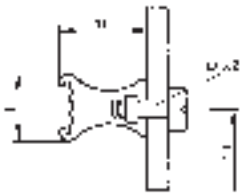
# 3: Handles

## 3.1 Fluted Handles

- Extruded aluminium handles, shaped to facilitate withdrawal of plug-in units
- Two grooves in the front face will accept identification strips (0.5 x 9 mm)
- **Scope of delivery:**
  - Extruded handle, clear anodised
  - Assembly material



### 3.1 Fluted Handles for Front Panels to IEC 60297

| Front Panel | Width | | Handle Length | | Part-No. |
|---|---|---|---|---|---|
| Width HP | mm | inch | mm | inch | |
| 3 HP | 15.1 | 0.59 | 12.5 | 0.49 | 60-103 |
| 4 HP | 20.1 | 0.79 | 17.6 | 0.69 | 60-104 |
| 5 HP | 25.2 | 0.99 | 22.6 | 0.88 | 60-105 |
| 6 HP | 30.3 | 1.19 | 27.7 | 1.09 | 60-106 |
| 7 HP | 35.3 | 1.38 | 33.5 | 1.31 | 60-107 |
| 8 HP | 40.5 | 1.59 | 37.9 | 1.49 | 60-108 |
| 10 HP | 50.6 | 1.99 | 48.0 | 1.88 | 60-110 |
| 12 HP | 60.8 | 2.39 | 58.2 | 2.29 | 60-112 |
| 14 HP | 70.9 | 2.79 | 69.1 | 2.72 | 60-114 |
| 16 HP | 81.1 | 3.19 | 78.5 | 3.09 | 60-116 |
| 20 HP | 101.4 | 3.99 | 98.8 | 3.88 | 60-120 |
| 21 HP | 106.4 | 4.18 | 104.6 | 4.11 | 60-121 |
| 27 HP | 137.0 | 5.39 | 134.4 | 5.29 | 60-127 |
| 30 HP | 152.2 | 5.99 | 149.6 | 5.88 | 60-130 |
| 40 HP | 203.0 | 7.99 | 200.4 | 7.88 | 60-140 |
| 60 HP | 304.6 | 11.99 | 302.0 | 11.88 | 60-160 |
| 84 HP | 426.5 | 16.79 | 424.0 | 16.69 | 60-184 |

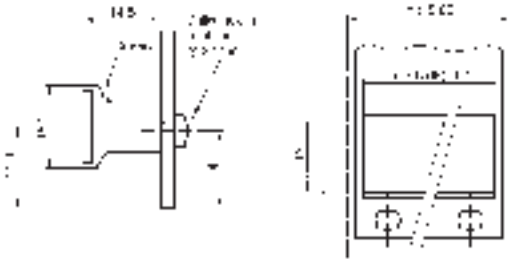
### 3.1.1 Fluted Handles for Cassettes and Modules With Front Panels to IEC 60297

| 7 HP | 10 HP | 14 HP | 21 HP | 28 HP | 42 HP |
|---|---|---|---|---|---|
| 23-060 | 23-061 | 23-062 | 23-063 | 23-064 | 23-065 |

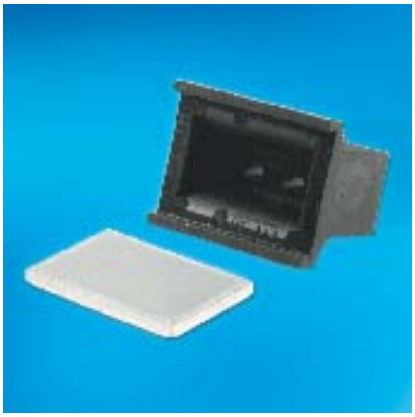
Incl. assembly material

# 3: Handles

## 3.2 Rigid-Mounted Unit Handles



- Shape/finish and mounting position which correspond to those of the injector/ejector handles
- 4 HP to 12 HP injection-moulded in black glass reinforced Nylon (UL94 V-0)
- 14 HP to 84 HP are extruded in black Noryl (UL94 V-0)
- Aluminium identification labels are inserted into a slot in the handle
- Handles are fixed to the front panels using self-tapping, self-centering screws
- Handles for 4 HP have positioning nipples, allowing them to be fixed with one screw, without turning
- Width greater than 4 HP, at least two screws must be used for fixing
- Grooves on the handle always point towards the middle of the unit
- **Scope of delivery:**
  - Rigid-mounted handle
  - Identification label
- Assembly material see 3.2.1



### 3.2 Rigid-Mounted Handle with Identification Label

| Width | Scope of Delivery | Part-No. |
|---|---|---|
| 4 HP top* | 5 pcs. | 60-200-01 |
| 4 HP bottom* | 5 pcs. | 60-200-02 |
| 4 HP | 10 pcs. | 60-200-04 |
| 5 HP | 10 pcs. | 60-200-05 |
| 6 HP | 10 pcs. | 60-200-06 |
| 7 HP | 10 pcs. | 60-200-07 |
| 8 HP | 10 pcs. | 60-200-08 |
| 10 HP | 10 pcs. | 60-200-10 |
| 12 HP | 10 pcs. | 60-200-12 |
| 14 HP | 1 pc. | 60-200-14 |
| 21 HP | 1 pc. | 60-200-21 |

- Other sizes (up to 84 HP) are available on request

* (Flat front panel with card holder)

### 3.2.1 Assembly Material

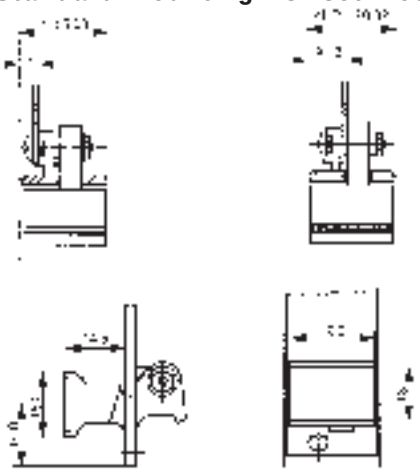
| | | |
|---|---|---|
| Recessed round head screw | 100 pcs. | 1902-70 |

# 3: Handles

## 3.3 Injector/Ejector Handles acc. to IEC

- Inject/eject function: Allows trouble-free insertion and extraction of electronic units with multi-pole connectors
- Inject and eject handle is injection moulded black, glass-reinforced Nylon (UL94 V-0)
- Anodised aluminium identification label is snapped into a slot on the handle
- The unit is extracted by pressing the handle outwards, and inserted by pressing the handle inwards
- The insert function is patented
- PC cards can be mounted both in the standard position and off-set 1 HP (5.08 mm/0.20 inch)
- Front panel with special cut-outs has to be ordered separately
- 3 U ≙ set for 1 handle, 6 U and 9 U ≙ set for 2 handles
- **Scope of delivery:**
  - Injector/ejector handle
  - Identification label
  - Catch plate
  - Assembly material

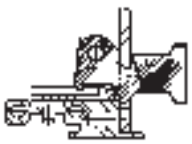
**Standard mounting** **Offset mounting**



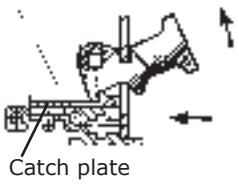
### Injector/Ejector Handle Complete, with Catch Plate

| Description | 3 U | 6 U |
|---|---|---|
| Injector/ejector handle complete, with catch plate | 63-358 | 63-359 |

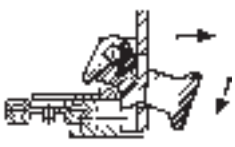
**Rest Position Handle**



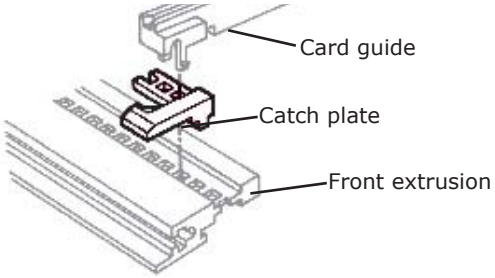
**Inject Handle**




**Eject Handle**

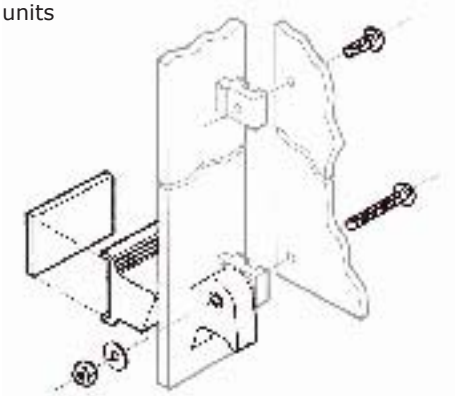


**Mounting of Catch Plate**



# 3: Handles

In use with part front panels for plug-in units



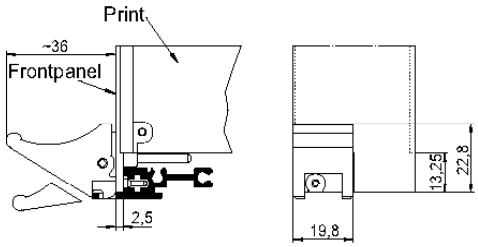
Card holder for use with flat front panels has to be ordered separately

**Single Parts Injector/Ejector Handle**

| Description | Scope of Delivery | Part-No. |
|---|---|---|
| Injector/ejector handle bottom | 100 pcs. | 63-451 |
| Injector/ejector handle top | 100 pcs. | 63-450 |
| Label | 100 pcs. | 63-454 |
| Bush | 100 pcs. | 63-667 |
| Bearing piece bottom (catch plate) | 100 pcs. | 63-452 |
| Bearing piece top (catch plate) | 100 pcs. | 63-453 |
| Slotted pan head screw M2.5 x 6 | 100 pcs. | 1901-06 |
| Slotted pan head screw M2.5 x 16 | 100 pcs. | 1901-16 |
| Hexagonal lock nut M2.5 | 100 pcs. | 1907-04 |
| Washer Ø 2.8/7 x 0.5 | 100 pcs. | 1907-01 |

## 3.4 Injector/Ejector Handles acc. to IEEE

### 3.4.1 Ergonomic IEEE Standard Injector/Ejector Handle



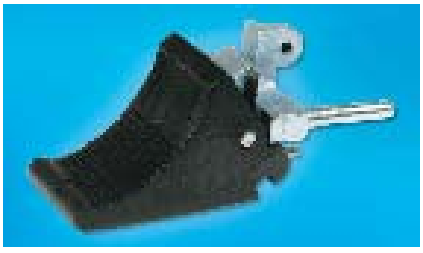

- Without latching (standard)
- **Scope of delivery:**
  - Handle black (plastic, UL94 V-0)
  - Card holder (zinc die-cast, galvanized)
  - Reset spring (stainless steel)
  - Assembly material (screws M2.5 for fixing of card holder/printed board/front panel)
- Grey handles available on request

**Injector/Ejector Handle Top *with* ESD Pin**

| Description | Part-No. 1 pc. |
|---|---|
| Black | 81-075 |

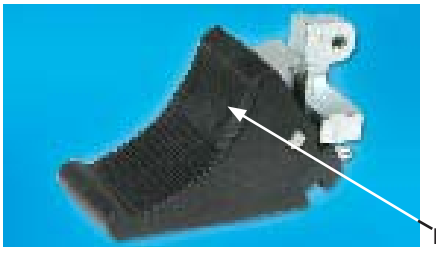
**Injector/Ejector Handle Top *without* ESD Pin**

| Description | Part-No. 1 pc. |
|---|---|
| Black | 81-075-01 |



**Injector/Ejector Handle Bottom *with* ESD Pin**

| Description | Part-No. 1 pc. |
|---|---|
| Black | 81-076 |




**Injector/Ejector Handle Bottom *without* ESD Pin**

| Description | Part-No. 1 pc. |
|---|---|
| Black | 81-076-01 |

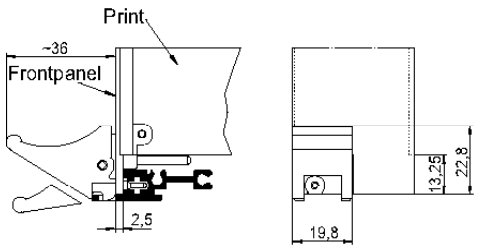
**Label 18.5 x 10 mm**

| | |
|---|---|
| **1 sheet A4 with 280 labels** | 81-030 |

# 3: Handles

## 3.4.2 Ergonomic IEEE Hot-Swap Injector/Ejector Handle

- With latching (hot-swap)
- **Scope of delivery:**
  - Handle black, button red (plastic, UL94 V-0)
  - Card holder (zinc die-cast, galvanized)
  - Reset spring (stainless steel)
  - Assembly material (screws M2.5 for fixing of card holder/printed board)
- Grey handles available on request
- Offset version:
  - Offset by 2.54 mm (1/2 HP) to the right
  - Thus giving more space on the solder side of the PCB




### Top Handle *with* ESD Pin

| Description | Part-No. 1 pc. |
|---|---|
| Black | 81-095 |
| Black offset | 81-184 |

Optional screws for fixing front panels: M2.5, 100 pcs: Cross recessed 1904-41 (12.7 mm), Torx: 1904K41 (11.3 mm)

### Top Handle *without* ESD pin

| Description | Part-No. 1 pc. |
|---|---|
| Black | 81-095-01 |

Optional screws for fixing front panels: M2.5, 100 pcs: Cross recessed 1904-41 (12.7 mm), Torx: 1904K41 (11.3 mm)

### Bottom Handle *with* ESD Pin

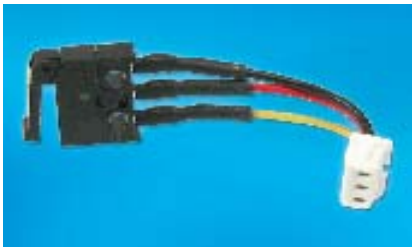
| Description | Part-No. 1 pc. |
|---|---|
| Black | 81-096 |
| Black offset | 81-185 |

Optional screws for fixing front panels: M2.5, 100 pcs: Cross recessed 1904-41 (12.7 mm), Torx: 1904K41 (11.3 mm)

### Bottom Handle *without* ESD Pin

| Description | Part-No. 1 pc. |
|---|---|
| Black | 81-096-01 |

Optional screws for fixing front panels: M2.5, 100 pcs: Cross recessed 1904-41 (12.7 mm), Torx: 1904K41 (11.3 mm)



### Microswitch for Injector/Ejector Handle

- Technical data and function see 3.4.7

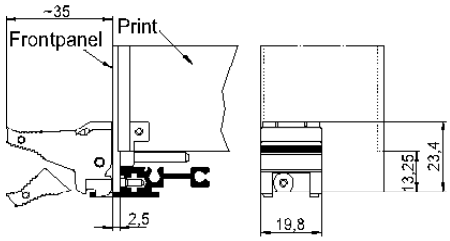
| Description | Part-No. 1 pc. |
|---|---|
| Microswitch with pre-assembled wire cable length (25 mm) | 81-088 |

### Label 18.5 x 10 mm

| | |
|---|---|
| **1 sheet A4 with 280 labels** | 81-030 |

## 3.4.3 Classic IEEE Standard and Hot-Swap Injector/Ejector Handle

- Without latching (standard)
- **Scope of delivery:**
  - Handle black, without button (plastic, UL94 V-0)
  - Card holder (zinc die-cast, galvanized)
  - Reset spring (stainless steel)
  - Assembly material (screws M2.5 for fixing of card holder/printed board)
- Offset version:
  - Offset by 2.54 mm (1/2 HP) to the right
  - Thus giving more space on the solder side of the PCB




### Top Handle *with* ESD Pin

| Description | Part-No. 1 pc. |
|---|---|
| Black | 81-260 |
| Black offset | 81-160 |

Optional screws for fixing front panels: M2.5, 100 pcs: Cross recessed 1904-41 (12.7 mm), Torx: 1904K41 (11.3 mm)

### Bottom Handle with ESD Pin

| Description | Part-No. 1 pc. |
|---|---|
| Black | 81-261 |
| Black offset | 81-161 |

Optional screws for fixing front panels: M2.5, 100 pcs: Cross recessed 1904-41 (12.7 mm), Torx: 1904K41 (11.3 mm)

- With latching (hot-swap)
- **Scope of delivery:**
  - Handle black, button light grey (plastic, UL94 V-0)
  - Card holder (die-cast tin, galvanized)
  - Assembly material (screws M2.5 for fixing of card holder/printed board)
- Offset version:
  - Offset by 2.54 mm (1/2 HP) to the right
  - Thus giving more space on the solder side of the PCB

### Top Handle *with* ESD Pin

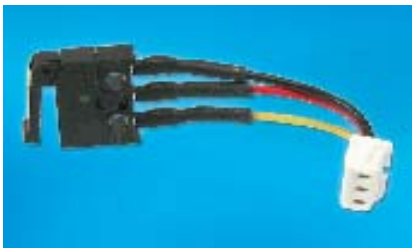
| Description | Part-No. 1 pc. |
|---|---|
| Black | 81-255 |
| Black offset | 81-155 |

Optional screws for fixing front panels: M2.5, 100 pcs: Cross recessed 1904-41 (12.7 mm), Torx: 1904K41 (11.3 mm)

### Bottom Handle *with* ESD Pin

| Description | Part-No. 1 pc. |
|---|---|
| Black | 81-256 |
| Black offset | 81-156 |

Optional screws for fixing front panels: M2.5, 100 pcs: Cross recessed 1904-41 (12.7 mm), Torx: 1904K41 (11.3 mm)



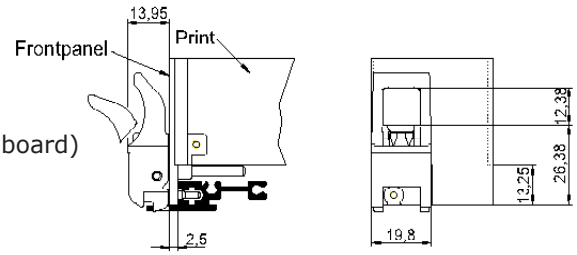
### Microswitch for Injector/Ejector Handle

- Technical data and function see 3.4.7

| Description | Part-No. 1 pc. |
|---|---|
| Microswitch with pre-assembled wire cable length (25 mm) | 81-088 |

## 3.4.4. Telecom Hot-Swap Injector/Ejector Handle

- With latching (hot-swap)
- **Scope of delivery:**
  - Handle black, button red (plastic, UL94 V-0)
  - Card holder (zinc die-cast, galvanized)
  - Assembly material (screws M2.5 for fixing of card holder/printed board)
- Grey handles available on request
- Offset version:
  - Offset by 2.54 mm (1/2 HP) to the right
  - Thus giving more space on the solder side of the PCB




### Top Handle *with* ESD Pin

| Description | Part-No. 1 pc. |
|---|---|
| Black | 81-205 |
| Black offset | 81-188 |

Optional screws for fixing front panels: M2.5, 100 pcs: Cross recessed 1904-41 (12.7 mm), Torx: 1904K41 (11.3 mm)

### Top Handle *without* ESD pin

| Description | Part-No. 1 pc. |
|---|---|
| Black | 81-205-01 |

Optional screws for fixing front panels: M2.5, 100 pcs: Cross recessed 1904-41 (12.7 mm), Torx: 1904K41 (11.3 mm)

### Bottom Handle *with* ESD Pin

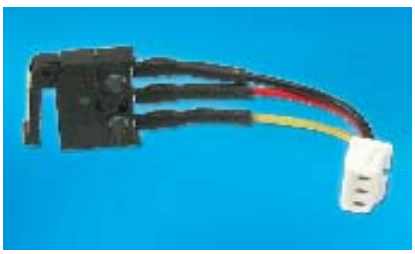
| Description | Part-No. 1 pc. |
|---|---|
| Black | 81-206 |
| Black offset | 81-189 |

Optional screws for fixing front panels: M2.5, 100 pcs: Cross recessed 1904-41 (12.7 mm), Torx: 1904K41 (11.3 mm)

### Bottom Handle *without* ESD Pin

| Description | Part-No. 1 pc. |
|---|---|
| Black | 81-206-01 |

Optional screws for fixing front panels: M2.5, 100 pcs: Cross recessed 1904-41 (12.7 mm), Torx: 1904K41 (11.3 mm)



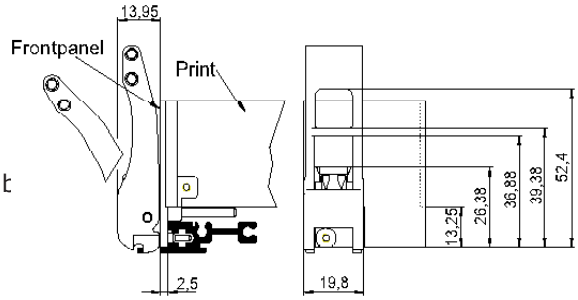
### Microswitch for Injector/Ejector Handle

- Technical data and function see 3.4.7

| Description | Part-No. 1 pc. |
|---|---|
| Microswitch with pre-assembled wire cable length (25 mm) | 81-088 |

## 3.4.5 Telecom Long Hot-Swap Injector/Ejector Handle

- With latching (hot-swap)
- **Scope of delivery:**
  - Handle black, button red (plastic, UL94 V-0)
  - Card holder (zinc die-cast, galvanized)
  - Assembly material (screws M2.5 for fixing of card holder/printed b
- Grey handles available on request
- Offset version:
  - Offset by 2.54 mm (1/2 HP) to the right
  - Thus giving more space on the solder side of the PCB




### Top Handle *with* ESD Pin

| Description | Part-No. 1 pc. |
|---|---|
| Black | 81-214 |
| Black offset | 81-117 |

Optional screws for fixing front panels: M2.5, 100 pcs: Cross recessed 1904-41 (12.7 mm), Torx: 1904K41 (11.3 mm)

### Bottom Handle *with* ESD pin

| Description | Part-No. 1 pc. |
|---|---|
| Black | 81-215 |
| Black offset | 81-116 |

Optional screws for fixing front panels: M2.5, 100 pcs:
Cross recessed 1904-41 (12.7 mm), Torx: 1904K41 (11.3 mm)

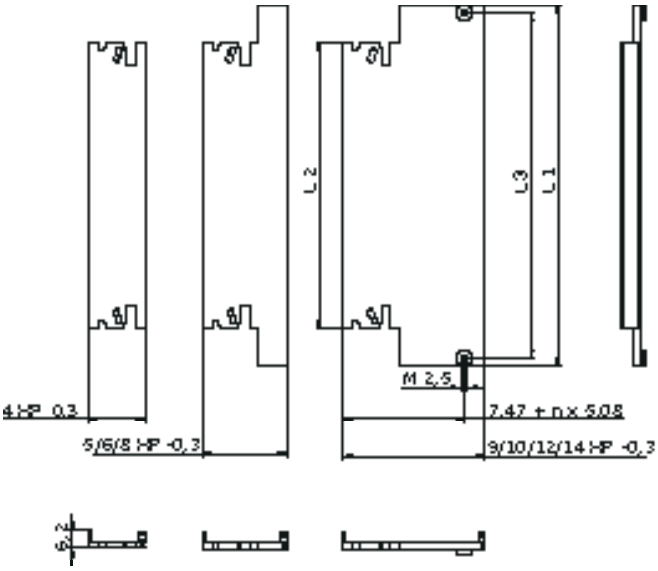
### Microswitch for Injector/Ejector Handle

- Technical data and function see 3.4.7

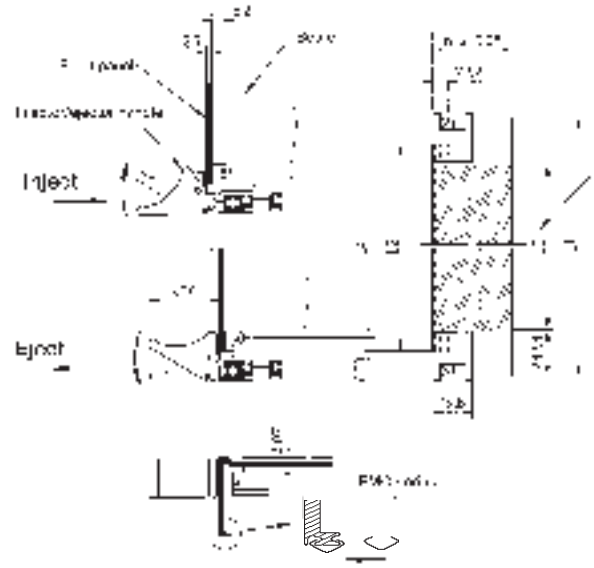
| Description | Part-No. 10 pc. |
|---|---|
| Microswitch with pre-assembled wire cable length (25 mm) | 81-088 |

# 3: Handles

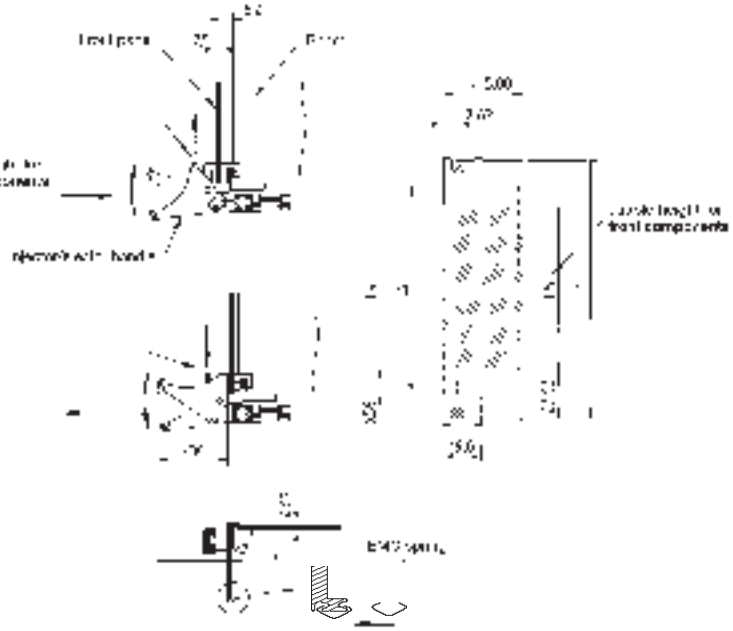
### 3.4.6 Cutouts and Function




Injector/Ejector Handle
Without Locking Feature (Function)

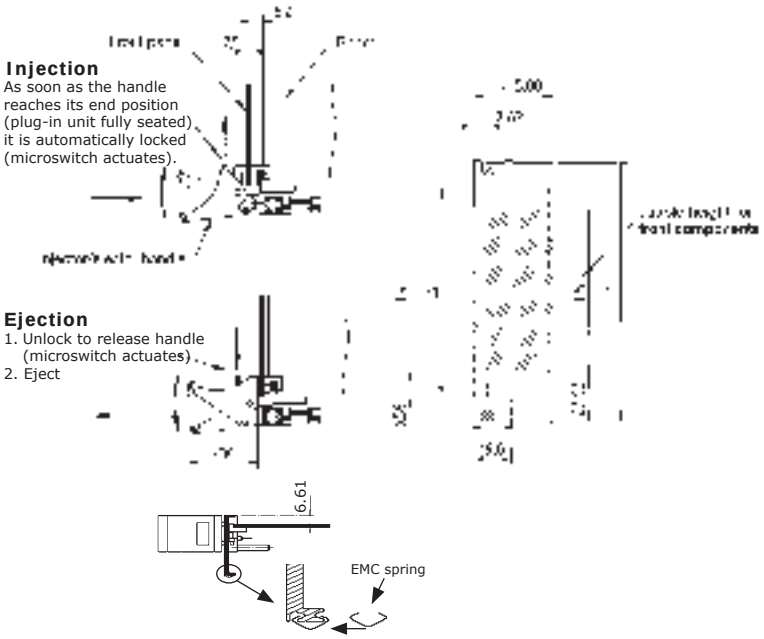



Injector/Ejector Handle
With Locking Feature (Function)



# 3: Handles

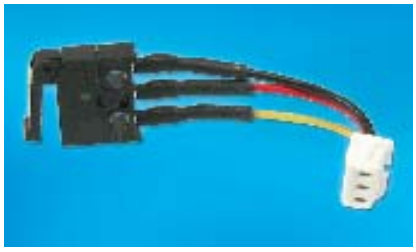
Injector/Ejector Offset Handle
With Locking Feature (Function)




**Dimensions**

| Height | L1 mm | L1 inch | L2 mm | L2 inch | L3 mm | L3 inch | L4 mm | L4 inch | L5 mm | L5 inch |
|---|---|---|---|---|---|---|---|---|---|---|
| 3 U | 128.55 | 5.06 | 102.05 | 4.01 | 122.50 | 4.82 | 88.90 | 3.50 | 81.30 | 3.20 |
| 6 U | 261.90 | 10.31 | 235.40 | 9.27 | 255.85 | 10.07 | 222.25 | 8.75 | 214.65 | 8.45 |
| 9 U | 395.25 | 15.56 | 368.75 | 14.51 | 389.20 | 15.32 | 355.60 | 14.00 | 348.00 | 13.70 |

## 3.4.7 Microswitch Technical Data and Function

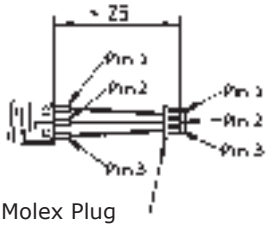


**Microswitch for Injector/Ejector Handle**

| Description | Part-No. 1 pc. |
|---|---|
| Microswitch with pre-assembled wire cable length (25 mm) | 81-088 |

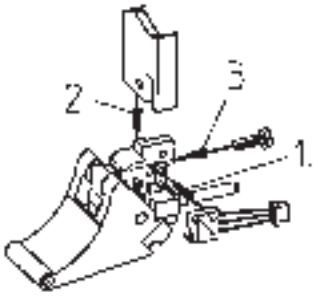
**Technical data**

| | | |
|---|---|---|
| Life circuit: | 30 V DC, 5 - 50 mA | 30'000 cycles |
| | 60 V DC, 5 mA | 30'000 cycles |
| | 60 V DC, 500 mA | 15'000 cycles |
| Temperature: | -25°C to +70°C | |
| Humidity: | RH 85% max. | |
| Vibration: | 10 Hz to 55 Hz, 18 g | |
| Shock: | 30 g, 11 msec | |




Molex Plug
Part-No. 51021-0300

Mates with: (Molex P/N)
51047-0300
53048-0310
53047-0310
53261-0390
53398-0390




Note: Microswitch orientation

Switch function:
- Switch open: Connection between Pin 1 and Pin 3
- Switch closed: Connection between Pin 1 and Pin 2

Mounting sequence:
1. Push microswitch onto the handle
2. Insert the front panel into the handle
3. Screw-on

# 3: Handles

## Hot-Swap Safely at the Touch of a Button

Modern backplanes are equipped with high pin density connectors. In order to manage the occurring high connecting forces, up to 500 N (100lbs.) for a 6U plug-in unit, a new insertion/extraction handle was designed and standardized in IEEE 1101.10.

The standards for CompactPCI Hot Swap and VME64x show new features added to the IEEE handle. To meet these different demands, Elma has developed two handles.

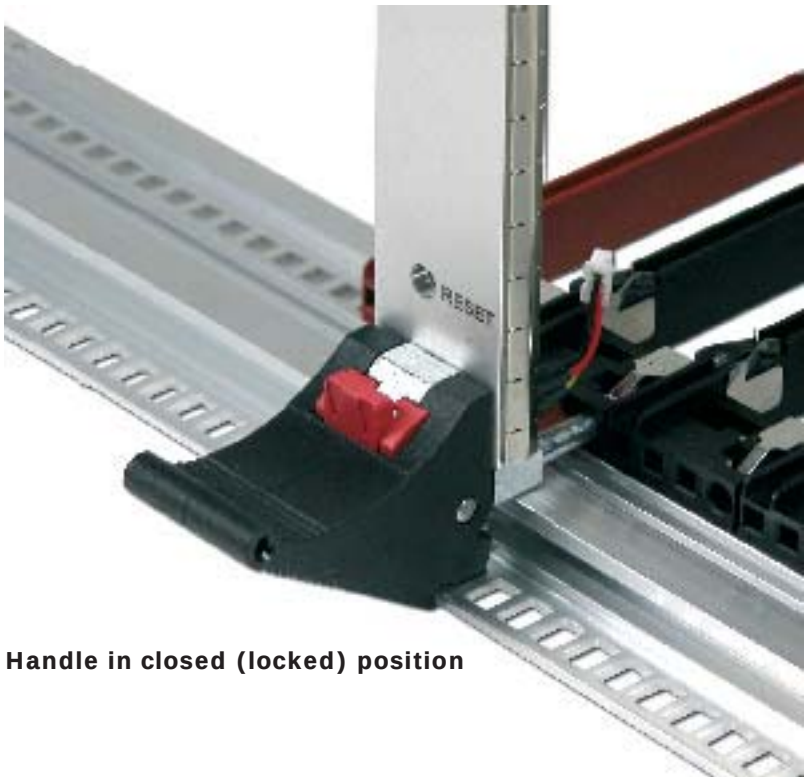
To confirm with IEEE 1101.10 and CompactPCI without Hot Swap or other applications where high insertion/extraction forces have to be managed, Elma developed a handle with an optimized ratio of leverage that impairs minimum vertical forces to the rack. Thus preventing the front extrusions from buckling which can cause malfunction of the handle. In addition the Elma handle has a positioning pin. This pin, anchored in the tapped strip, precisely aligns each board within its slot, eliminating lateral forces to adjacent boards (this guarantees the functionality of the EMC gaskets and reinforces the front extrusions). A matter of course are the coding (up to 4096 possibilities) and the ESD pin for electrostatic discharge of the front panel (via an ESD clip in the card guide) as defined in the IEEE standard.

The CompactPCI Hot Swap specification asks for a switch incorporated in the handle assembly. And the VME64x specifications requires a handle with a build in locking feature. Elma has added these features to the above mentioned handle. Thus offering the user two almost identical handles for different requirements. Unique and user friendly is the locking feature:

To remove the plug-in unit first the handle has to be unlocked by pushing down the red button on the handle. The red button also activates at the same time the switch (open). The red button remains depressed. Now the plug-in unit can be removed by pushing the handle outwards. If the red button was pushed in error, push the handle inwards. When the plug-in unit is fully seated, the red button jumps up automatically thus locking the handle and activating the switch (closed).

To separate the two operations (unlocking and extraction) means security and guarantees that the handle meets completely the Hot Swap specification. According to the specification the switch has to change the state as the handle is unlocked but before any movement of the board begins. On insertion the switch should change state after the board is fully seated (physical connection is done). This locking happens automatically with the Elma handle. Only when the plug-in unit is fully and correctly inserted, will the handle be locked and the switch actuated (closed).

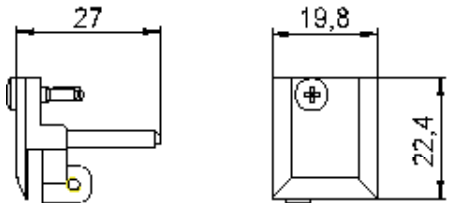
The Hot Swap specification highly recommends a protective cover for Hot Swap boards. The cover from Elma can be mounted without screws. It is inserted between printed board and front panel. Then the double-sided adhesive tape is pressed on the printed board through the pins of the connector. No time or money is wasted fitting screws and in addition the cover can be fixed on all 6U-, 160mm and 80mm boards even on those where holes for a protective cover are missing.




**Handle in closed (locked) position**

# 3: Handles

## 3.4.8 Card Holder and Coding Pins acc. to IEEE




- **Scope of delivery:**
  - End piece card holder (die-cast tin, galvanized)
  - Assembly material (screws M2.5 for fixing of front panel/card holder/printed board)

### 3.4.8.1 Card Holder / End Piece *with* ESD Pin

| Description | Part-No. 1 pc. |
|---|---|
| Top | 81-070 |
| Bottom | 81-071 |

### 3.4.8.2 Card Holder / End Piece *without* ESD Pin

| Description | Part-No. 1 pc. |
|---|---|
| Top | 81-070-01 |
| Bottom | 81-071-01 |

### 3.4.8.3 Coding Pins

- Acc. to IEC60297-3-103
- Plastic, UL94 V-0
- Can be rotated in 4 positions
- Card guides see chapter 7

| Description | Part-No. 1 pc. |
|---|---|
| Grey | 81-054-02 |
| Dark red | 81-054-06 |
| Black | 81-054-04 |

# 3: Handles


## 3.5 Injector/Ejector Handles acc. to AdvancedTCA

- Ergonomic for easy operation
- Material: steel
- With latching (hot-swap)

### 3.5.1. Classic Handle

- **Scope of delivery:**
  - 2 steel handles
  - 2 shoulder screws M2.5, Torx size T10
  - 4 + 4 washers
  - 2 latch spring clips

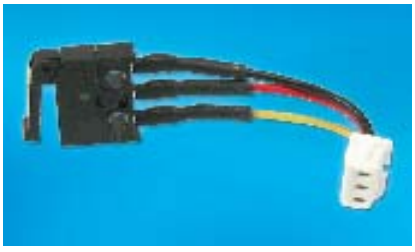
| Description | Part-No. |
|---|---|
| 2 handles | 12T130 |

### 3.5.2 Ergonomic Handle acc. to ATCA

- Pre-assembled
- Easy assembling onto front panel and PCB
- Product still in development
- Available from end 2006, samples earlier (on request)

| Description | Part-No.<br>1 pc. |
|---|---|
| Top handle | AT-300 |
| Bottom handle | AT-301 |

Please find further information on www.elma.com.



### 3.5.3 Microswitch for Injector/Ejector Handle

- Technical data and function see 3.4.7

| Description | Part-No.<br>1 pc. |
|---|---|
| Microswitch with pre-assembled wire cable length (25 mm) | 81-088 |

# Application of Front Panels, Handles & Accessories

Source: Telkoor, USA