compatible. The keyboard with PC/AT adapter is PC/AT compatible. The enclosure was designed for operator comfort and for reliable operation in harsh environments.

Accessory items for this MET data entry product include power supplies for the lighted keyboards and PC/AT keyboard adapter.

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## 2.0 SERIES M75 PC-COMPATIBLE KEYBOARDS

### 2.1 Product Features/Options

The PC-Compatible Keyboard is designed to be rugged and durable, yet provide modern styling with a built-in palm rest. It is available in two standard color schemes. These options provide a coordinated contrasting color scheme or a matching color scheme created via the laser-etched keycaps and the elastomer keypad. Backlighting with green LEDs is available as an option. Also available is the option for sealing to NEMA 4 requirements.

### 2.2 Keyboard and Cursor Control in Rugged Enclosure

The keyboard and cursor control in a hard elastomer enclosure, along with three cables, are shown in Figure 2.1.

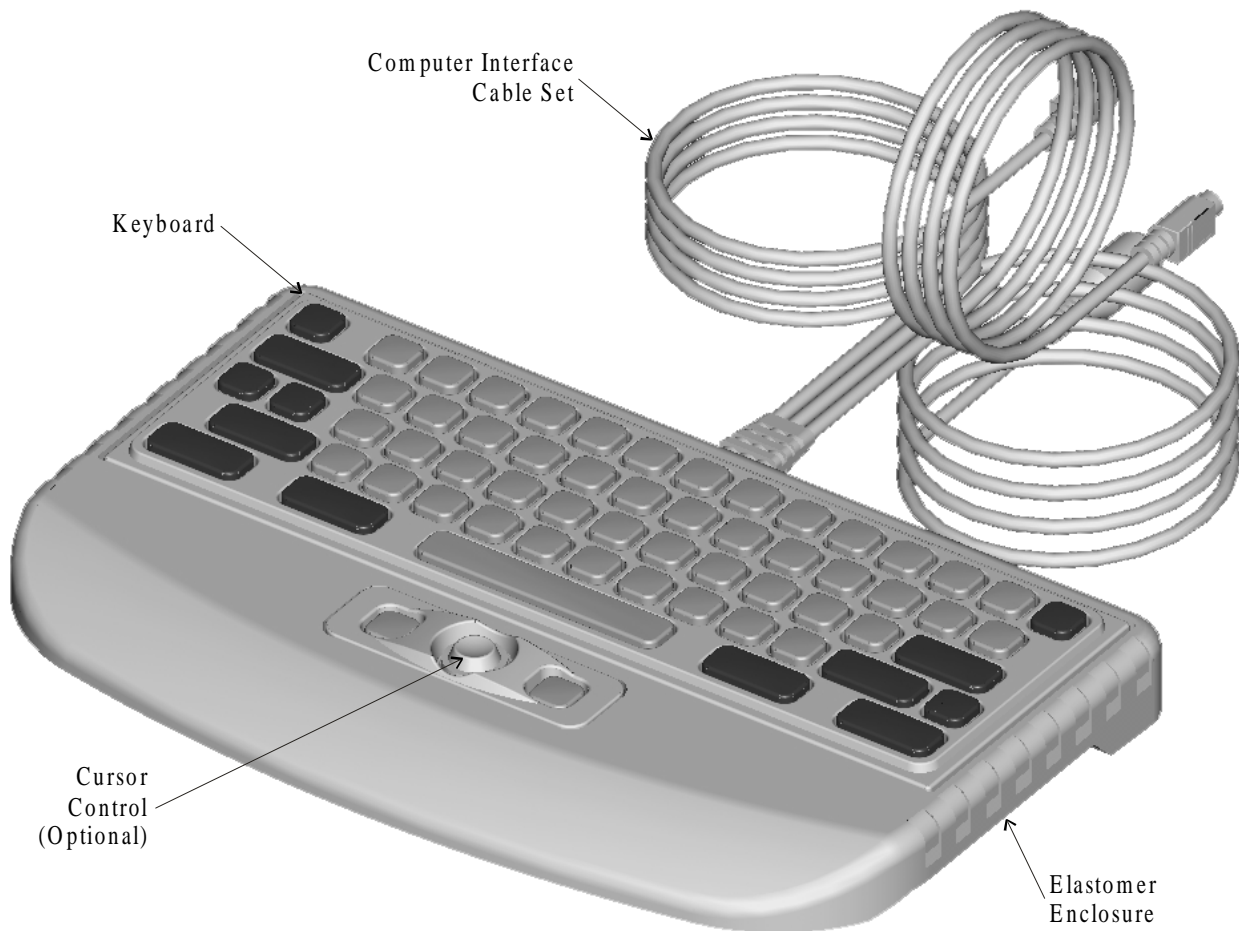


Figure 2.1  
**Keyboard with Integral Cursor Control**

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The keyboard cable is terminated with a male PS/2 keyboard connector to interface to the computer's keyboard I/O connector.

The cursor control cable is terminated with a male PS/2 connector for the PS/2 mouse port. The LED power cable is terminated with a five-pin female circular DIN connector for the lighted keyboard power supply. A PS/2 to PC/AT keyboard adapter may be used to connect the keyboard to a computer with a PC/AT connector.

### 2.3 Keyboard

The keyboard module used in this product has 61 physical keys as shown in Figure 2.2 and resides in the keyboard enclosure as shown in Figure 2.1. Utilization of the "Fn" key provides additional functions that allows the keyboard to operate as an 84-key keyboard. The keyboard has a built-in encoder that allows the keyboard to be connected directly to an IBM PS/2 port. The keyboard has plastic keycaps with laser engraved legends. The keyboard is a plug and play device.

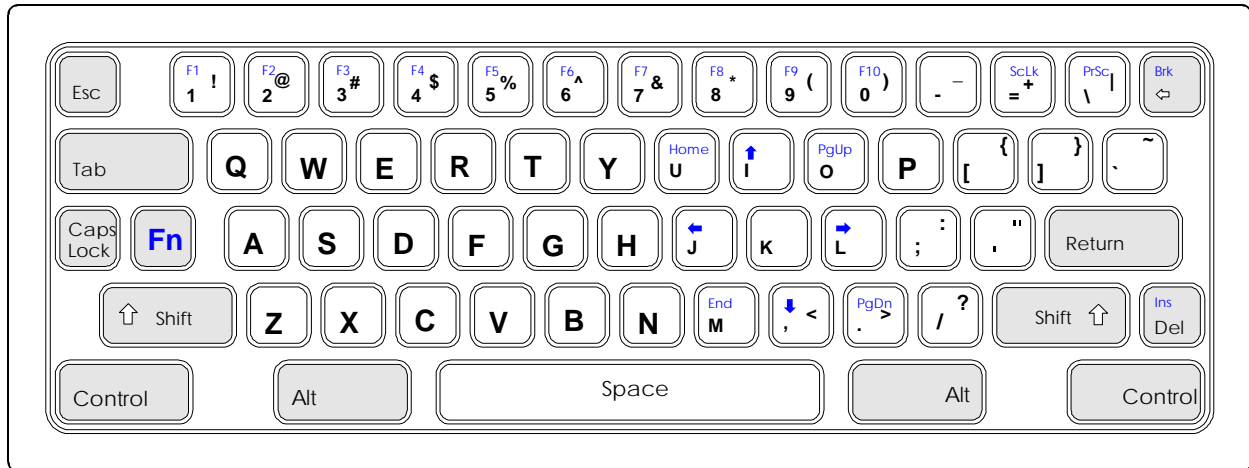


Figure 2.2  
Keyboard Keys

### 2.4 Color

The alpha-numeric keycaps in the center of the keyboard and the control (peripheral) keys on the left and right edges of the keyboard are of the contrasting colors as shown in Figure 2.2. That figure distinguishes the alpha-numeric and control keys by shading the control keys. Two contrasting color combinations are available. The space bar color matches the alpha-numeric keys color and the key legend color is white. The cursor control button keys color matches the control keys color. Two keypad colors are available and two cursor control colors are available.

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## 2.5 Cursor Control

The optional cursor control module is a low profile, pressure sensitive cursor steering button with left and right cursor control buttons, as shown in Figure 2.3 and resides in the keyboard enclosure as shown in Figure 2.1. It is similar in function to a two button mouse. Each button has a plastic keycap without legends.



Figure 2.3  
**Cursor Control**

## 2.6 Lighting

### 2.6.1 Backlighting Option

When the option is specified, the lighted keyboard is equipped with green LEDs under each key for background lighting. A cable connector for the LED power source is built into the unit.

### 2.6.2 Status Indicator

All keyboards are equipped with a Caps Lock red indicator.

## 2.7 Sealing

When so specified, the enclosed keyboard and cursor control will be sealed to meet NEMA 4 requirements. There is a breather vent on the bottom of the unit for use in equalizing the air pressure inside the sealed unit to that of the surrounding atmosphere. Clean the breather vent periodically with soft tooth brush and clean water as required.

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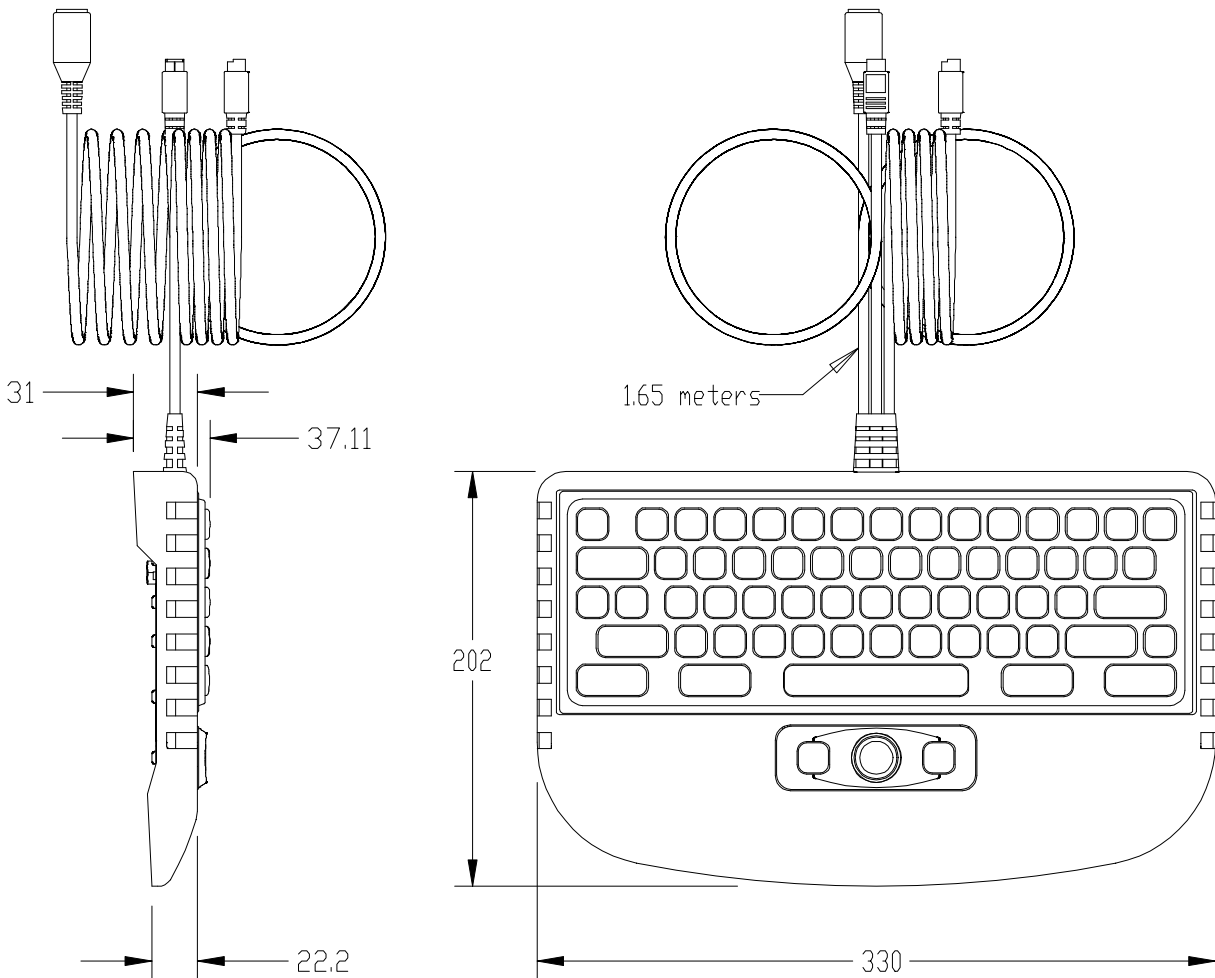


### 3.0 REQUIREMENTS

This specification defines the detailed requirements for the M75 keyboard. For all tests specified in this document, the test sample shall be mounted in such a manner as to simulate in-service use unless the specific test method precludes such mounting.

### 3.1 Dimensions

The keyboard outline dimensions are shown in Figure 3.1.



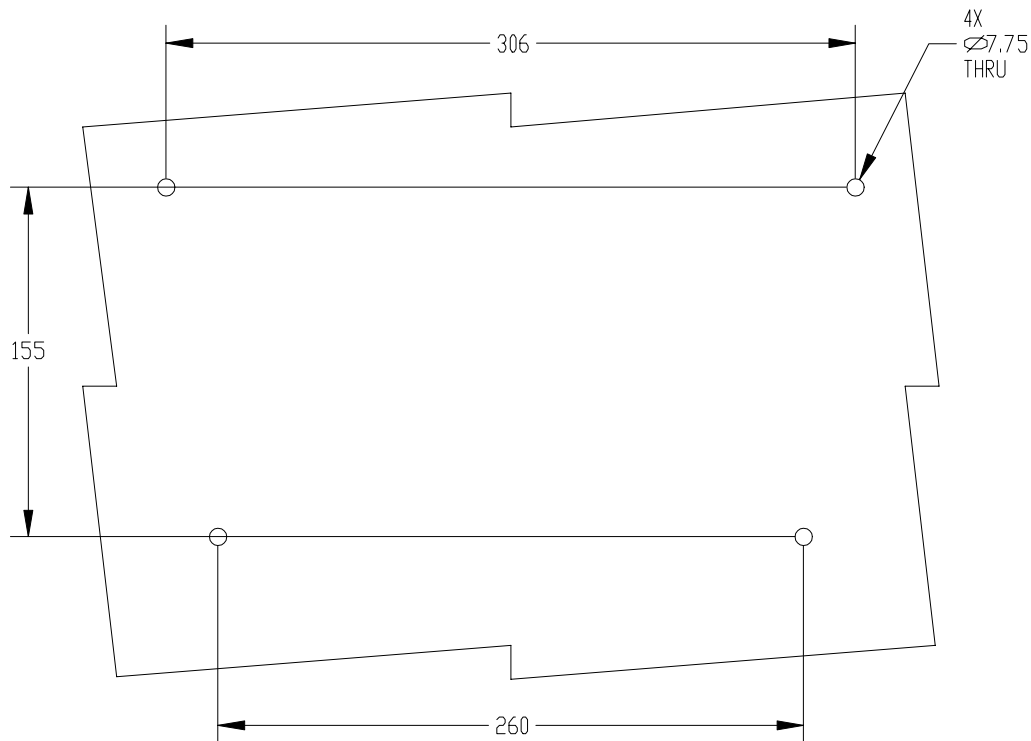
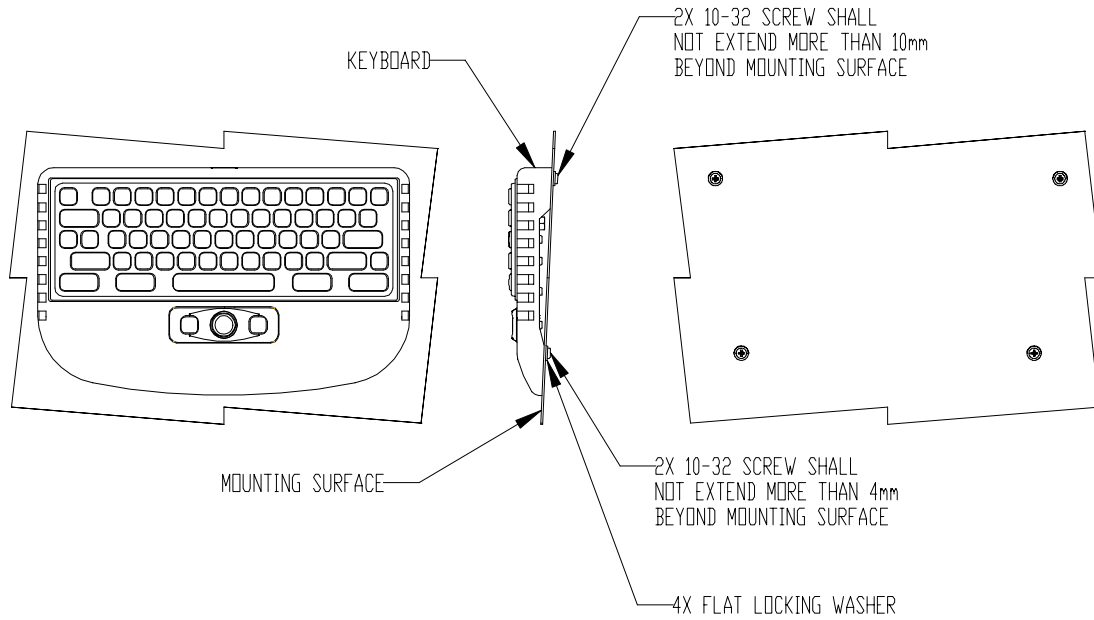
DIMENSIONS ARE IN MILLIMETERS

Figure 3.1  
Keyboard Outline Dimensions

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### 3.1.1 Keyboard Mounting

Figure 3.2 depicts the recommended hole pattern for mounting a keyboard on a flat surface. The keyboard has four 10-32 thread inserts with six full thread minimum in each insert. Four 10-32 thread screws and four flat locking washers are required to mount a keyboard.



DIMENSIONS ARE IN MILLIMETERS.

Figure 3.2  
**Recommended Hole Pattern for Mounting a Keyboard**

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### 3.1.2 Mounting Torque

The recommended torque to be applied to each screw when panel mounting the keyboard is 0.68 Nm (6 lbf in).

## 3.2 Interface Connections

The connections to the keyboard and cursor control are through PS/2 connectors. A label that identifies the functionality of the connector at the end of the cable is attached to each cable. Users must provide their own strain relief for severe vibration requirements.

### 3.2.1 Keyboard Connection

The connection from the keyboard is through a standard male PS/2 connector. The mating connector should be female PS/2 port. Figure 3.3 shows the pin numbers, and Table 3.1 shows the function of each pin.

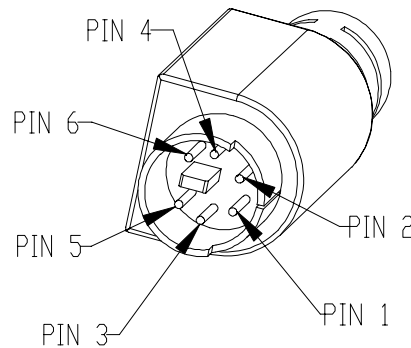


Figure 3.3  
**Keyboard Pin Number**

Table 3.1  
**Keyboard Pin Number and Description**

Pin Number	Description
1	Keyboard Data
2	N/C
3	GND
4	+5 VDC
5	Keyboard Clock
6	N/C

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### 3.2.2 Cursor Control Connection

The connection from the cursor control is through a standard male PS/2 connector as shown in Figure 3.4. Figure 3.4 also shows the pin numbers of cursor control cable connector, and Table 3.2 shows the description of each cursor control pin.

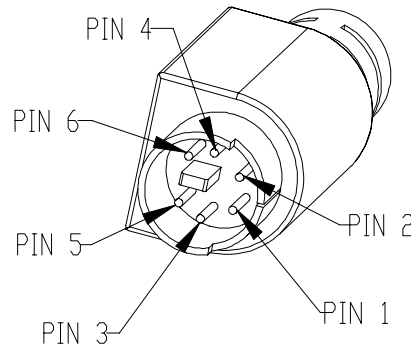


Figure 3.4

#### Cursor Control Cable Connector Pin Numbers

Table 3.2

#### Cursor Control Pin Number and Description

Pin Number	Description
1	Cursor Control Data
2	N/C
3	GND
4	+5 VDC
5	Cursor Control Clock
6	N/C

### 3.2.3 LED Electrical Connection and Power Requirements

The lighting power connection to the keyboard and cursor control LEDs is through a cable terminated with a standard female five-pin circular DIN. The mating connector from a power source should be a male five-pin circular DIN.

Power requirements to light the keyboard are 1.6 A at 2.1 VDC for a total power requirement of 3.36 W. To meet this requirement, a choice of two AC adapters, constant current, power supplies are available; see section 4.2.1.

Figure 3.5 shows the pin numbers of a keyboard and cursor control lighting connector, and Table 3.3 shows the description of each pin.

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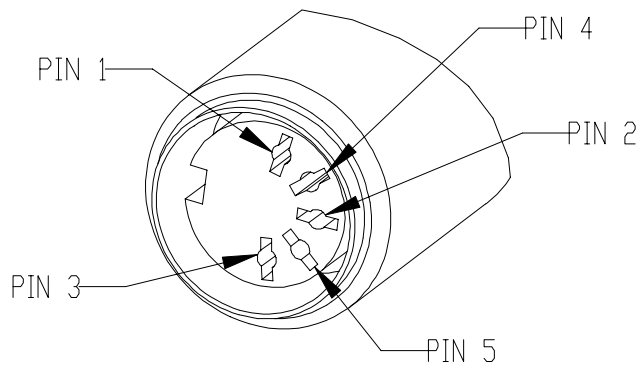


Figure 3.5

**Keyboard Lighting Connector Pin Number**

Table 3.3

**Keyboard Lighting Connector Pin Number and Description**

Pin Number	Description
1	DC Common
2	No Connection
3	+2.1 VDC
4	DC Common
5	+2.1 VDC

**3.3 Electrical Performance Requirements**

Electrical Life                      1,000,000 Actuations minimum at rated load.

**3.4 Mechanical Performance**

**3.4.1 Weight**

The typical weight of this data entry product is given in Table 3.4.

Table 3.4

**M75 Keyboard Weight**

Data Entry	Weight, Not to Exceed	
	Grams	Ounces
Keyboard, Lighted and Cursor Control with 3 Cables	2268	80
Keyboard, Unlighted and Cursor Control with 2 Cables	2214	79
Keyboard, Lighted (no Cursor Control) with 2 Cables	2157	77
Keyboard, Unlighted (no Cursor Control) with 1 Cable	2103	75

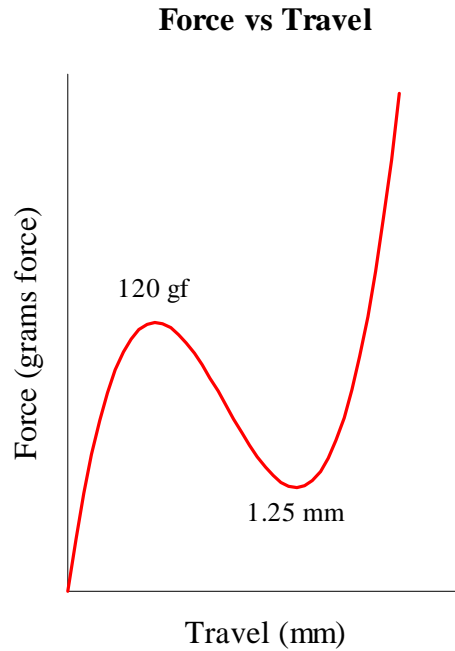
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### 3.4.2 Mechanical Life

Mechanical Life

1,000,000 cycles of operation at 25 °C ambient temperature. The cycling rate is between 10 to 1000 cycles of operation per minute.

### 3.4.3 Force Travel Curve



Nominal Key Travel

1.25 mm (.050 in).

Nominal Actuation Force

120 grams force (4.23 ounces force).

## 3.5 Environmental Requirements

### 3.5.1 Temperature Range

The operating and storage temperature range of the Series M75 product line shall be as shown in Tables 3.5, 3.6 and 3.7.

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Table 3.5  
**Unlighted Keyboard without Cursor Control Temperature Range**

Condition	° Celsius	° Fahrenheit
Operating	-30 to 85	-22 to 185
Storage	-30 to 85	-22 to 185

Table 3.6  
**Lighted Keyboard without Cursor Control Temperature Range**

Condition	° Celsius	° Fahrenheit
Operating	-25 to 65	-13 to 149
Storage	-30 to 75	-22 to 167

Table 3.7  
**Keyboard with Cursor Control Temperature Range**

Condition	° Celsius	° Fahrenheit
Operating	-20 to 60	-4 to 140
Storage	-20 to 60	-4 to 140

### 3.5.2 Thermal Shock

Thermal Shock Test: -30 °C (-22 °F) for ½ hour,  
 +75 °C (167 °F) for ½ hour  
 for 5 cycles with recovery time and temperature  
 of 5 minutes at 25 °C (77 °F).

### 3.5.3 Vibration

Vibration Test: 15 G peak or .06 inches double amplitude, 10 to 2000 Hz.

The entire frequency range of 10 to 2000 Hz and return to 10 Hz shall be traversed in 60 minutes. This cycle shall be performed once in each of three mutually perpendicular directions (total of 3 times), so that the motion shall be applied for a total period of approximately 3 hours.

### 3.5.4 Shock

Three shocks shall be applied in each direction of the three mutually perpendicular axes of the keyboard (total of 9 shocks). Each shock pulse shall have 100 G peak value, 11 ms duration, half-sine waveform and 12.3 ft/s velocity change.

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### 3.5.5 Moisture Resistance

Moisture Resistance Test: With the relative humidity between 90 and 98% cycle between 65 °C (149 °F) and 25 °C (77 °F) for 10 cycles (240 hours), following the 10-day cycle profile of MIL-STD-202, method 106.

### 3.5.6 NEMA 4

The keyboard shall be subjected to a stream of water from a hose that has a 25.4 mm (1 in) nozzle and delivers at least 246 liters (65 gallons) per minute. The water shall be directed at all joints from all angles from a distance of 3.05 to 3.65 meters (10 to 12 feet) for a minimum of 5 minutes.

### 3.5.7 Salt Spray

No functional damage will result from a test wherein the data entry product shall be sprayed with a 5% salt and water solution at 35 °C (95 °F) for 96 hours.

### 3.5.8 Sand and Dust

The data entry product shall be exposed to the three dust tests in succession. The dust shall be fine sand, and shall pass through a 140-mesh screen. The dust concentration shall be 0.3 grams (0.01 oz) per cubic foot. For each test, the dust shall be mixed with different air velocity, temperature and relative humidity as described in Table 3.8. Also specified is the duration of each test.

Table 3.8  
**Air Characteristic and Test Duration**

Dust Test #	Velocity (ft/minute)	Temperature (°C)	Relative Humidity %	Test Duration (hours)
1	1750	23	< 22	6
2	300	63	< 10	16
3	1750	63	< 10	6

### 3.5.9 EMI/RFI Shielding

Keyboard shall meet requirements of FCC Level A.

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### **3.5.10 Legend Chemical Resistance**

The legend shall be insecticide, glass cleaner, and hand cream resistant. Two tests shall be performed to test the legend chemical resistance.

Test one requires that the legend shall be coated with each chemical, allowed to dry, and rubbed 25 times under a load of 500 grams per square centimeter (7.1 psi).

Test two requires that the legend shall be coated with each chemical, allowed to dry, wiped away, and left for 60 hours at 60 °C (140 °F) and 95% RH.

The legend shall be readable after completion of the tests.

### **3.5.11 Legend Wear**

Two tests shall be performed to test the legend wear.

Test one requires that a rubber eraser shall be dragged across the legend under a 500 gram (17.6 oz) load for 1,000 cycles at a rate of 30 cycles per minute.

Test two requires that a rubber eraser shall be dragged across the legend under a 1,000 gram (35.3 oz) load for 500 cycles at a rate of 30 cycles per minute.

After testing, the characters and symbols shall remain readable.

### **3.5.12 Legend Adhesion**

A one mm interval grid pattern shall be cut on the legend. An adhesive tape shall be applied to the surface, and rapidly peeled away.

After testing, the characters and symbols shall remain readable.

### **3.5.13 Finger Print Resistance**

Two tests are required to test the fingerprint resistance. Test one requires that the legend shall be coated with a synthetic finger print solution, and left at 60 °C (140 °F) and 95% RH for 240 hours.

Test two requires that the legend shall be dipped in a synthetic fingerprint solution and rubbed 50 times with a cotton applicator saturated with synthetic fingerprint solution under a load of 500 grams per square centimeter (7.1 psi).

After testing, the characters and symbols shall remain readable.

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### **3.6 Material Requirement**

#### **3.6.1 Corrosion Resistance**

All metal parts shall be corrosion-resistant material, or shall be suitably protected to resist corrosion.

#### **3.6.2 Fungus**

The data entry product shall be constructed of fungus inert materials.

#### **3.6.3 Finish**

Exterior surfaces should have an orange peel finish.

#### **3.6.4 Terminal Plating**

Printed switch board shall be plated with .00005 inches (0.0013 mm) thick 99% gold (130-200 Knoop hardness). Connector terminals (header pins) shall be gold plated 20 micro inch thick.

### **3.7 Other Requirements**

#### **3.7.1 Marking**

Data entry product package shall be legibly marked as follows:

- a) StacoSwitch name and logo (optional).
- b) StacoSwitch Manufacturer's Cage Code Identification No. 12522.
- c) StacoSwitch Part Number.
- d) Manufacturing Date Code.
- e) Breather Vent (when applicable).

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### **3.7.2 Workmanship**

Products shall be manufactured in such a manner as to be uniform in quality and free from cracked or displaced parts, sharp edges, burrs and other defects that would be detrimental to their serviceability or performance.

### **3.7.3 Quality**

This keyboard shall be inspected and tested as necessary to substantiate product conformance to drawings and specifications. Inspection and test records shall be documented and shall be available for review.

### **3.7.4 Changes In Specification**

Specifications defined herein are accurate at the time of release and publication of this document. StacoSwitch reserves the right to make changes without prior notice.

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## 4.0 PART NUMBER INFORMATION

This section contains the information necessary to order each of the standard and optional features of the Series M75 keyboard products described in this specification. Accessories are covered in Section 4.2.

### 4.1 M75 Keyboards, Enclosed

M75	X	X	X	X	Code	
█	█	█	█	█		
				█	Color Combination	1 Black A 6 Black B
			█	█	Lighting	0 Unlighted 1 Lighted
		█	█	█	Sealing	0 Unsealed 1 Sealed to NEMA 4
	█	█	█	█	Type Detail	1 61 Keys w/ Encoder (No Cursor Control) 2 61 Keys w/ Encoder and Cursor Control
█	█	█	█	█	Type M75	Keyboard, Enclosed

Table 4.1 gives the definition of the color combination codes.

Table 4.1  
**Color Combination Codes**

Color Combination Code	Enclosure	Keyboard	Alpha Numeric Key Color	Control Key Color
Black A	Black	Gray	Gray	Black
Black B	Black	Black	Black	Gray


Table 4.2 gives the relationship between color description and Pantone number. Other colors are available by special order.

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Table 4.2  
**Color Description**

Data Entry	Color	Pantone Number
Keyboard	Black	Pantone # 433 U
	Gray	Pantone # Cool Gray 9 U
Key Color	Black	Pantone # 433 U
	Gray	Pantone # 429 U
Enclosure	Black	Pantone # 433 U

Typical data entry part number is M752116. This is a keyboard and cursor control in an enclosure, which is sealed and lighted. The keyboard alpha numeric keycap color is black, and the control keycap color is gray. The keyboard legend color is white. The keyboard and cursor control colors are black, and the enclosure color is black.

M75	2	1	1	6	Code	
					Color Combination	6 Black B
					Lighting	1 Lighted
					Sealing	1 Sealed
					Type Detail	2 61 Keys w/ Encoder and Cursor Control
					Type M75	Keyboard, Enclosed

## 4.2 Accessories

### 4.2.1 Power Supply

For customer convenience, two power supplies are available to light the keyboard. The power supplies convert 110 VAC to 2.1 VDC with a constant current rating of 1.6 A. The power supply has a five-pin DIN female connector that mates with the keyboard lighting connector. Two power supplies are available. One is a wall mount version, and the second one is table mount version.

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#### **4.2.1.1 Wall Mount Power Supply**

The part number of the wall mount power supply is 15239. The wall mount power supply plugs directly into an AC power source and provides the power output through a six foot long cord with a connector that mates with the keyboard lighting connector. The power supply dimension is 81 x 55 x 49 mm (L x W x H) or approximately 3.2 x 2.2 x 1.9 inches. The wall mount power supply weighs approximately 300 gm (10.6 oz). This AC adapter converts 120 VAC, 47 to 62 Hz, 0.4 A to 2.1 VDC, 1.6 A, constant current.

#### **4.2.1.2 Desktop Power Supply**

The desktop power supply, part number 15241, has two cords. One cord is approximately 2 m (6 ft) long and has a plug that plugs into an AC power source. The second cord is approximately the same length and has a five-pin male connector that mates with the keyboard lighting connector. The power supply dimension is 105 x 63.5 x 38.1 mm (L x W x H) or approximately 4.1 x 2.5 x 1.5 inches. The desktop power supply weighs approximately 530 gm (18.7 oz).

#### **4.2.2 PC/AT Keyboard Adapter**

The PC/AT keyboard adapter allows the keyboard to be connected to a PC/AT connector. The adapter weighs approximately 18.5 gm (0.66 oz). Part Number is 15260.

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