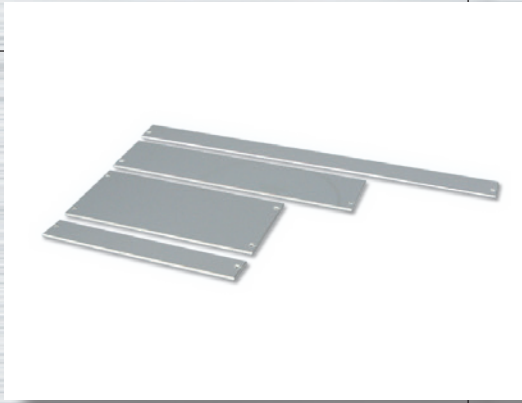


Front Panels, Handles and Plug-in Units

1. Front Panels for Sub Racks and Enclosures



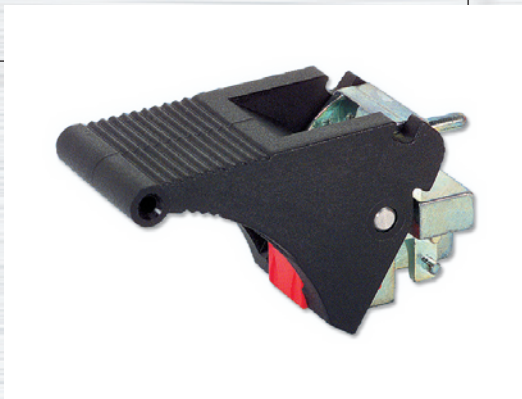
- Flat front panels
- EMC flat front panels
- Fan front panels
- Hinged front panels

2. Front Panels for Plug-In Units



- IEC plug-in units
- IEEE plug-in units
- ATCA plug-in units
- PMC Mezzanine front panels
- FMC Mezzanine front panels

3. Handles



- Fixed handles
- Injector-/ejector handles

4. Cassettes and Modules

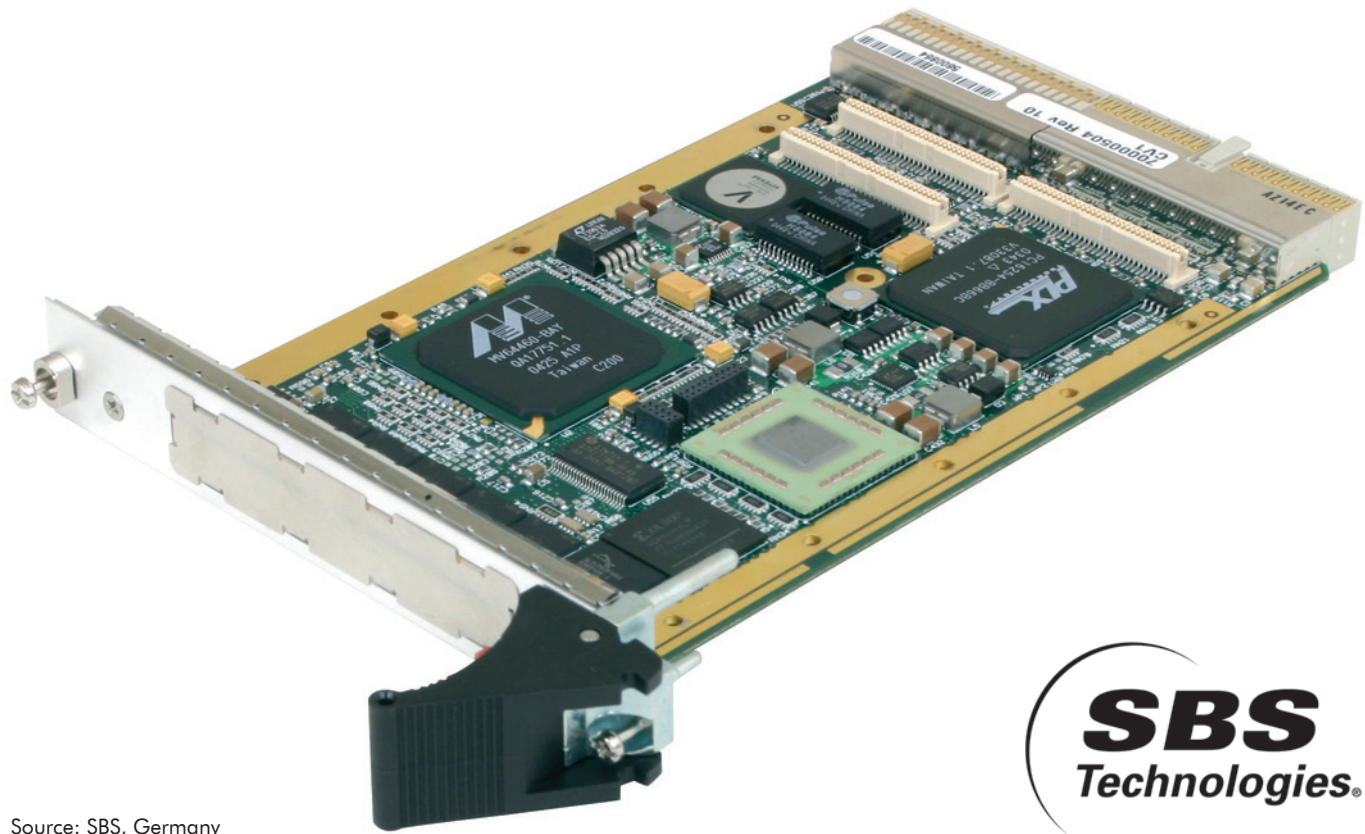
- For several eurocards
- For one eurocard and bulky components



5. Ventilation 84 HP

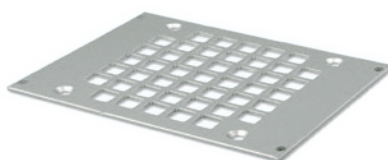
- Fan Modules Vertical
- Fan Modules Horizontal
- Fan and Fan Speed Control





Source: SBS, Germany

1: Front Panels for Sub Racks and Enclosures



1.1 Flat Front Panels C | 1_2

1.1.1 Front Panel Screws C | 1_2

1.2 EMC Flat Front Panels C | 1_3

1.2.1 EMC Filler Panel with EMC Gasket C | 1_4

1.2.2 EMC Filler Panel without EMC Gasket C | 1_4

1.2.3 EMC Flat Front Panels C | 1_5

1.2.4 Superior EMC Level C | 1_6

1.2.5 Perforated EMC Front Panel 84 HP C | 1_6

1.3 Fan Front Panels C | 1_7

1.3.1 Fan Front Panel 84 HP for Vertical Ventilation C | 1_7

1.3.2 Fan Front Panel for Horizontal Ventilation C | 1_8

1.3.3 Fan Front Panels for Direct Fan Mounting C | 1_8

1.4 Hinged Front Panels C | 1_9

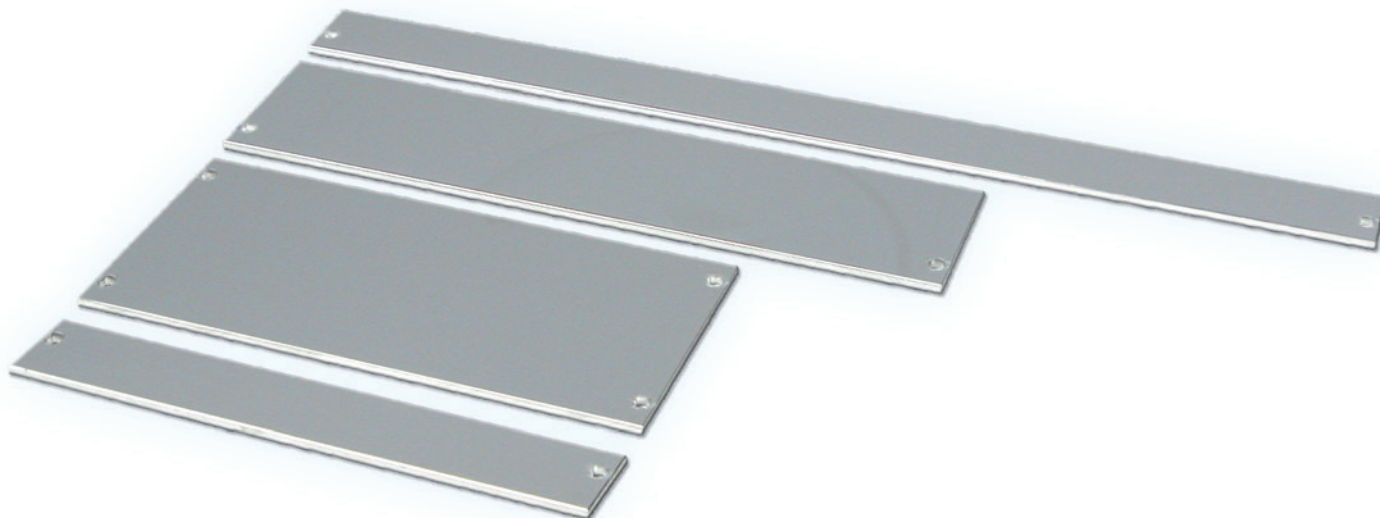
1.4.1 Top / Bottom-Hinged Front Panel C | 1_9

1.4.2 EMC Top / Bottom-Hinged Front Panel C | 1_10

1.4.3 Side-Hinged Front Panel C | 1_10

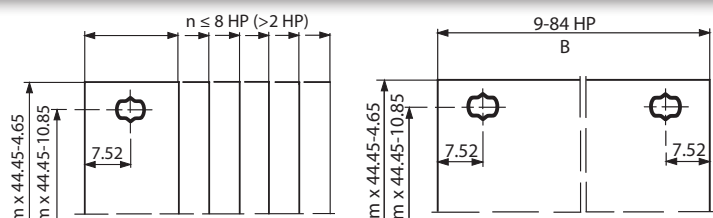
1.4.4 Accessories C | 1_11

1: Front Panels for Sub Racks and Enclosures



1.1 Flat Front Panels

- For sub racks and enclosures, solid
- Aluminium 2.5 mm, clear anodised (non-conductive)
- **Scope of delivery:**
 - Flat front panel
- Front panel screws, see below
- 2 HP version: screw retainer can not be fitted



1.1 Flat Front Panels for Sub Racks and Enclosures, Solid

Width	B		Height		Part-No.					
	mm	inch	1 U 39.8mm	ca. 1 U* 42.15mm	2 U 84.2mm	3 U 128.7mm	4 U 173.1mm	6 U 262.0mm	7 U 306.5mm	9 U 395.4mm
2 HP ⁽¹⁾	10.0	0.39	—	—	—	21N302	—	21N602	—	—
3 HP	15.2	0.59	—	—	—	21N303	21N403	21N603	—	—
4 HP	20.1	0.79	—	—	—	21N304	21N404	21N604	—	21N904
5 HP	25.2	0.99	—	—	—	21N305	21N405	21N605	—	—
6 HP	30.3	1.19	—	—	—	21N306	21N406	21N606	—	—
7 HP	35.3	1.38	—	—	—	21N307	21N407	21N607	—	—
8 HP	40.4	1.59	—	—	—	21N308	21N408	21N608	—	—
10 HP	50.6	1.99	—	—	—	21N310	21N410	21N610	—	—
11 HP	55.7	2.19	—	—	—	21N311	—	—	—	—
12 HP	60.7	2.38	—	—	—	21N312	21N412	21N612	—	—
14 HP	70.9	2.79	—	—	—	21N314	21N414	21N614	—	—
16 HP	81.1	3.19	—	—	—	21N316	21N416	21N616	—	—
20 HP	101.4	3.59	—	—	—	21N320	21N420	21N620	—	—
21 HP	106.5	4.19	—	—	—	21N321	—	21N621	—	—
28 HP	142.0	5.59	—	—	—	21N328	—	21N628	—	—
32 HP	162.3	6.38	—	—	—	21N332	21N432	—	—	—
42 HP	213.1	8.38	—	—	21N242	21N342	21N442	21N642	—	—
52 HP	263.9	10.38	—	—	—	21N352	21N452	21N652	—	—
63 HP	319.8	12.59	—	—	21N263	21N363	21N463	21N663	—	—
81 HP	411.3	16.19	—	—	21N281	21N381	21N481	21N681	—	—
84 HP	426.5	16.79	21N184	21N084*	21N284	21N384	21N484	21N684	21N784	21N984

* Coverplates for 1 U fan opening

1.1.1 Front Panel Screws

- Set of 10 screws, with screw retainer

Description	Part-No. 10 pcs.
Torx screws M2.5 x 11.3, size T8 with plastic screw retainer	63K159
Rounded head screws recessed M2.5 x 11.3 with plastic screw retainer	63-159



1.2 EMC Flat Front Panels

“Electromagnetic compatibility is the ability of a system to operate in the intended environment without causing or suffering unacceptable degradation of performance due to unintentional electromagnetic radiation or response.” The EMC characteristics of a system therefore consist of an appropriate immunity from interference (noise immunity) and a limited emission of interference (noise emission).

Elma’s EMC concept describes three levels of electromagnetic shielding performance (Performance Level). The attenuation levels will simplify the selection of sub racks for the user. Test setup: The first measurement E1 is without the enclosure. The next measurement E2 is made with the transmitting antenna installed inside the enclosure. The difference between the received signal without and with the enclosure represents the shielding effectiveness in dB.

Performance Level	30-230 MHz	230-1000 MHz	1000-2000 MHz
1 / Elma: basic level	20 dB	10 dB	0 dB
2 / Elma: advanced level	40 dB	30 dB	20 dB
3 / Elma: superior level	60 dB	50 dB	40 dB

Note: Throughout the catalogue we put all EMC parts in a yellow table.

1: Front Panels for Sub Racks and Enclosures

1.2.1 EMC Filler Panel with EMC Gasket

- High stability (U-profile)
- Extruded aluminium
- Pressed-in centring pin and bushes M2.5
- Front side clear anodised, rear side conductive
- **Scope of delivery:**
 - EMC front panel incl. pressed-in centering pin and bushes M2.5
- EMC-gasket see below
- Front panel screw see below



1.2.1 EMC Front Panel

Width	Part-No. 3 U	Part-No. 4 U	Part-No. 6 U
4 HP	66-514-73	66-514-74	66-514-76
5 HP	66-515-73	-	66-515-76
6 HP	66-516-73	66-516-74	66-516-76
8 HP	66-518-73	66-518-74	66-518-76
9 HP	66-519-73	-	66-519-76
10 HP	66-520-73	-	66-520-76
12 HP	66-522-73	-	66-522-76
14 HP	66-534-73	-	66-534-76

1.2.1.1 EMC Gasket (Stainless Steel)

Height	Part-No.
3 U	81-062-03
4 U	81-062-04
6 U	81-062-06

1.2.1.2 Front Panel Screws

- Front panel width up to 8 HP = 2 screws; ≥ 9 HP = 4 screws

Description	Part-No.
Torx screw, M2.5 x 11.3, size T8	5443-08
Rounded head screw, cross recessed M2.5 x 12.7	61-287

1.2.2 EMC Filler Panel without EMC Gasket

- Front panel standard, solid
- Front clear anodised
- Rear conductive
- Basic level EMC
- **Scope of delivery:**
 - 1 front panel incl. press-fit bushes M2.5 (pressed-in)
- Front panel screws, see below
- Spacer see 1.2.2.2



1.2.2 EMC Filler Panel without Gasket

Width	Part-No. 3 U	Part-No. 4 U	Part-No. 6 U
4 HP	21B304	-	-
10 HP	21B310	-	-
12 HP	21B312	-	-
16 HP	21B316	21B416	-
21 HP	21B321	21B421	-
42 HP	21B342	21B442	21B642
63 HP	21B363	21B463	-
84 HP	21B384	21B484	21B684

1.2.2.1 Front Panel Screws

- Front panel width up to 9 HP = 2 screws; ≥ 10 HP = 4 screws

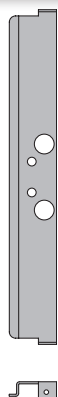
Description	Part-No.
Torx screw, M2.5 x 11.3, size T8	5443-08
Rounded head screw, cross recessed M2.5 x 12.7	61-287

1: Front Panels for Sub Racks and Enclosures

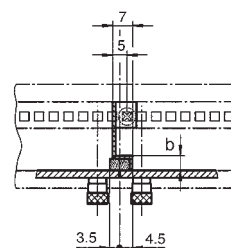
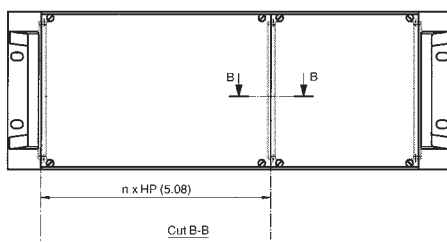
1.2.2.2 Spacer for EMC Front Panel Flat

- EMC-Level: Advanced
- **Scope of delivery:**
 - 1 spacer incl. gasket
 - 2 Torx sheet metal screws 2.9 x 6.5; size T 10

Height	Part-No.
3 U	81K023
4 U	81K024
7 U	81K027

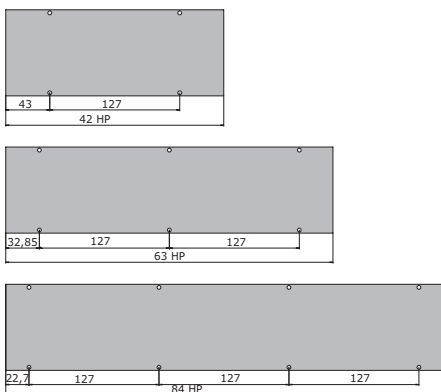


Holes in some cases needed for mounting telescopic rails



1.2.3 EMC Flat Front Panels

- Aluminium 2.5 mm (conductive)
- Closes the front or rear of the sub rack with very high shielding effectiveness
- Contact between the flat front panel and the case is made via EMC gaskets



1.2.3 Advanced EMC Level

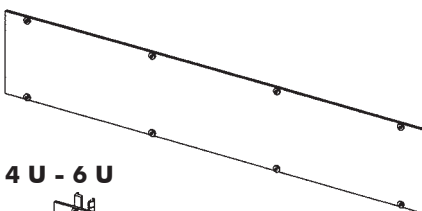
- **Scope of delivery:**
 - EMC flat front panel
 - Contact angle, incl. screws (4 + 6 U version only)
 - EMC gasket for contact angle (4 + 6 U version only)
- Front panel screws see below
 - Front panel width 42 HP = 4 screws
 - Front panel width 63 HP = 6 screws
 - Front panel width 84 HP = 8 screws

Width	Part-No. 1 U	Part-No. 2 U	Part-No. 3 U	Part-No. 4 U	Part-No. 6 U
42 HP	-	-	21C342	-	-
63 HP	-	21C263	21C363	21C463	-
84 HP	21C184	21C284	21C384	21C484	21C684

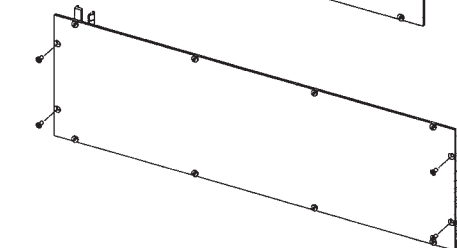
1.2.3.1 Front Panel Screws

Description	Part-No. 10 pcs.
Torx screws M2.5 x 11.3, size T8, with press-fit bush	63K480
Screw recessed M2.5 x 11.3, with press-fit bush	63-444
Screw cross recessed M2.5 x 12.7, with press-fit bush	63-480

1 U - 3 U



4 U - 6 U



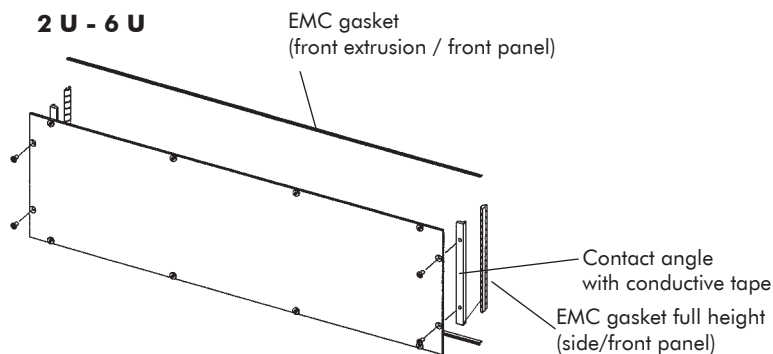
Contact angle

EMC gasket partial (side/front panel)

1: Front Panels for Sub Racks and Enclosures

1.2.4 Superior EMC Level

- **Scope of delivery:**
 - EMC flat front panel
 - Contact angle, incl. screws
 - EMC gasket for contact angle
 - EMC gasket for front extrusion/front panel
- Front panel screws, see below
 - Front panel width 42 HP = 4 screws
 - Front panel width 63 HP = 6 screws
 - Front panel width 84 HP = 8 screws



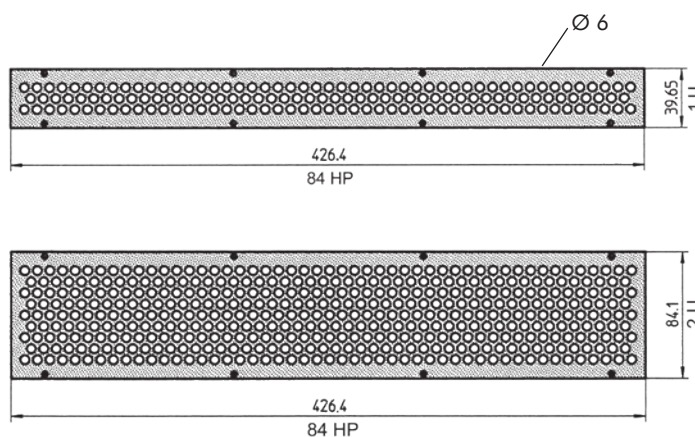
Width	Part-No. 2 U	Part-No. 3 U	Part-No. 4 U	Part-No. 6 U
84 HP	21D284	21D384	21D484	21D684

1.2.4.1 Front Panel Screws

Description	Part-No. 10 pcs.
Torx screws M2.5 x 11.3, size T8, with press-fit bush	63K480
Screw recessed M2.5 x 11.3, with press-fit bush	63-444
Screw cross recessed M2.5 x 12.7, with press-fit bush	63-480

1.2.5 Perforated EMC Front Panel 84 HP

- Front anodised, rear conductive
- Advanced EMC level
- Width: 84 HP
- **Scope of delivery:**
 - Perforated flat front panel
- Front panel screws see below
- On-off switch see below



1.2.5 Perforated EMC Front Panel 84 HP

Height			Air Passage	Switch Opening Part-No. without
1 U	39.65 mm	1.56"	4'100 mm ²	21C184-01
2 U	84.1 mm	3.31"	12'300/11'700 mm ²	21C284-01

1.2.5.1 Front Panel Screws

Description	Part-No. 10 pcs.
Torx screws M2.5 x 11.3, size T8, with press-fit bush	63K480
Screws recessed M2.5 x 11.3, with press-fit bush	63-444
Screws cross recessed M2.5 x 12.7, with press-fit bush	63-480



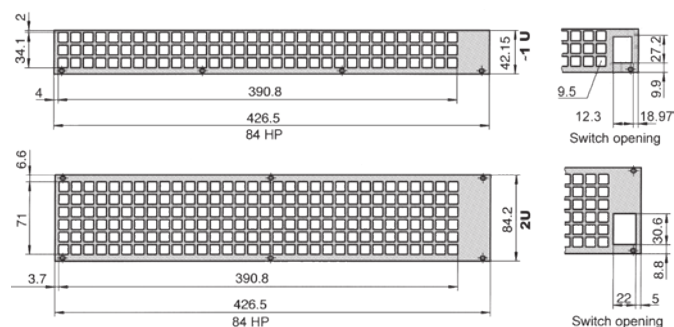
1: Front Panels for Sub Racks and Enclosures



1.3 Fan Front Panels

1.3.1 Fan Front Panel 84 HP for Vertical Ventilation

- Fan front panels are flat, perforated and designed to ensure an optimum air flow rate
- Available with or without switch cut-out (switch opening 1 U = 12.3 x 27.2 mm / 2 U = 22 x 30.6 mm)
- Aluminium 2.5 mm, clear anodised (non-conductive)
- **Scope of delivery:**
 - 1 perforated fan front panel
- Front panel screws see below
- On-off switch see below



1.3.1 Fan Front Panel 84 HP for Vertical Ventilation

Description	Height	Air passage		Part-No.
		mm ²	sq. inch	
Without switch opening	~ 1 U	8664	13.42	21N084-01
With switch opening	~ 1 U	8664	13.42	21N084-02
Without switch opening	2 U	17328	26.85	21N284-01
With switch opening	2 U	17328	26.85	21N284-02

1.3.1.1 Front Panel Screws

- Set of 10 screws
- With screw retainer
- Fan front panel ~1 U = 4 screws; 2 U = 6 screws

Description	Part-No. 10 pcs.
Torx screws M2.5 x 11.3 , size T8, with plastic screw retainer	63K159
Rounded head screws recessed M2.5 x 11.3, with plastic screw retainer	63-159

1.3.1.2 On-Off Switch

- Black body, plastic
- 2 pole
- 250V, 16A
- Quick-connect terminal 6.3 x 0.8 mm
- Cut-out for 4426-00: 22 x 30.6 mm (0.87" x 1.20")
- Cut-out others: 12.3 x 27.2 mm (0.48 x 1.07")

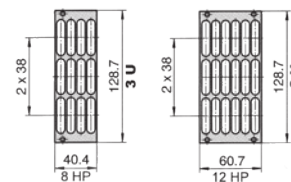
Description	Part-No.
On-off switch, indicator light green	69-410-04
On-off switch, without signal light	69-410-09



1: Front Panels for Sub Racks and Enclosures

1.3.2 Fan Front Panel for Horizontal Ventilation

- Aluminium 2.5 mm, clear anodised (non-conductive)
- Scope of delivery:**
 - 1 perforated fan front panel
- Front panel screws see below



1.3.2 Fan Front Panel for Horizontal Ventilation

Height	Width	Air passage		Part-No.
		mm ²	sq. inch	
3 U	8 HP	3195	4.95	21N308-01
	12 HP	4793	7.42	21N312-01

1.3.2.1 Front Panel Screws

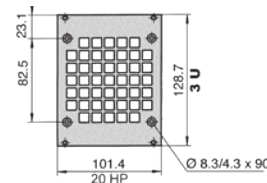
- Set of 10 screws
- With screw retainer
- Fan front panel width up to 8 HP = 2 screws; ≥ 12 HP = 4 screws

Description	Part-No.
Torx screws M2.5 x 11.3 , size T8, with plastic screw retainer	63K159
Rounded head screws recessed M2.5 x 11.3, with plastic screw retainer	63-159



1.3.3 Fan Front Panels for Direct Fan Mounting

- Aluminium 2.5 mm, clear anodised (non-conductive)
- Scope of delivery:**
 - 1 perforated fan front panel
- Front panel screws see below
- Assembly material for fan mounting has to be ordered separately



1.3.3 Fan Front Panels for Direct Fan Mounting

Description	Height	Width	Air passage		Part-No.
			mm ²	sq. inch	
Without switch opening	3 U	20 HP	4051	6.27	21N320-04

1.3.3.1 Front Panel Screws

- Set of 10 screws
- With screw retainer
- Per front panel 4 screws are needed

Description	Part-No.
Torx screws M2.5 x 11.3 , size T8, with plastic screw retainer	63K159
Rounded head screws recessed M2.5 x 11.3, with plastic screw retainer	63-159

1.3.3.2 Assembly Material for Fan Mounting

Description	Part-No.
Countersunk screw, recessed M4 x 10	5342-10
Hexagonal nut M4, 0.8D	5620-51
Countersunk self-tapping screw cross.recessed, 13 mm	5441-55



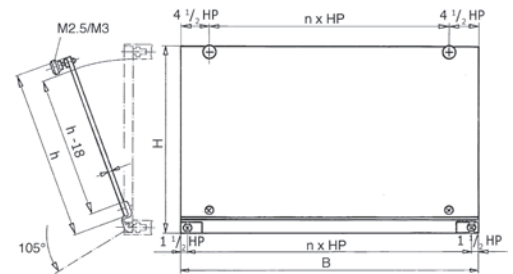
1: Front Panels for Sub Racks and Enclosures



1.4 Hinged Front Panels

1.4.1 Top / Bottom-Hinged Front Panel

- Hinges are attached to the front extrusions of the sub rack or case
- Aluminium 2.5 mm, clear anodised (non-conductive)
- **Scope of delivery:**
 - Front panel
 - Hinge extrusion
 - Assembly material M2.5, incl. hinges



1.4.1 Top/Bottom-Hinged Front Panel

Width	Part-No. 3 U	Part-No. 4 U	Part-No. 6 U
84 HP	25N384-19	25N484-19	25N684-19

Dimensions

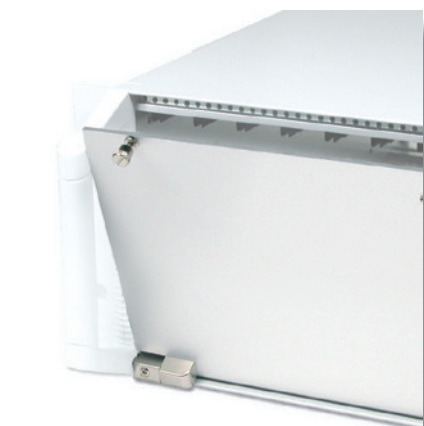
Nominal Width			Width B	
HP	mm	inch	mm	inch
84 HP	426.72	16.80	426.5	16.79

Nominal Height		Height H		Height h	
U	mm	inch	mm	inch	inch
3 U	128.7	5.07	117	4.61	
4 U	173.15	6.81	161.4	6.35	
6 U	262.05	10.31	250.3	9.85	

1: Front Panels for Sub Racks and Enclosures

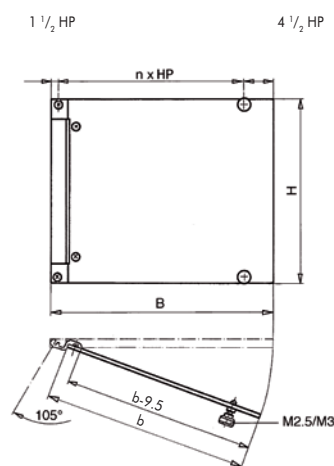
1.4.2 EMC Top / Bottom-Hinged Front Panel

- Width: 84 HP
- Offers optimum protection from electromagnetic interference
- Aluminium 2.5 mm, front anodised, rear conductive
- **Scope of delivery:**
 - EMC front panel
 - Hinge extrusions
 - Assembly material M2.5, incl. hinges
 - EMC gaskets



1.4.2 EMC Top / Bottom-Hinged Front Panel

EMC Level	Part-No. 3 U	Part-No. 6 U
Advanced	25C384-11	-
Superior	-	25D684-11



1.4.3 Side-Hinged Front Panel

- Aluminium 2.5 mm, clear anodised (non-conductive)
- **Scope of delivery:**
 - Front panel
 - Hinge extrusion
 - Assembly material M2.5, incl. hinges



1.4.3 Side-Hinged Front Panel

Width	Part-No. 3 U	Part-No. 6 U
84 HP	25N384-29	25N684-29

Other widths and heights available on request

Dimensions

Nominal Width			Width B		Width b	
HP	mm	inch	mm	inch	mm	inch
84 HP	426.72	16.80	426.5	16.79	414.3	16.31

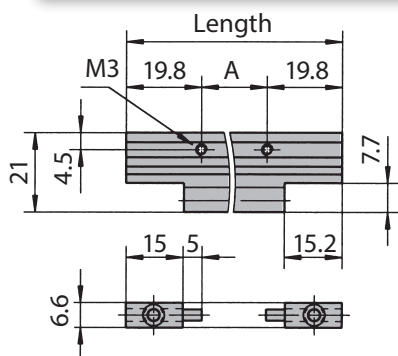
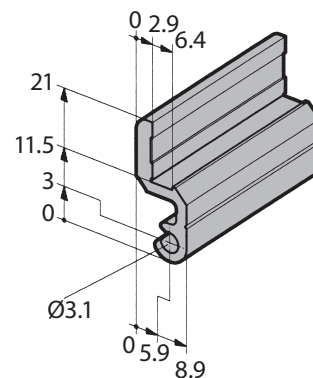
Nominal Height	Height H	
U	mm	inch
3 U	128.7	5.06
6 U	262.05	10.31

Use Elma's front panel service for machining and screen printing of your panels!

1: Front Panels for Sub Racks and Enclosures

1.4.4 Accessories

- To build up customised hinged front panels

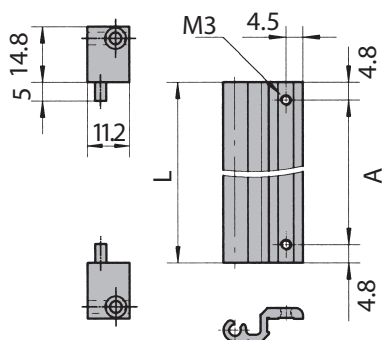


1.4.4.1 Hinge Extrusions for Top/Bottom-Hinged Front Panels

Width	A mm	A inch	L mm	L inch	Part-No.
42 HP	172.9	6.80	212.5	8.36	66-230-27
63 HP	279.5	11.00	319.1	12.56	66-230-28
84 HP	386.2	15.20	425.8	16.76	66-230-26

1.4.4.2 Assembly Material incl. Hinge Parts for Top/Bottom-Hinged Front Panels

Description	Part-No.
Incl. screws, tapped strips, nuts in thread M2.5	81-124



1.4.4.3 Hinge Extrusions for Side-Hinged Front Panels

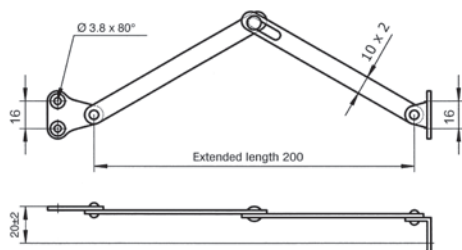
Height	A mm	A inch	L mm	L inch	Part-No.
3 U	89.1	3.50	98.7	3.88	66-230-33
4 U	133.6	5.26	143.2	5.63	66-230-34
6 U	222.5	8.76	232.1	9.13	66-230-36
7 U	266.9	10.50	276.5	10.88	66-230-37

1.4.4.4 Assembly Material incl. Hinge Parts for Side-Hinged Front Panels

Description	Part-No.
Incl. screws, tapped strips, nuts in thread M2.5	81-125

1.4.4.5 Panel Stay

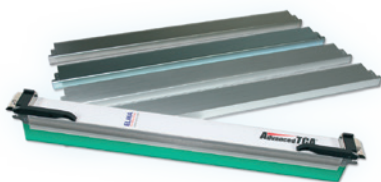
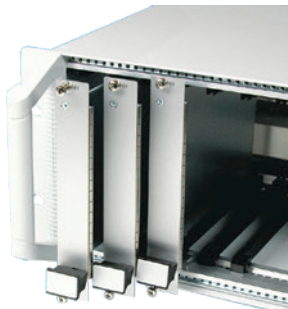
- Scope of delivery:
 - 2 pcs. panel stay
 - Assembly material



Description	Part-No.
Set of panel stay complete	63-242

2: Front Panels for Plug-In Units

C



2.1 Plug-In Units acc. to IEC C | 2_3

2.1.1 Extruded Front Panel	C 2_3
2.1.2 Front Panel with Cutout for IEC Ejector Handle	C 2_5

2.2 EMC Plug-In Units acc. to IEC C | 2_6

2.2.1 EMC Filler Panel without Openings	C 2_6
2.2.2 EMC Front Panels for IEC Plug-In Units with Cutout for Ejector Handle acc. to IEC	C 2_7

2.3 Plug-In Units acc. to IEEE C | 2_10

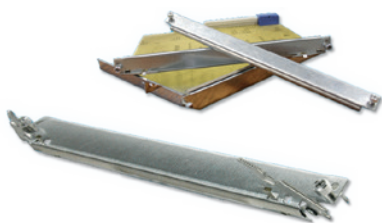
2.3.1 EMC Front Panels Aluminium with EMC Gasket acc. IEEE	C 2_10
2.3.2 Injector/Ejector Handles acc. to IEEE	C 2_12
2.3.3 Card Holder and Coding Pins acc. to IEEE	C 2_13

2.4 Plug-In Units acc. to VPX C | 2_14

2.5 Plug-In Units "Ergonomic" acc. to AdvancedTCA C | 2_15

2.5.1 EMC ATCA Front Panels "Ergonomic"	C 2_15
2.5.2 EMC Front Panel 8 U x 6 HP Aluminium	C 2_16
2.5.3 ATCA Ergonomic Handle	C 2_16
2.5.4 Microswitch for Injector/Ejector Handle	C 2_16
2.5.5 EMC-Gasket	C 2_16
2.5.6 Cutouts for ATCA Ergonomic Handle without Switching Nose	C 2_17
2.5.7 Cutouts for ATCA Ergonomic Handle with Switching Nose	C 2_17

2: Front Panels for Plug-In Units



2.6 Plug-In Units "Classic" acc. to AdvancedTCA

C | 2_18

2.6.1 Plug-In Units "Classic"

C | 2_18

2.6.2 Filler Panel

C | 2_18

2.6.3 Handle Set acc. to ATCA

C | 2_19

2.6.4 Captive Screw M3 and Latch Spring Clip

C | 2_19

2.6.5 EMC-Gasket

C | 2_19

2.6.6 Microswitch for Injector/Ejector Handle

C | 2_19



2.7 PMC Mezzanine Front Panels

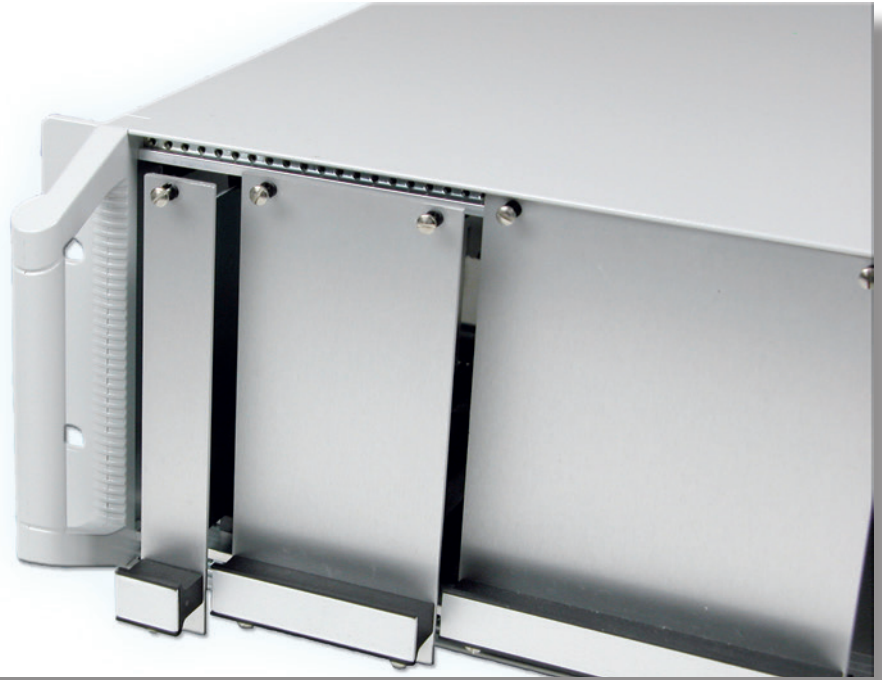
C | 2_21



2.8 FMC Mezzanine Front Panels

C | 2_22

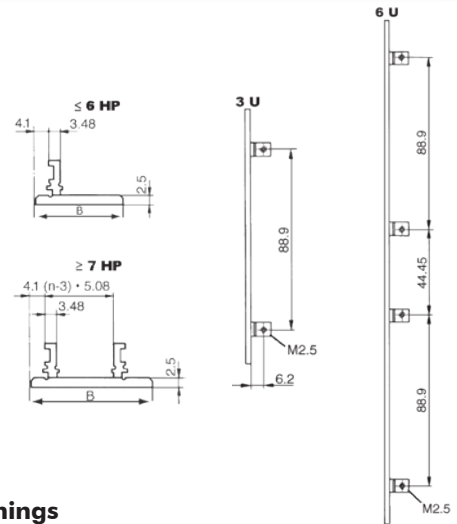
2: Front Panels for Plug-In Units



2.1 Plug-In Units acc. to IEC

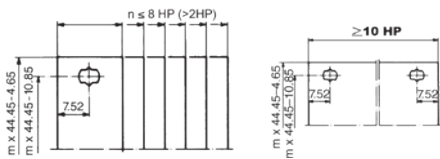
2.1.1 Extruded Front Panel

- Aluminium 2.5 mm, clear anodised (non-conductive)
- PCB mounting lugs are formed on the rear face of the panel
- No PCB fixing screws on the front face of the panel, leaving more space for silk screening and mounting front panel components
- Suitable for all sub racks and cases
- Thickness of the mounting lugs (3.48 mm) allows PCBs to be mounted on either side of the lugs
- Drill marks at rear for handle-fixing holes
- **Scope of delivery:**
 - Extruded front panel, clear anodised
- Front panel screws see below



2.1.1 Extruded Front Panels, without Openings

Width	B		Part-No. 3 U	Part-No. 6 U
	mm	inch		
3 HP	15.0	0.59	26N303	26N603
4 HP	20.1	0.79	26N304	26N604
5 HP	25.2	0.99	26N305	26N605
6 HP	30.3	1.19	26N306	26N606
7 HP	35.3	1.38	26N307	26N607
8 HP	40.4	1.59	26N308	26N608
10 HP	50.6	1.99	26N310	26N610
12 HP	60.7	2.38	26N312	26N612
14 HP	70.9	2.79	26N314	26N614
16 HP	81.1	3.19	26N316	26N616
21 HP	106.5	4.19	26N321	-



2.1.1.1 Front Panel Screws

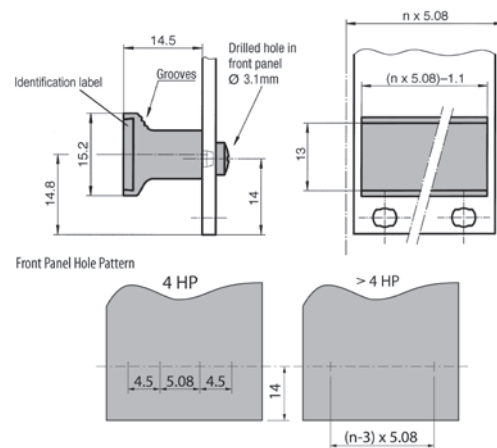
- Set of 10 screws
- With screw retainer
- Front panel width up to 9 HP = 2 screws; ≥ 10 HP = 4 screws

Description	Part-No. 10 pcs.
Torx screws M2.5 x 11.3 , size T8, with plastic screw retainer	63K159
Rounded head screws recessed M2.5 x 11.3, with plastic screw retainer	63-159

2: Front Panels for Plug-In Units

2.1.1.2 Rigid-Mounted Unit Handles with Identification Label

- Black, plastic UL94 V-0, label aluminium anodised
- **Scope of delivery:**
 - Rigid-mounted handle
 - Identification label
- Assembly material see below



2.1.1.2 Rigid-Mounted Handle with Identification Label

Width	Scope of Delivery	Part-No.
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

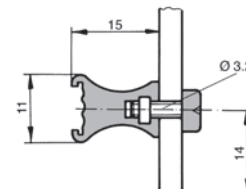
- Other sizes (up to 84 HP) are available upon request

Assembly Material

Description	Part-No.
Cross recessed rounded head screw	61-276

2.1.1.3 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



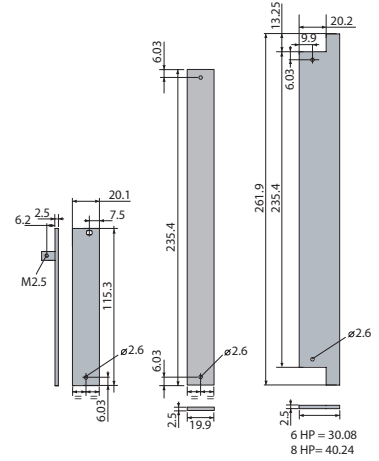
2.1.1.3 Fluted Handles for Front Panels to IEC

Front Panel Width HP	Width		Handle Length		Part-No.
	mm	inch	mm	inch	
3 HP	15.0	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	40.4	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
21 HP	106.5	4.18	104.6	4.11	60-121
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

2: Front Panels for Plug-In Units

2.1.2 Front Panel with Cutout for IEC Ejector Handle

- Aluminium 2.5 mm, clear anodised (non-conductive)
- PCB mounting lugs are formed on the rear face of the panel (only 3 U-Version)
- No PCB fixing screws on the front face of the panel, leaving more space for silk screening and mounting front panel components
- Suitable for all sub racks and cases
- 3 U front panels prepared for one handle
- 6 U front panels prepared for two handles
- **Scope of delivery:**
 - Front panel, clear anodised
- Front panel screws see 2.1.2.1 (for 3 U-Version only)
- IEC ejector handles, see 2.1.2.2



2.1.2 Front Panel with Cutout for IEC Ejector Handle

Width	B		Part-No. 3 U	Part-No. 6 U
	mm	inch		
4 HP	20.0	0.79	26N304-51	21N604-51
6 HP	30.2	1.19		21N606-51
8 HP	40.3	1.59		21N608-51

2.1.2.1 Front Panel Screws (for 3 U-Version only)

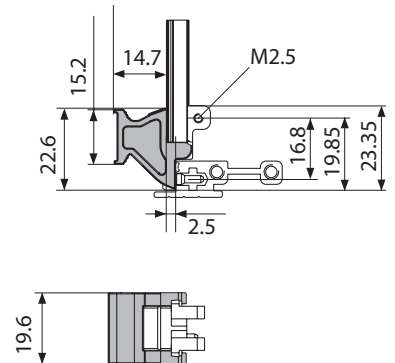
- Set of 10 screws
- With screw retainer
- Front panel 3 U = 1 screw

Description	Part-No. 10 pcs.
Torx screws M2.5 x 11.3, size T8, with plastic screw retainer	63K159
Rounded head screws recessed M2.5 x 11.3, with plastic screw retainer	63-159



2.1.2.2 Ergonomic Ejector Handles acc. to IEC

- Simple assembly of plug-in units
- Allows trouble-free extraction of electronic units with multi-pole connectors
- Main features in one part: card holder, ejector handle and centring pin
- Reset spring for safe insertion
- One version for top and bottom only
- Handle is injection moulded, glass-reinforced plastic, UL94 V-0
- Card holder is zinc die-cast, nickel plated
- Reset spring is stainless steel
- **Scope of delivery:**
 - Ejector handle
 - Assembly material (cross recessed screws M2.5 for fixing of card holder/printed board/front panel)
- Front panel with special cutouts have to be ordered separately

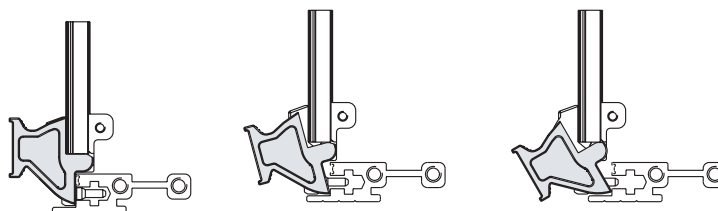


2.1.2.2 Ejector Handle acc. to IEC

Description	Part-No.
Ejector handle black	81-233
Ejector handle grey	81-234

Extraction process:

Rest position Extraction End position



Label

Description	Part-No.
1 sheet A4 of 220 labels	81-031



2: Front Panels for Plug-In Units



2.2 EMC Plug-In Units acc. to IEC

2.2.1 EMC Filler Panel without Openings

- Excellent EMC shielding
- Made of aluminium extrusions
- Rear side: conductive surface finish (clear passivated)
- Used in the assembly of plug-in units
- The EMC-gasket is integrated into the front panel profile to protect it from damage
- A pressfit centering pin guarantees optimum positioning of the panel as well as the right pressure between the contact strip and the next panel

2.2.1 EMC Filler Panel without Openings

- High stability
- Extruded aluminium
- Pressed-in centering pin and bushes M2.5
- Front side clear anodised, rear side conductive
- **Scope of delivery:**
 - EMC front panel, incl. pressed-in centering pin and bushes M2.5
- EMC-gasket see below
- Front panel screw see below
- Handles and card holders cannot be fitted with this type of front panel



Width	Part-No. 3 U	Part-No. 6 U
4 HP	66-514-73	66-514-76
6 HP	66-516-73	66-516-76
8 HP	66-518-73	66-518-76

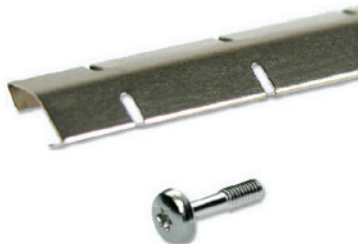
2.2.1.1 EMC Gasket (Stainless Steel)

Height	Part-No.
3 U	81-062-03
6 U	81-062-06

2.2.1.2 Front Panel Screws

- Front panel width up to 8 HP = 2 screws

Description	Part-No.
Torx screw, M2.5 x 11.3, size T8	5443-08
Rounded head screw, cross recessed M2.5 x 12.7	61-287



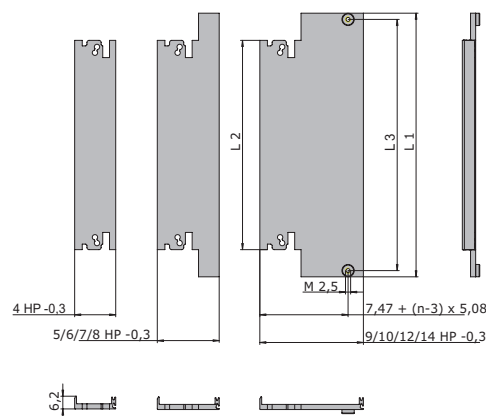
Use Elma's front panel service for machining and screen printing of your panels!

2: Front Panels for Plug-In Units

2.2.2 EMC Front Panels for IEC Plug-In Units with Cutout for Ejector Handle acc. to IEC

EMC Front Panels Aluminium with EMC Gasket

- Excellent EMC shielding
- Immune to snagging
- EMC-gasket slid onto the extrusion
- **Scope of delivery:**
 - EMC front panel, incl. pressed-in bushes M2.5 (size \geq 9 HP)
- EMC-gasket see 2.2.2.4
- Handle has to be ordered separately, see 2.2.2.6
- Front panel screw (size \geq 10 HP), see 2.2.2.5



2.2.2.1 Front Anodised, Rear Conductive (2 cutouts)

- With 2 cutouts (bottom + top)

Width	Part-No. 3 U	Part-No. 6 U	Part-No. 9 U
4 HP	66-514-23	66-514-26	66-514-29
5 HP	66-515-23	66-515-26	-
6 HP	66-516-23	66-516-26	66-516-29
7 HP	66-517-23	66-517-26	-
8 HP	66-518-23	66-518-26	66-518-29
9 HP	66-519-23	66-519-26	-
10 HP	66-520-23	66-520-26	66-520-29
12 HP	66-522-23	66-522-26	-
14 HP	66-534-23	66-534-26	-

2.2.2.2 Front Anodised, Rear Conductive (1 cutout)

- With 1 cutout (bottom)
- Incl. pressed-in centring pin and bush M2.5 (top)
- Incl. cutout for mounting of card holder 61-156 (top) with screw 5322-08 (see 2.2.2.7)

Width	Part-No. 3 U
4 HP	66-514-43
5 HP	66-515-43
6 HP	66-516-43
8 HP	66-518-43
10 HP	66-520-43
12 HP	66-522-43
14 HP	66-534-43



Dimensions

Height	L1 mm	L1 inch	L2 mm	L2 inch	L3 mm	L3 inch
3 U	128.55	5.06	102.05	4.01	122.50	4.82
6 U	261.90	10.31	235.40	9.27	255.85	10.07
9 U	395.25	15.56	368.75	14.51	389.20	15.32

2: Front Panels for Plug-In Units

2.2.2.4 EMC-Gasket (Stainless Steel)

Unit	Part-No. 3 U	Part-No. 6 U	Part-No. 9 U
1 pc.	81-062-03	81-062-06	81-062-09

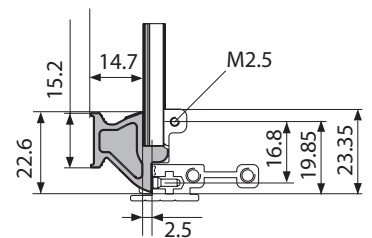
2.2.2.5 Front Panel Screw

- For EMC front panels size ≥ 9 HP = 2 additional screws are needed

Description	Part-No.
Cross recessed rounded head screws M2.5 x 12.7	61-287
Torx screws M2.5 x 11.3, size T8	5443-08

2.2.2.6 Ergonomic Ejector Handles acc. to IEC

- Simple assembly of plug-in units
- Allows trouble-free extraction of electronic units with multi-pole connectors
- Main features in one part: card holder, ejector handle and centring pin
- Reset spring for safe insertion
- One version for top and bottom only
- Handle is injection moulded, glass-reinforced plastic, UL94 V-0
- Card holder is zinc die-cast, nickel plated
- Reset spring is stainless steel
- Scope of delivery:**
 - Ejector handle
 - Assembly material (cross recessed screws M2.5 for fixing of card holder/printed board/front panel)
- Front panel with special cutouts have to be ordered separately



2.2.2.6 Ejector Handle acc. to IEC

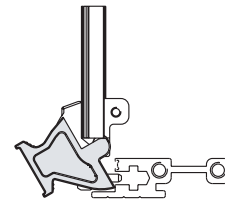
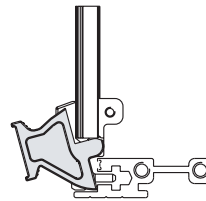
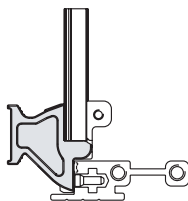
Description	Part-No.
Ejector handle black	81-233
Ejector handle grey	81-234

Extraction process:

Rest position

Extraction

End position



Label

Description	Part-No.
1 sheet A4 of 220 labels	81-031

2: Front Panels for Plug-In Units

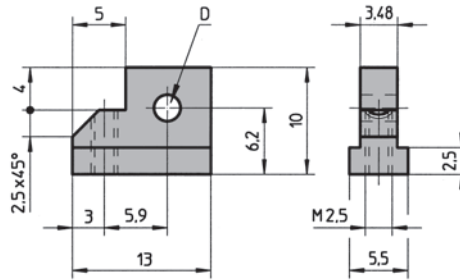
2.2.2.7 Card Holder acc. to IEC Standard

- By using the zinc die-cast card holder, flat front panels and EMC front panels acc. to IEC can be connected to a PC card to form a plug-in unit
- The card can be mounted both in the standard position and offset 1 HP (5.08 mm)
- **Scope of delivery:**
 - Card holder
- Assembly material see below



2.2.2.7 Card Holder without Swivel Stop

Description	Application	D	Part-No.
Card holder without swivel stop	Without injector / ejector handle	M2.5	61-156



Assembly Material

Description	Application	Part-No.
Cross recessed countersunk screw M2.5 x 8	For card holder	5322-08
Torx countersunk screw M2.5 x 8, size T8	For card holder	5470-21
Slotted pan head screw M2.5 x 6	For printed board	5571-06
Torx cylinder head screw M2.5 x 6, size T8	For printed board	5470-04



2.2.2.8 Card Holder/End Piece without ESD Pin

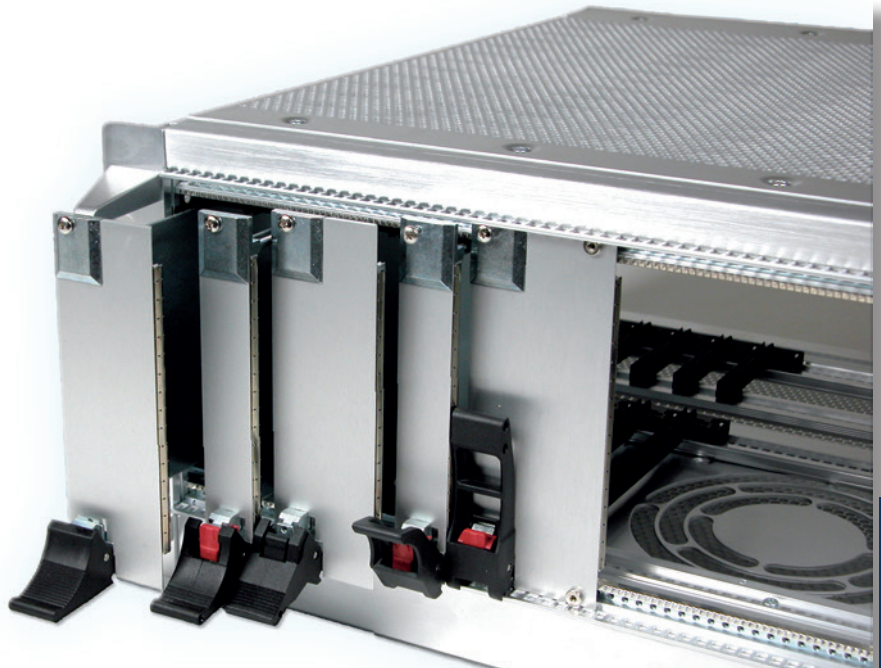
- **Scope of delivery:**
 - End piece card holder (zinc die-cast, nickel plated)
 - Assembly material (screws M2.5 for fixing of front panel/card holder/printed board)



Card Holder/End Piece without ESD Pin

Description	Part-No.
Top	81-018-01
Bottom	81-019-01

2: Front Panels for Plug-In Units



2.3 Plug-In Units acc. to IEEE

2.3.1 EMC Front Panels Aluminium with EMC Gasket acc. IEEE

- Excellent EMC shielding
- Immune to snagging
- EMC-gasket slid onto the extrusion
- **Scope of delivery:**
 - EMC front panel, incl. press-in bushes M2.5 (size ≥ 10 HP)
- EMC-gasket see 2.3.1.1
- Handle has to be ordered separately, see 2.3.5
- Front panel screw (size ≥ 10 HP), see 2.3.1.2

2.3.1.1 Front Anodised, Rear Conductive (2 cutouts)

- With 2 cutouts (bottom + top)

Width	Part-No. 3 U	Part-No. 6 U
4 HP	66-514-23	66-514-26
5 HP	66-515-23	66-515-26
6 HP	66-516-23	66-516-26
7 HP	66-517-23	66-517-26
8 HP	66-518-23	66-518-26
9 HP	66-519-23	66-519-26
10 HP	66-520-23	66-520-26
12 HP	66-522-23	66-522-26
14 HP	66-534-23	66-534-26

2.3.1.2 Front Anodised, Rear Conductive (1 cutout)

- With 1 cutout (bottom)
- Incl. pressed-in centring pin and bush M2.5 (top)
- Incl. cutout for mounting of card holder 61-156 (top) with screw 5322-08

Width	Part-No. 3 U
4 HP	66-514-43
5 HP	66-515-43
6 HP	66-516-43
8 HP	66-518-43
10 HP	66-520-43
12 HP	66-522-43
14 HP	66-534-43



2: Front Panels for Plug-In Units

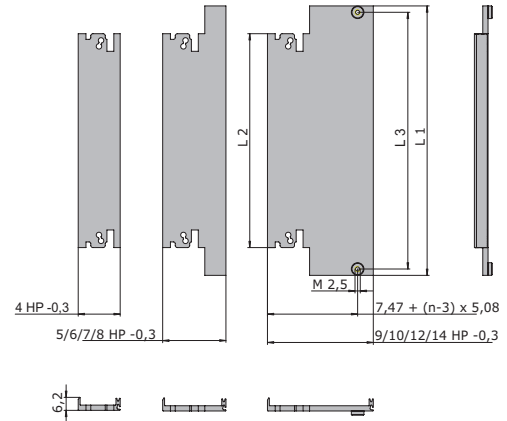
EMC-Gasket (Stainless Steel)

Unit	Part-No. 3 U	Part-No. 6 U
1 pc.	81-062-03	81-062-06

Front Panel Screw

- For EMC front panels size ≥ 9 HP = 2 additional screws are needed

Description	Part-No.
Cross recessed rounded head screws M2.5 x 12.7	61-287
Torx screws M2.5 x 11.3, size T8	5443-08



Dimensions

Height	L1 mm	L1 inch	L2 mm	L2 inch	L3 mm	L3 inch
3 U	128.55	5.06	102.05	4.01	122.50	4.82
6 U	261.90	10.31	235.40	9.27	255.85	10.07

2: Front Panels for Plug-In Units



2.3.2 Injector/Ejector Handles acc. to IEEE

Type			Mounting	ESD Pin	Colour	Part-No.
Ergonomic			Bottom	With ESD-pin	Black	81-076
Ergonomic			Top	With ESD-pin	Black	81-075
Ergonomic			Bottom	Without ESD-pin	Black	81-076-01
Ergonomic			Top	Without ESD-pin	Black	81-075-01
Ergonomic	Hot Swap		Bottom	With ESD-pin	Black	81-096
Ergonomic	Hot Swap		Top	With ESD-pin	Black	81-095
Ergonomic	Hot Swap		Bottom	Without ESD-pin	Black	81-096-01
Ergonomic	Hot Swap		Top	Without ESD-pin	Black	81-095-01
Ergonomic	Hot Swap	Offset	Bottom	With ESD-pin	Black	81-185
Ergonomic	Hot Swap	Offset	Top	With ESD-pin	Black	81-184
Classic			Bottom	With ESD-pin	Black	81-261
Classic			Top	With ESD-pin	Black	81-260
Classic		Offset	Bottom	With ESD-pin	Black	81-161
Classic		Offset	Top	With ESD-pin	Black	81-160
Classic	Hot Swap		Bottom	With ESD-pin	Black	81-256
Classic	Hot Swap		Top	With ESD-pin	Black	81-255
Classic	Hot Swap	Offset	Bottom	With ESD-pin	Black	81-156
Classic	Hot Swap	Offset	Top	With ESD-pin	Black	81-155
Telecom	Hot Swap		Bottom	With ESD-pin	Black	81-206
Telecom	Hot Swap		Top	With ESD-pin	Black	81-205
Telecom	Hot Swap		Bottom	Without ESD-pin	Black	81-206-01
Telecom	Hot Swap		Top	Without ESD-pin	Black	81-205-01
Telecom	Hot Swap	Offset	Bottom	With ESD-pin	Black	81-189
Telecom	Hot Swap	Offset	Top	With ESD-pin	Black	81-188
Telecom long	Hot Swap		Bottom	With ESD-pin	Black	81-215
Telecom long	Hot Swap		Top	With ESD-pin	Black	81-214
Telecom long	Hot Swap	Offset	Bottom	With ESD-pin	Black	81-116
Telecom long	Hot Swap	Offset	Top	With ESD-pin	Black	81-117
Microswitch						81-088-1 (10 pcs.)

For more information refer to chapter 3 "Handles".

2: Front Panels for Plug-In Units

2.3.3 Card Holder and Coding Pins acc. to IEEE

• Scope of delivery:

- End piece card holder (zinc die-cast, nickel plated)
- Assembly material (screws M2.5 for fixing of front panel/card holder/printed board)

2.3.3.1 Card Holder/End Piece with ESD Pin

Description	Part-No.
Top	81-018
Bottom	81-019

2.3.3.2 Card Holder/End Piece without ESD Pin

Description	Part-No.
Top	81-018-01
Bottom	81-019-01

2.3.3.3 Middle Part

- Usable for all front panels
- For positioning and fixing of 6 U and 9 U cards, card thickness 1.6 mm
- Material: Plastic UL94 V-0

Description	A		Part-No.
	mm	inch	
Aluminium 2.5 mm	2.5	0.10	61-960

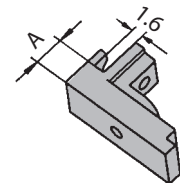
Assembly Material

Description	Part-No.
PT-countersunk, 2.5 x 6	5534-06

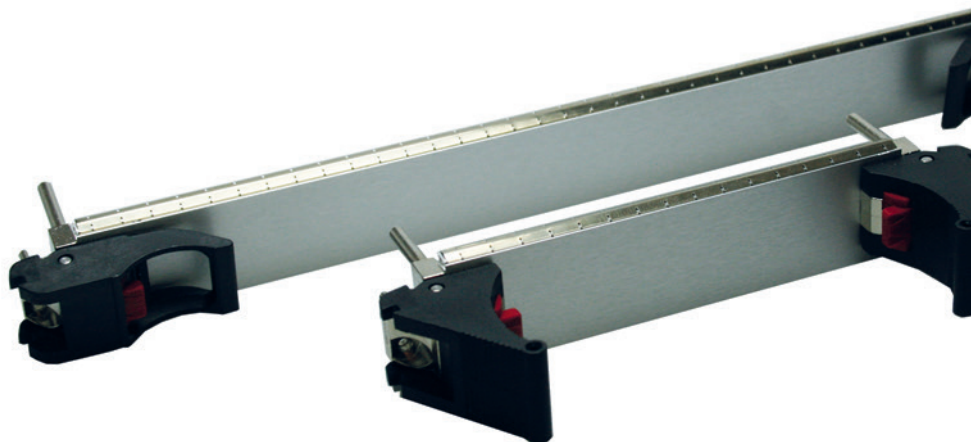
2.3.3.4 Coding Pins

- Acc. to IEC 60297-3-103
- Plastic, UL94 V-0
- Can be rotated in 4 positions

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



2: Front Panels for Plug-In Units



2.4 Plug-In Units acc. to VPX

2.4.1 EMC Front Panels Aluminium acc. VPX

- Excellent EMC shielding
 - EMC gasket can be inserted on the profile
 - In accordance with VPX specifications
 - Aluminum extrusion, anodized front, side and rear: conductive
 - Front panels with 2 cut-outs (bottom + top); 66-515-43-VPX only 1 cut-out (bottom)
- **Scope of delivery:**
 - 1 EMC front panel, aluminum
 - 66-515-43-VPX additionally 1 card holder and assembly material
 - EMC gasket and injector handles must be ordered separately
 - For more injector handles, see Elmaset, Chapter C_3

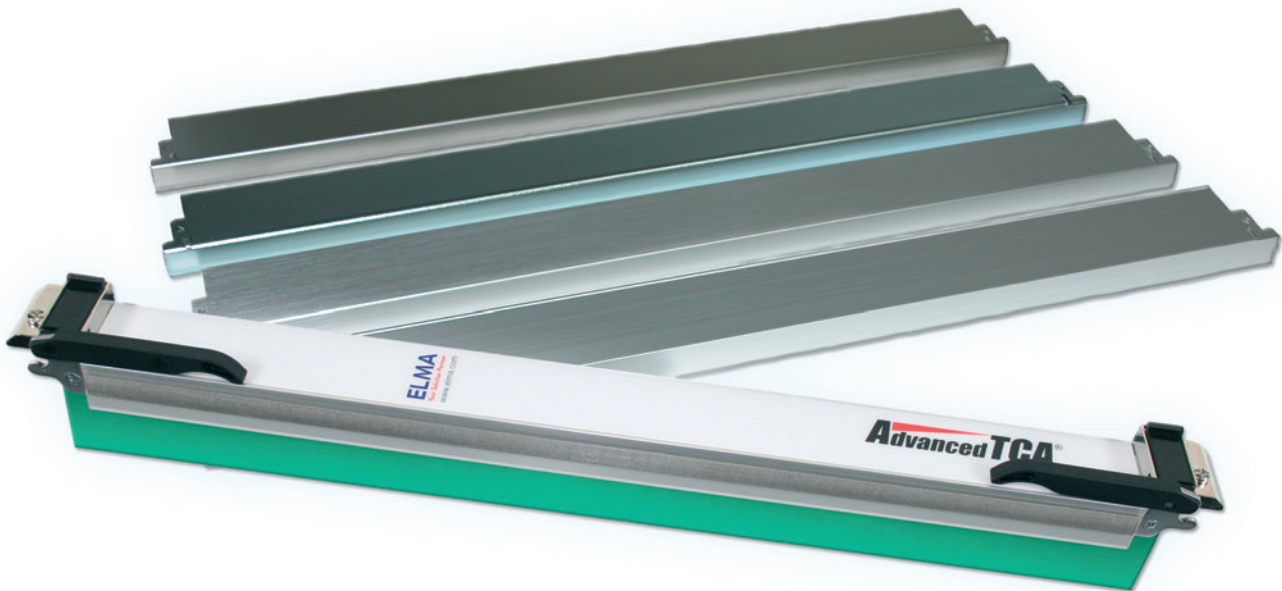


Description	Part-No. 3 U	Part-No. 3 U, 1 cut-out	Part-No. 6 U
VPX profile front panel, 5 HP	66-515-23-VPX	66-515-43-VPX	66-515-26-VPX
EMC gasket (stainless steel)	81-062-03	81-062-03	81-062-06
Ergonomic injector handle bottom	81-096	81-096	81-096
Ergonomic injector handle top	81-095	-	81-095
Telecom injector handle bottom	81-206	81-206	81-206
Telecom injector handle top	81-205	-	81-205
10 pcs. Microswitch for injector handle	81-088-1	81-088-1	81-088-1

Contact us for the mechanical processing and imprinting of your VPX front panels.

Use Elma's front panel center for the processing, coloring, digital and anodized digital aluminium printing and installation of your operating unit.

2: Front Panels for Plug-In Units



ATCA and the ATCA logo are trademarks of the PCI Industrial Computers Manufacturers Group

AdvancedTCA

- AdvancedTCA, the PICMG 3.0 family, is a new series of PICMG specifications, targeted to requirements for the next generation of carrier grade communications equipment. This series of specifications incorporates the latest trends in high speed interconnect technologies, next generation processors and improved reliability, manageability and serviceability.
- AdvancedTCA has several key features including Gigabit/Terabit per second bandwidth across each shelf, 150 - 200 W per board and 3 kilowatts per chassis power. It accommodates larger (8 U x 280 mm) boards and a 1.2 mm pitch which allows larger/taller components and more space on each board. Over 100 companies participated in developing the ATCA specification

2.5 Plug-In Units "Ergonomic" acc. to AdvancedTCA

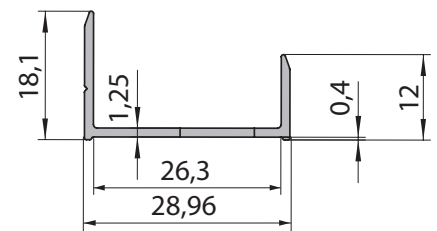
2.5.1 EMC ATCA Front Panels "Ergonomic"

- 8 U x 6 HP
- Conform to the PICMG 3.0 specification
- For boards with thicknesses of 1.6 mm to 2.4 mm
- Made for the ATCA Ergonomic handle family

2.5.1 EMC Front Panel 8 U x 6 HP Aluminium for Overlays

- Extruded aluminium
- Clear passivated
- **Scope of delivery:**
 - EMC front panel

Description	Part-No.
EMC front panel with pinhole for microswitch activation	66-535-38



2: Front Panels for Plug-In Units

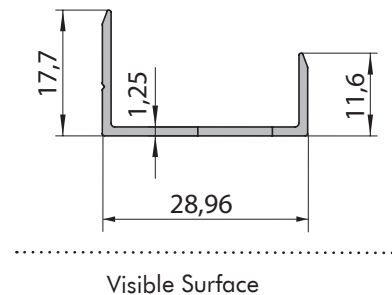
2.5.2 EMC Front Panel 8 U x 6 HP Aluminium



2.5.2 EMC Front Panel 8 U x 6 HP Aluminium

- Extruded aluminium
- Surfaces: visible part : Clear anodised
rest: Clear passivated
- **Scope of delivery:**
 - EMC front panel

Description	Part-No.
EMC front panel	66-536-28
EMC front panel with pinhole for microswitch activation	66-536-38



2.5.3 ATCA Ergonomic Handle



2.5.3 ATCA Ergonomic Handle

- Pre-assembled
- Easy assembling onto front panel and PCB
- **Scope of delivery:**
 - Handles pre assembled
 - Screws front panel assembly loose packed
 - Screws PCB mounting loose packed

Description	Part-No.
Top handle	81-300-00
Bottom handle	81-301-00
Bottom handle with pin for microswitch activation	81-301-01

2.5.4 Microswitch for Injector/Ejector Handle



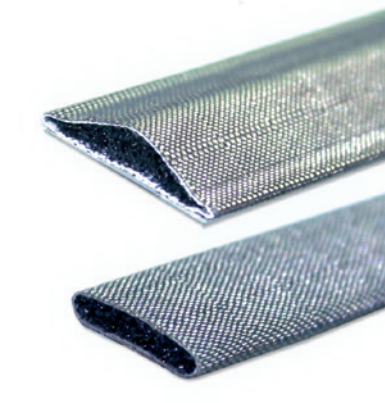
2.4.4 Microswitch for Injector/Ejector Handle

- Technical data and function see 3.5.3.1

Description	Part-No. 10 pcs.
Microswitch with pre-assembled wire cable length (25 mm)	81-088-1

Assembly material for mounting of Microswitch onto front panel acc. to ATCA, 2 pcs. 5686-05 have to be ordered separately

2.5.5 EMC-Gasket



2.4.5 EMC-Gasket

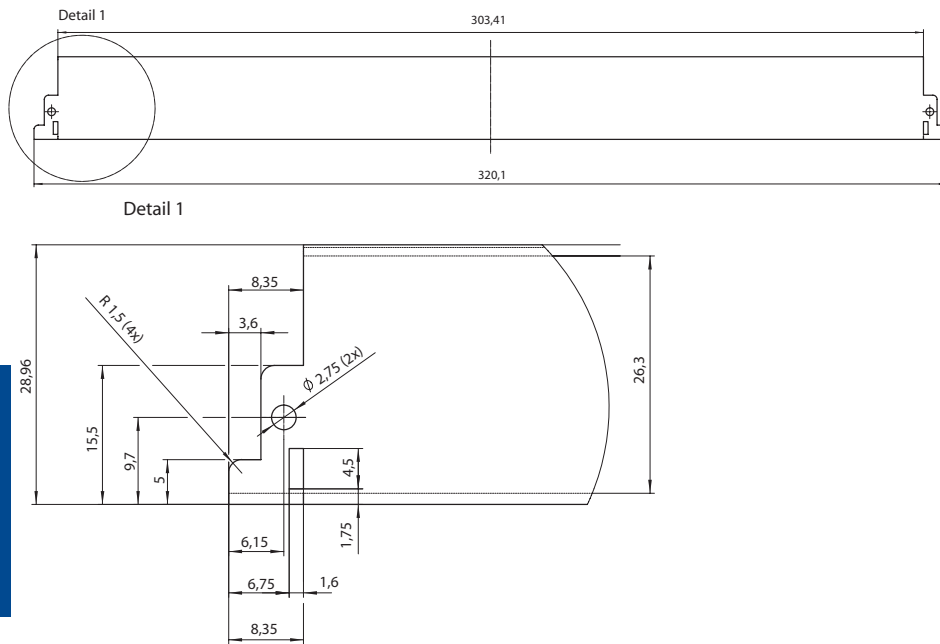
- Polyurethan foam core
- Conductive fabric (Cu + nickel plated)

Description	Part-No.
EMC-gasket triangular. 2.3 x 10 mm, L = 300 mm	7821-300
EMC-gasket triangular. 2.3 x 10 mm, L = 2000 mm	7821-2000

2: Front Panels for Plug-In Units

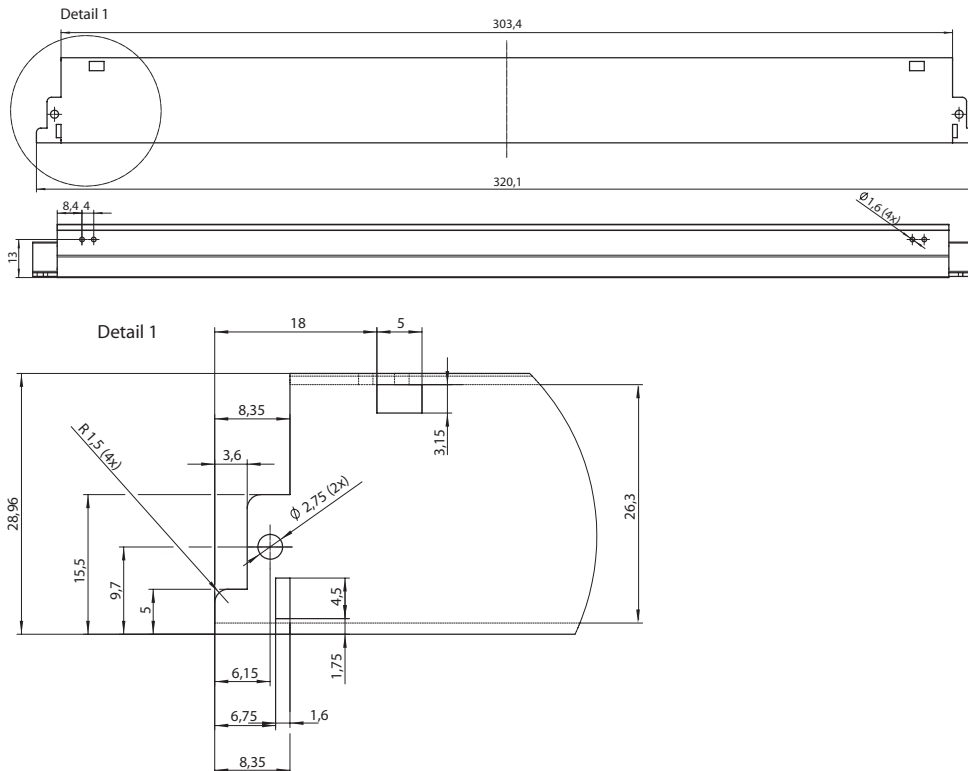
2.5.6 Cutouts for ATCA Ergonomic Handle without Switching Nose

- Microswitch 81-088 assembled to handle
- Microswitch activation through interlock (sliding button) on handle



2.5.7 Cutouts for ATCA Ergonomic Handle with Switching Nose

- Microswitch 81-088 assembled to front panel
- Microswitch activation through switching pin on lever handle



2: Front Panels for Plug-In Units

AdvancedTCA®



ATCA and the ATCA logo are trademarks of the PCI Industrial Computers Manufacturers Group

2.6 Plug-In Units "Classic" acc. to AdvancedTCA

2.6.1 Plug-In Units "Classic"

- 8 U x 6 HP with handles
- Conform to the PICMC 3.0 specification
- For boards with thicknesses of 1.6 mm to 2.4 mm

2.6.1 Front Panel 8 U x 6 HP with Handles acc. to ATCA

- **Scope of delivery:**
 - Galvanised steel front panel incl. captive screws M3
 - EMC gasket
 - Handle set



Description	Part-No.
Steel front panel with handle	12T100

2.6.2 Filler Panel

2.6.2.1 Filler Panel 8 U x 6 HP acc. to ATCA

- **Scope of delivery:**
 - Steel filler panel, incl. captive screws M3
 - EMC gasket



Description	Part-No.
Filler panel steel, incl. captive screws M3	12T102

2.6.2.2 Filler Panels with Baffle

- **Scope of delivery:**
 - Steel filler panel, incl. captive screws M3
 - EMC gasket
 - Incl. Baffles

Description	Part-No.
Filler front panel with baffles 8 U x 6 HP x 270 mm	12T120
Filler RTM panel with baffles 8 U x 6 HP x 72.5 mm	12T121

2: Front Panels for Plug-In Units

2.6.3 Handle Set acc. to ATCA



2.6.3 Handle Set acc. to ATCA

- **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

2.6.4 Captive Screw M3 and Latch Spring Clip



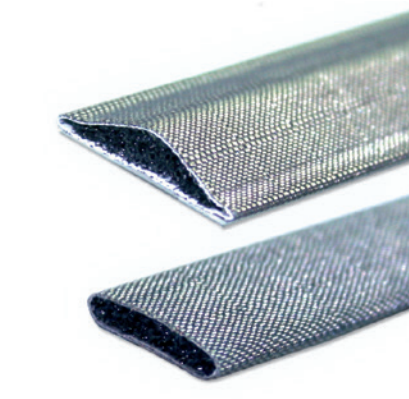
2.6.4.1 Captive Screw M3

Description	Part-No.
Screw M3 captive	12T133

2.6.4.2 Latch Spring Clip

Description	Part-No.
Latch spring	12T132

2.6.5 EMC-Gasket



2.6.5 EMC-Gasket

- Polyurethan foam core
- Conductive fabric (cu+Niplated)

Description	Part-No.
EMC-gasket triangular. 2.3 x 10 mm, L = 300 mm	7821-300
EMC-gasket triangular. 2.3 x 10 mm, L = 2000 mm	7821-2000

2.6.6 Microswitch for Injector/Ejector Handle



2.6.6 Microswitch for Injector/Ejector Handle

Technical data and function see 3.5.3.1

Description	Part-No. 10 pcs.
Microswitch with pre-assembled wire cable length (25 mm)	81-088-1

2: Front Panels for Plug-In Units

AdvancedTCA

AdvancedTCA (ATCA) stands for Advanced Telecom Computer Architecture.

ATCA is the first open industry specification for carrier grade equipment incorporating high speed switched fabric technology. ATCA systems are capable of switching and processing 2.5 terabits per second in a single shelf.

What Size are the Boards?

After lengthy deliberations, sophisticated thermal simulations, and a lot of customer feedback, PICMG 3 boards are 8 U (322.25 mm) high and 280 mm deep. This size was carefully arrived at after considering cooling, front panel space, backplane size, and rear panel I/O requirements. Boards are spaced at a 1.2" (6 HP) pitch. The wider pitch accommodates taller components like next generation CPU's with integral heat sinks, off-the-shelf memory modules, and high power DC-DC converters. The wider pitch also improves cooling as more air volume can be circulated over a card.

Elma's ATCA Products and Services

Capabilities

- Simulation
- NEBS certification
- Customisation
- 3D solid modeling
- Manufacturing
- Integration

Systems

- 2 U, 3 U, 4 U, 5 U, 12 U & 13 U
- Redundant 48VDC input (AC input options available)
- Optimised via thermal simulation studies
- IPM sentry shelf management options

Backplanes

- 2, 4, 5, 14 & 16 slots
- Dual star, mesh or replicated mesh
- Compliant to PICMG 3.0
- Optimised via signal integrity studies

Accessories

- Front panels
- Handles
- Shelf managers

Please find further information on www.elma.com

AdvancedMC

AdvancedMC (AMC) brings hot swap and ATCA like features to a new generation of mezzanine modules.

While AMC was developed to be compatible with the ATCA architecture, AMC modules will be used in conjunction with other platform architectures. As its predecessors have shown, good mezzanine cards will be used wherever they can fit, which will encompass a very wide range of carrier form factors and applications.

AdvancedMC Products

To build up AMC Carriers and mezzanine modules mechanics in different versions are needed: Covers, Front Panels, Handles, EMC-Gaskets, Card-Guides, Filler Panels, Air Baffles and Micro Switches.

Elma is still working on those products.

Please find further information on www.elma.com

Customisation is the standard at Elma. With an extensive offering of modular products as a foundation, Elma is able to leverage existing solutions and proven design concepts to meet any custom application.

uTCA

MicroTCA defines a system architecture that uses AdvancedMC mezzanine cards plugged directly into a backplane architecture to produce smaller form factor systems.

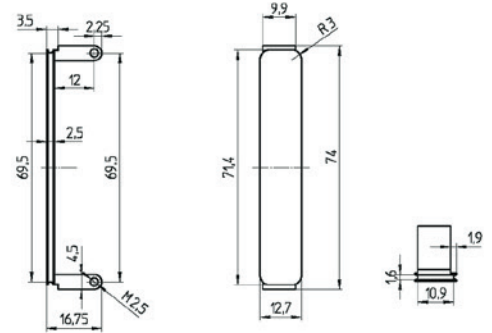
Please find further information on www.elma.com

2: Front Panels for Plug-In Units



2.7 PMC Mezzanine Front Panels

- Acc. to IEEE 1386
- Used on VME-, Future, CPCI- or MultibusII-Boards when additional interfaces are needed
- On a double euro board (6 U / 4 HP) maximum two PCI mezzanine cards can be placed
- Two designs are available: Zinc die-cast or aluminium extrusion
- Mezzanine filler panel: To cover the unused Mezzanine cut outs. The filler panels are simply clipped into the cut outs.
- The EMC-gaskets can be inserted into the groove of the front panels
- **Scope of delivery:**
 - 1 Mezzanine front panel
 - 1 Gasket
 - 2 screws M2.5 x 6 mm

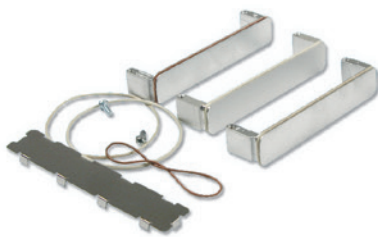


2.7 PMC Mezzanine Front Panels

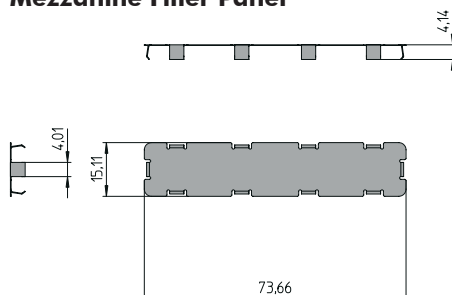
Description	Material	Part-No.
Mezzanine front panel incl. EMC-gasket	Zinc die-cast, chrome-plated	21M171
Mezzanine front panel incl. EMC-gasket	Aluminium extrusion, clear anodised	21M271

Accessories

Description	Material	Part-No.
EMC-gasket (for zinc die-cast version)	Berilium copper	21M571
EMC-gasket (for aluminium profile version)	Elastomer mix with metal portion	21M570
Mezzanine filler panel	Stainless steel	21M600
Screws cross recessed M2.5 x 6 mm	Steel zinc plated blue	5325-06
Torx cylinder head screw M2.5 x 6, size T8	Stainless	5470-04



Mezzanine Filler Panel



2: Front Panels for Plug-In Units

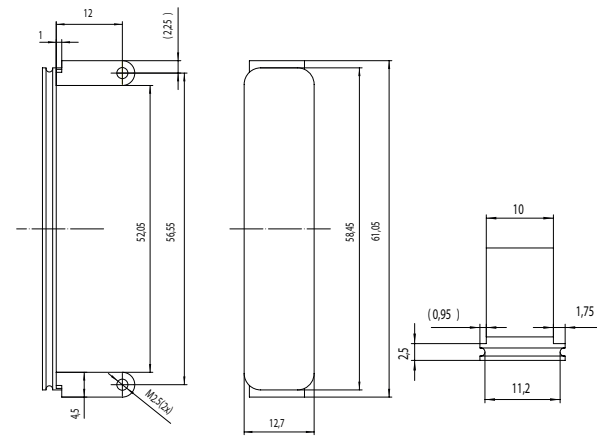


2.8 FMC Mezzanine Front Panels

FPGA Mezzanine Card or FMC (Vita 57.1) describes a specification of I/O mezzanine modules in conjunction with FPGA or another device with configurable I/O capability. The low-profile design allows use on any industry standard slot card with form factors such as VME, VPX, CompactPCI, AdvancedTCA, MicroTCA, PCI, PXI, and many others. The compact size is very highly adaptable to many configuration requirements and complements existing mezzanine technologies such as PMC.



- Front panel in accordance with VITA 57.1 for FPGA Mezzanine Card (FMC)
- Material: aluminum
- The EMC gasket is inserted into the groove on the front panel
- **Scope of delivery:**
 - 1 Mezzanine FMC front panel, aluminum, anodized front, rest: conductive
 - 1 EMC gasket (elastomer)
 - 4 cylinder screws with cross recess M2.5 × 6 mm
 - 21M2080-2 additionally: 2 standoffs 10mm, 4 screws

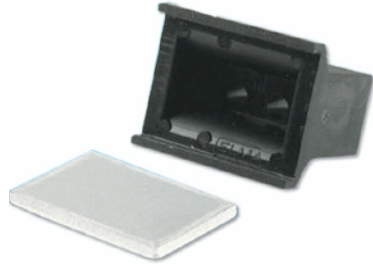


2.8 FMC Mezzanine Front Panels



Description	Part-No.
1 FMC Mezzanine front panel incl. EMC-gasket	21M280-1
1 FMC Mezzanine front panel incl. EMC-gasket and 2 standoffs 10mm	21M280-2

3: Handles



3.1 Fluted Handles

C | 3_2

3.2 Rigid-Mounted Unit Handles

C | 3_3

3.3 Ejector Handles acc. to IEC

C | 3_4

3.4 Injector/Ejector Handles acc. to IEEE

C | 3_6

3.4.1 Ergonomic IEEE Standard Injector/Ejector Handle

C | 3_6

3.4.2 Ergonomic IEEE Hot-Swap Injector/Ejector Handle

C | 3_7

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

C | 3_8

3.4.4 Telecom Hot-Swap Injector/Ejector Handle

C | 3_9

3.4.5 Telecom Long Hot-Swap Injector/Ejector Handle

C | 3_10

3.4.6 Cutouts and Function

C | 3_11

3.4.7 Microswitch Technical Data and Function

C | 3_12

3.4.8 Card Holder and Coding Pins acc. to IEEE

C | 3_14

3.5 Injector/Ejector Handles acc. to AdvancedTCA

C | 3_15

3.5.1 ATCA Ergonomic Injector / Ejector Handle

C | 3_15

3.5.2 ATCA Classic Handle

C | 3_16

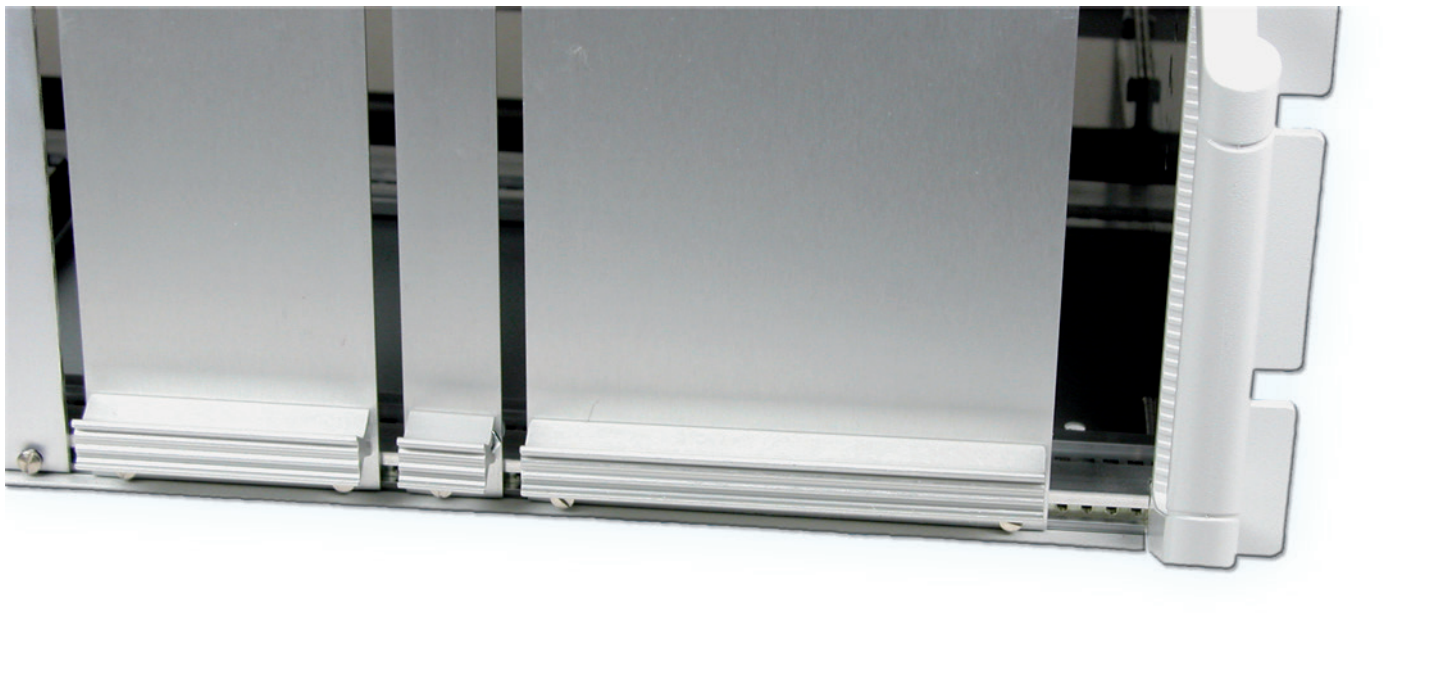
3.5.3 Microswitch Technical Data and Function

C | 3_16

3.5.4 Fixing material

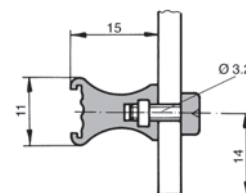
C | 3_18

3: Handles



3.1 Fluted Handles

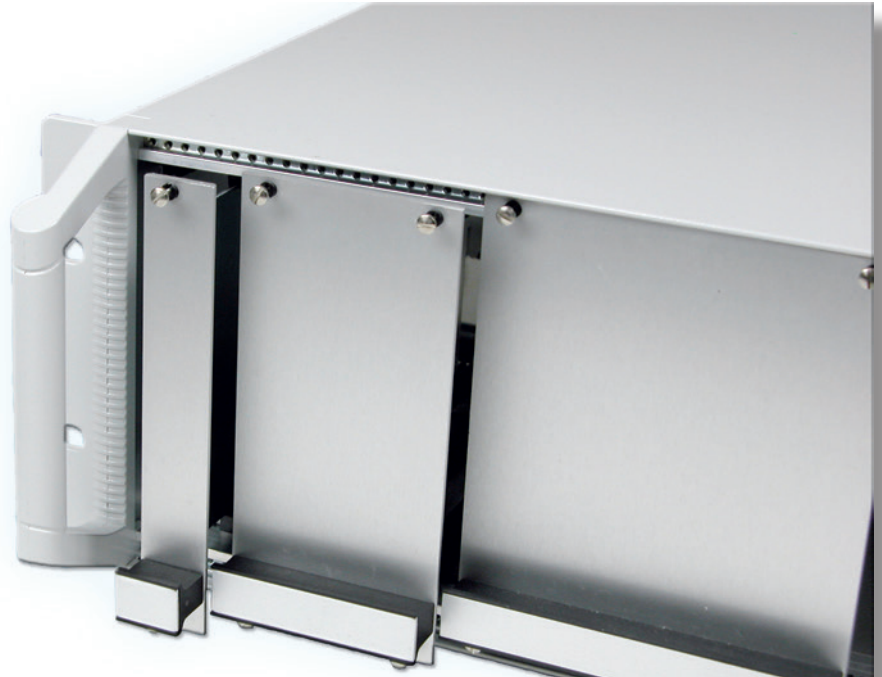
- Extruded aluminium handles, shaped to facilitate withdrawal of plug-in units
- Two grooves in the front face will accept identification strips (0.5 x 9 mm)
- **Scope of delivery:**
 - Extruded handle, clear anodised
 - Assembly material



3.1 Fluted Handles for Front Panels to IEC

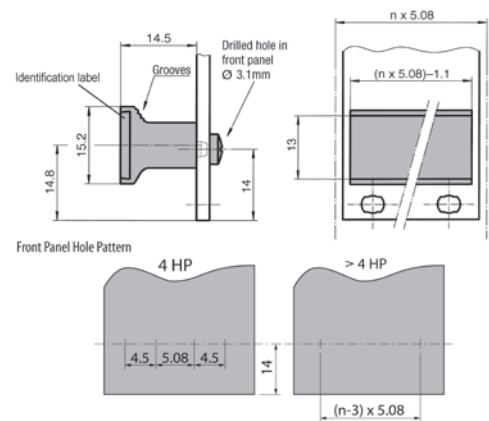
Front Panel Width HP	Width		Handle Length		Part-No.
	mm	inch	mm	inch	
3 HP	15.0	0.59	12.5	0.49	60-103
4 HP	20.1	0.79	17.6	0.69	60-104
5 HP	25.2	0.99	22.6	0.88	60-105
6 HP	30.3	1.19	27.7	1.09	60-106
7 HP	35.3	1.38	33.5	1.31	60-107
8 HP	40.4	1.59	37.9	1.49	60-108
10 HP	50.6	1.99	48.0	1.88	60-110
12 HP	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
21 HP	106.5	4.18	104.6	4.11	60-121
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: 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 below



3.2 Rigid-Mounted Handle with Identification Label

Width	Scope of Delivery	Part-No.
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

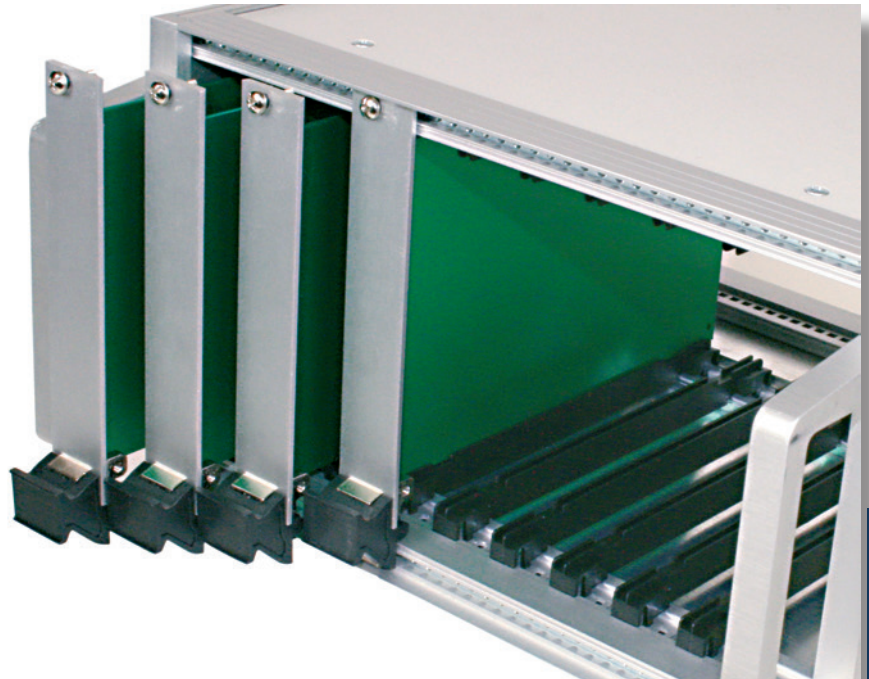
- Other sizes (up to 84 HP) are available upon request

Assembly Material

Description	Part-No.
Cross recessed rounded head screw	61-276

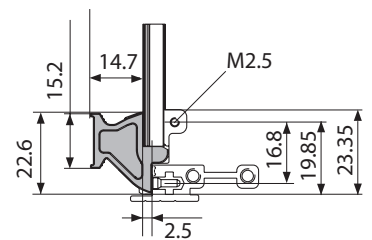


3: Handles



3.3 Ejector Handles acc. to IEC

- Simple assembly of plug-in units
- Allows trouble-free extraction of electronic units with multi-pole connectors
- Main features in one part: card holder, ejector handle and centring pin
- Reset spring for safe insertion
- One version for top and bottom only
- Handle is injection moulded, glass-reinforced plastic, UL94 V-0
- Card holder is zinc die-cast, nickel plated
- Reset spring is stainless steel
- **Scope of delivery:**
 - Ejector handle
 - Assembly material (cross recessed screws M2.5 for fixing of card holder/printed board/front panel)
- Front panel with special cutouts have to be ordered separately



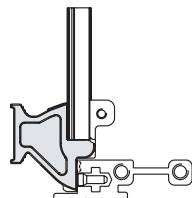
3.3 Ejector Handle acc. to IEC

Description	Part-No.
Ejector handle black	81-233
Ejector handle grey	81-234

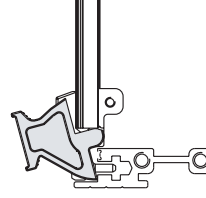


Extraction process:

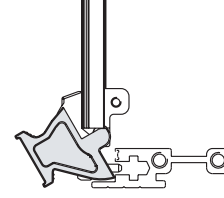
Restposition



Extraction

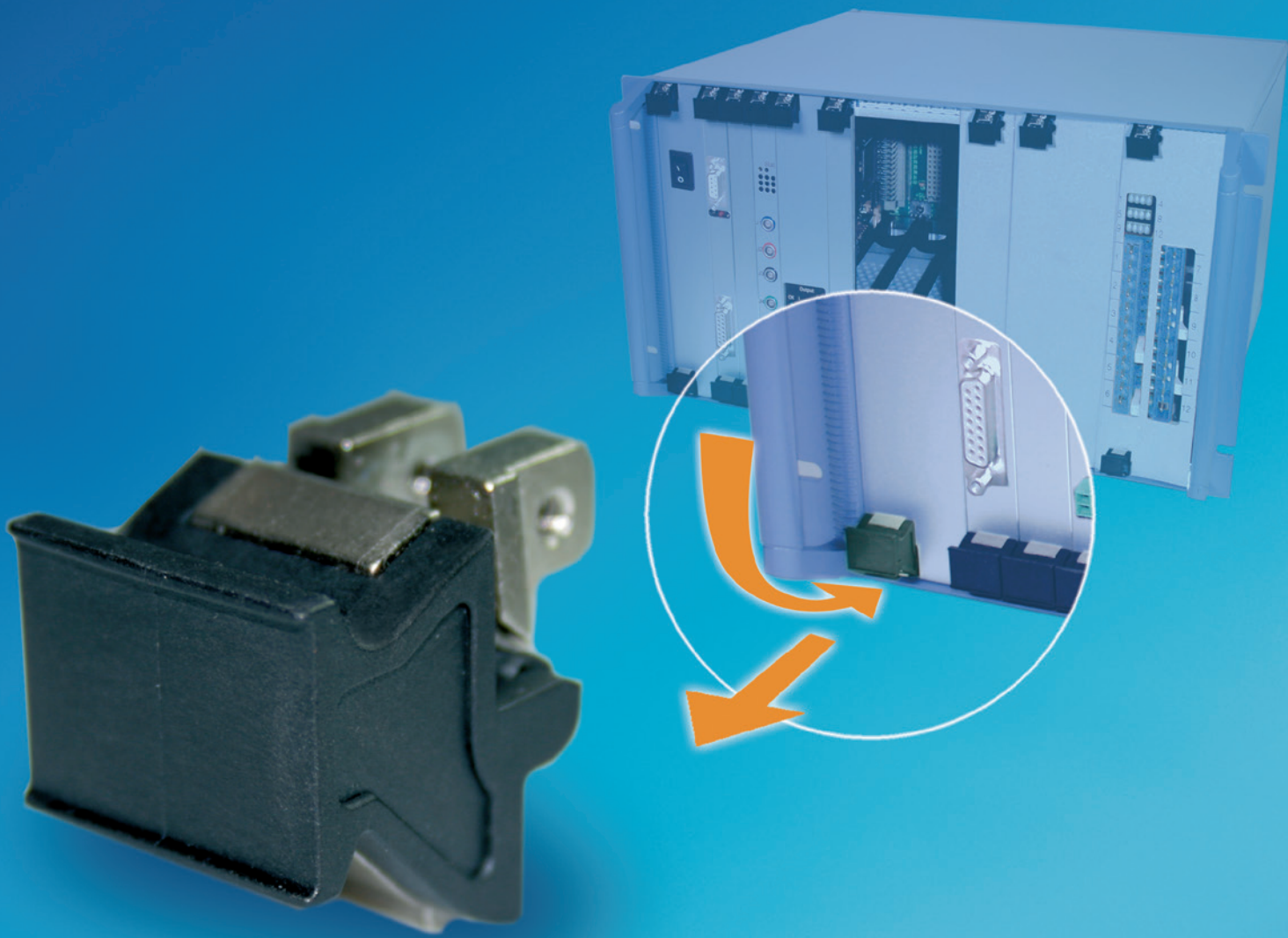


Endposition



Label

Description	Part-No.
1 sheet A4 of 220 labels	81-031



Simplify Your Operations

Straightforward and shorter, error free assembly

Elma's New IEC Ergonomic Handle

- Shorter assembly time of plug-in units
- Fewer individual parts
- Ejector function with optimised pressure point
- Reset spring for defined rest position
- All functions integrated in only 3 parts
- Use of simple standard front panels

www.elma.com

ELMA
Your Solution Partner

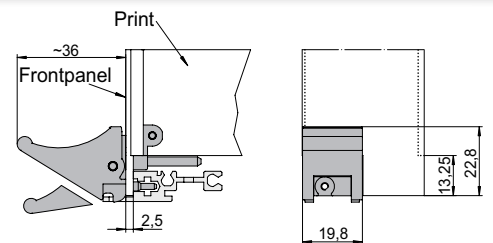
3: Handles



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 (nickel plated)
 - Reset spring (stainless steel)
 - Assembly material (screws M2.5 for fixing of card holder/printed board/front panel)
- Maximal recommended force per handle 550 N
- Grey handles available on request



Injector/Ejector Handle Top with ESD Pin

Description	Part-No.
Black	81-075



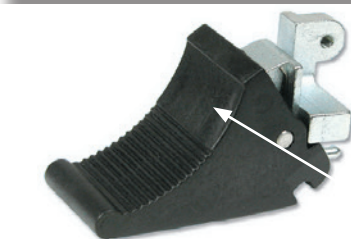
Injector/Ejector Handle Top without ESD Pin

Description	Part-No.
Black	81-075-01



Injector/Ejector Handle Bottom with ESD Pin

Description	Part-No.
Black	81-076



Injector/Ejector Handle Bottom without ESD Pin

Description	Part-No.
Black	81-076-01

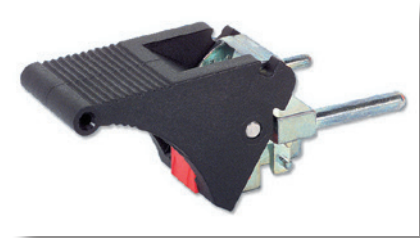
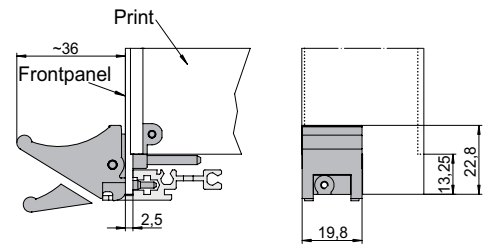
Label 18.5 x 10 mm

Label sheet A4 with 280 labels	81-030
--------------------------------	--------

3: Handles

3.4.2 Ergonomic IEEE Hot-Swap Injector/Ejector Handle

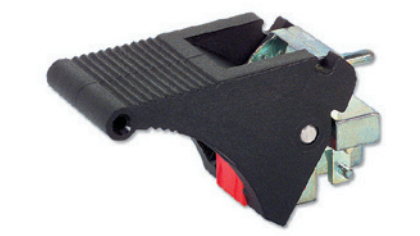
- With latching (hot-swap)
- **Scope of delivery:**
 - Handle black, button red (plastic, UL94 V-0)
 - Card holder (nickel plated)
 - Reset spring (stainless steel)
 - Assembly material (screws M2.5 for fixing of card holder/printed board)
- Maximal recommended force per handle 550 N
- Grey handles available 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.
Black	81-095
Black offset	81-184

Optional screws for fixing front panels: M2.5, : 61-295



Top Handle without ESD pin

Description	Part-No.
Black	81-095-01

Optional screws for fixing front panels: M2.5, : 61-295



Bottom Handle with ESD Pin

Description	Part-No.
Black	81-096
Black offset	81-185

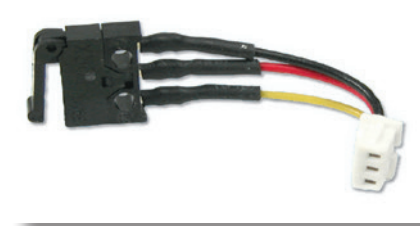
Optional screws for fixing front panels: M2.5, : 61-295



Bottom Handle without ESD Pin

Description	Part-No.
Black	81-096-01

Optional screws for fixing front panels: M2.5, : 61-295



Microswitch for Injector/Ejector Handle

- Technical data and function see 3.4.7

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

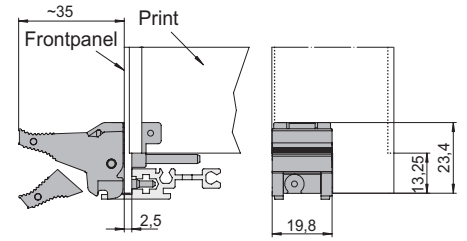
Label 18.5 x 10 mm

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

3: Handles

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 (nickel plated)
 - Reset spring (stainless steel)
 - Assembly material (screws M2.5 for fixing of card holder/printed board)
- Maximal recommended force per handle 550 N
- 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.
Black	81-260
Black offset	81-160

Optional screws for fixing front panels: M2.5, : 61-295



Bottom Handle with ESD Pin

Description	Part-No.
Black	81-261
Black offset	81-161

Optional screws for fixing front panels: M2.5, : 61-295

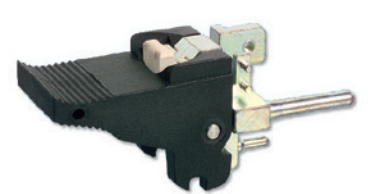
- With latching (hot-swap)
- **Scope of delivery:**
 - Handle black, button light grey (plastic, UL94 V-0)
 - Card holder (zinc die-cast, galvanized)
 - Assembly material (screws M2.5 for fixing of card holder/printed board)
- Offset version:
 - Offset by 2.54 mm (1/2 HP) to the right
 - Thus giving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



Top Handle with ESD Pin

Description	Part-No.
Black	81-255
Black offset	81-155

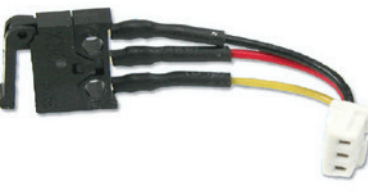
Optional screws for fixing front panels: M2.5, : 61-295



Bottom Handle with ESD Pin

Description	Part-No.
Black	81-256
Black offset	81-156

Optional screws for fixing front panels: M2.5, : 61-295



Microswitch for Injector/Ejector Handle

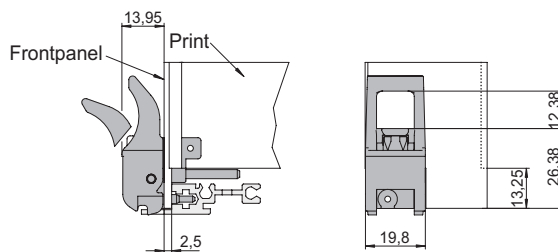
- Technical data and function see 3.4.7

Description	Part-No.
Microswitch with pre-assembled wire cable length (25 mm)	10 pcs. 81-088-1

3: Handles

3.4.4 Telecom Hot-Swap Injector/Ejector Handle

- With latching (hot-swap)
- **Scope of delivery:**
 - Handle black, button red (plastic, UL94 HB)
 - Card holder (zinc die-cast, galvanized)
 - Assembly material (screws M2.5 for fixing of card holder/printed board)
- Maximal recommended force per handle 550 N
- 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.
Black	81-205
Black offset	81-188

Optional screws for fixing front panels: M2.5, : 61-295



Top Handle without ESD Pin

Description	Part-No.
Black	81-205-01

Optional screws for fixing front panels: M2.5, : 61-295



Bottom Handle with ESD Pin

Description	Part-No.
Black	81-206
Black offset	81-189

Optional screws for fixing front panels: M2.5, : 61-295



Bottom Handle without ESD Pin

Description	Part-No.
Black	81-206-01

Optional screws for fixing front panels: M2.5, : 61-295



Microswitch for Injector/Ejector Handle

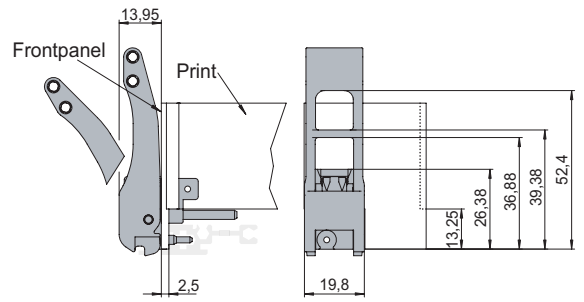
- Technical data and function see 3.4.7

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

3: Handles

3.4.5 Telecom Long Hot-Swap Injector/Ejector Handle

- With latching (hot-swap)
- **Scope of delivery:**
 - Handle black, button red (plastic, UL94 HB)
 - Card holder (zinc die-cast, galvanized)
 - Assembly material (screws M2.5 for fixing of card holder/printed board)
- Maximal recommended force per handle 550 N
- 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.
Black	81-214
Black offset	81-117

Optional screws for fixing front panels: M2.5; 61-295



Bottom Handle with ESD pin

Description	Part-No.
Black	81-215
Black offset	81-116

Optional screws for fixing front panels: M2.5; 61-295



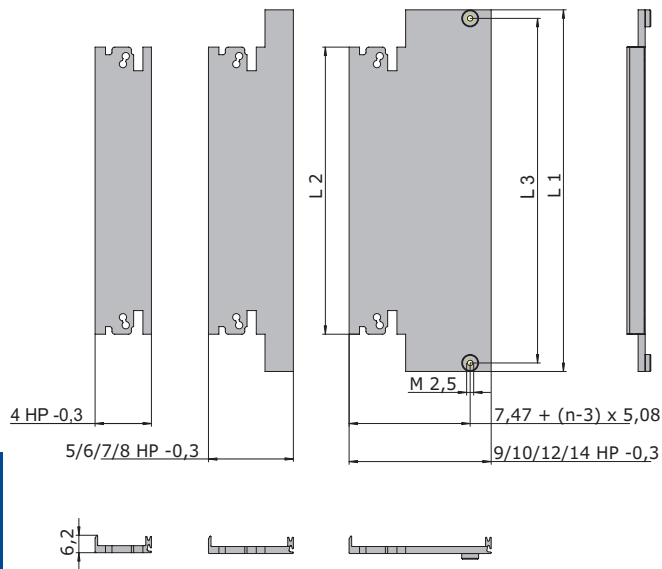
Microswitch for Injector/Ejector Handle

- Technical data and function see 3.4.7

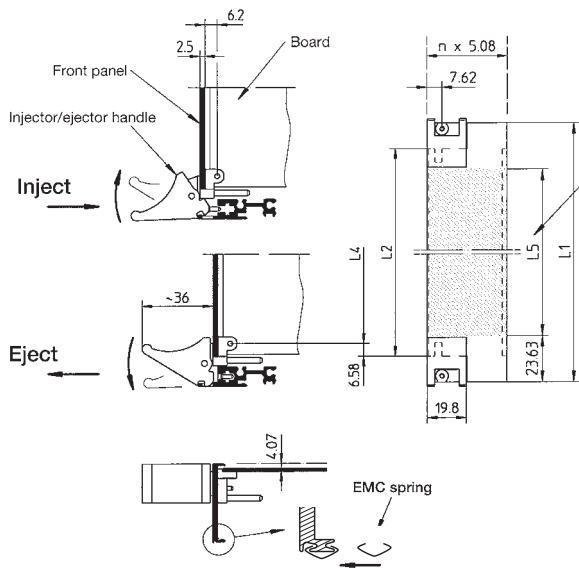
Description	Part-No. 10 pcs.
Microswitch with pre-assembled wire cable length (25 mm)	81-088-1

3: Handles

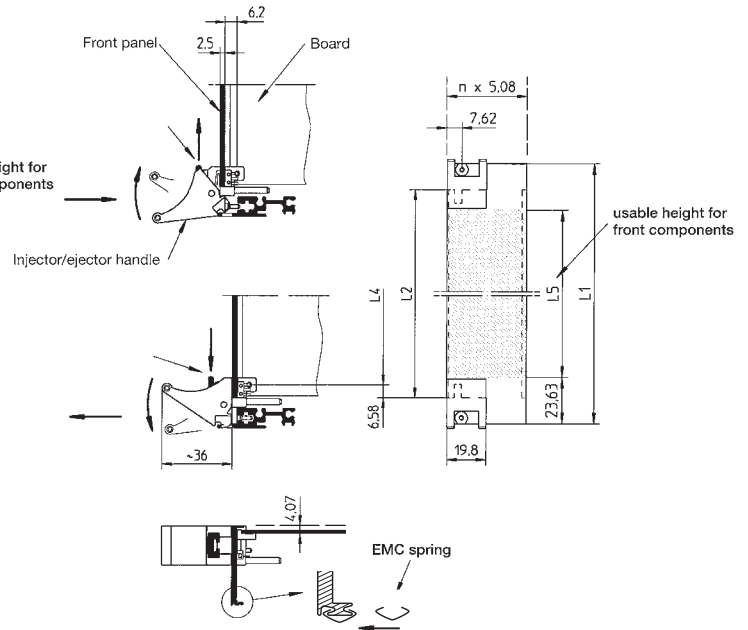
3.4.6 Cutouts and Function



Injector/Ejector Handle
Without Locking Feature (Function)

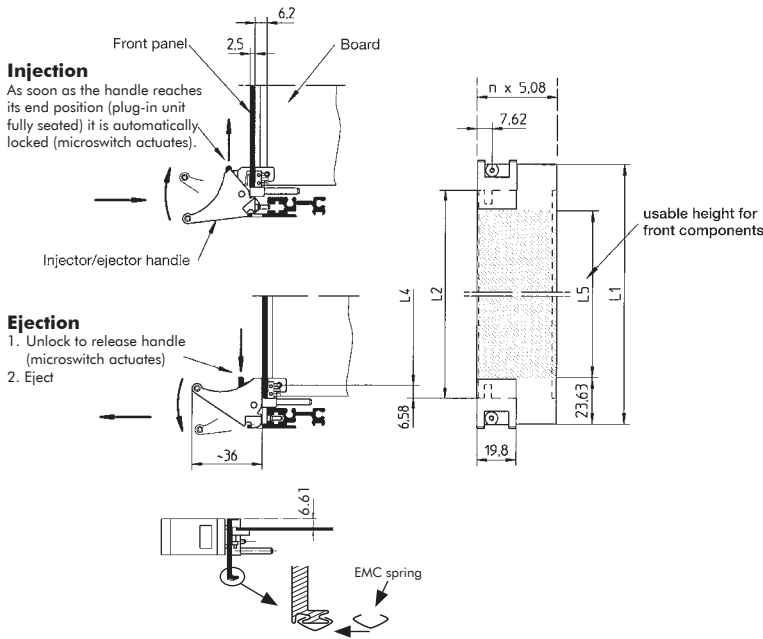


Injector/Ejector Handle
With Locking Feature (Function)



3: Handles

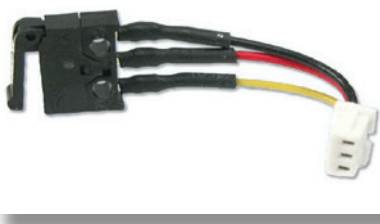
Injector/Ejector Offset Handle With Locking Feature (Function)



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

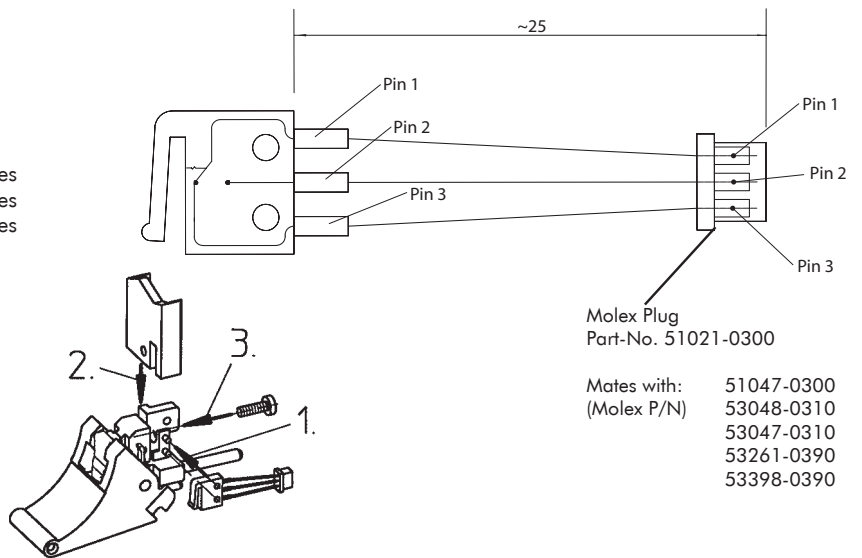


Microswitch for Injector/Ejector Handle

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

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	



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.

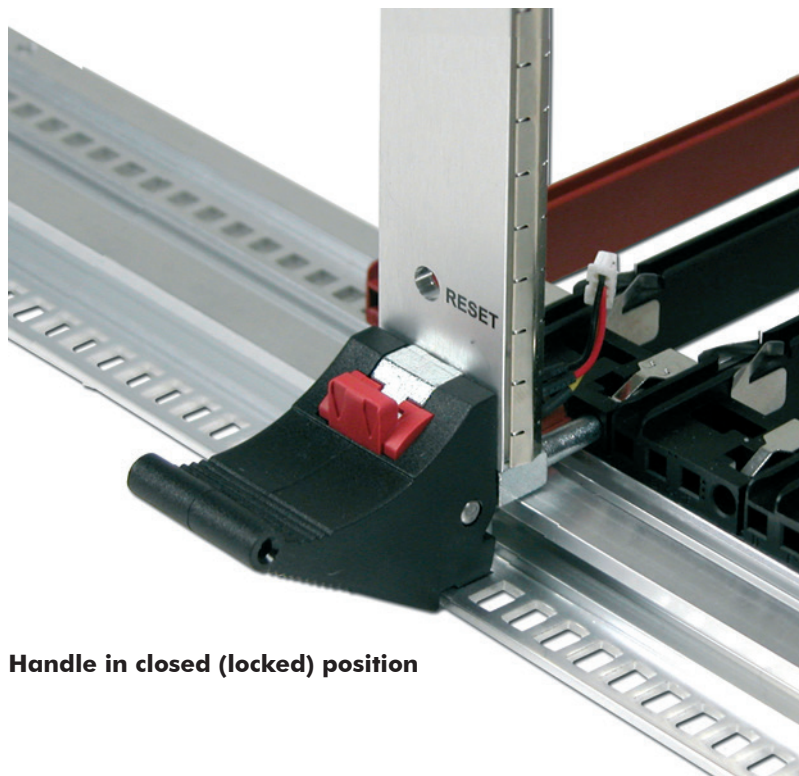
To confirm with IEEE 1101.10 and CompactPCI without Hot Swap or other applications where high insertion/extraction forces have to be managed, Elma developed a handle with an optimised ratio of leverage that impairs minimum vertical forces to the rack. Thus preventing the front extrusions from buckling 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 6 U-, 160 mm and 80 mm boards even on those where holes for a protective cover are missing.



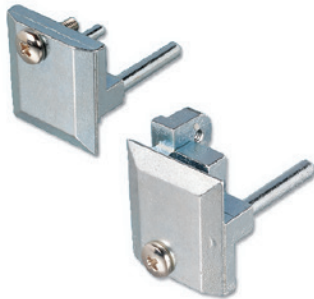
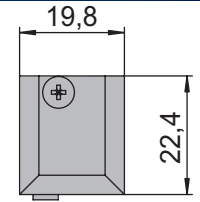
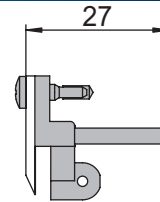
Handle in closed (locked) position

3: Handles

3.4.8 Card Holder and Coding Pins acc. to IEEE

• Scope of delivery:

- End piece card holder (zinc die-cast, nickel plated)
- 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.
Top	81-018
Bottom	81-019



3.4.8.2 Card Holder/End Piece without ESD Pin

Description	Part-No.
Top	81-018-01
Bottom	81-019-01



3.4.8.3 Coding Pins

- Acc. to IEC 60297-3-103
- Plastic, UL94 V-0
- Can be rotated in 4 positions

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

3: Handles

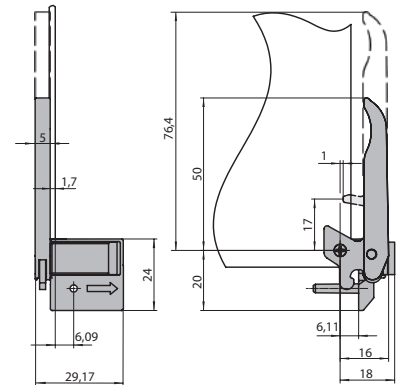


ATCA and the ATCA logo are trademarks of the PCI Industrial Computers Manufacturers Group

3.5 Injector/Ejector Handles acc. to AdvancedTCA

3.5.1 ATCA Ergonomic Injector / Ejector Handle

- Pre-assembled
- Self-locking screws for front panel and board mounting (Tuflok)
- Plastic parts black (UL94 V-0)
- Base part including alignment pin (zinc die-cast, nickel plated)
- Other versions available on request
- **Scope of delivery:**
 - Handle pre-assembled
 - Retaining screw mounting (loose packed)
 - Screw for board mounting (loose packed)



3.5.1.1 Ergonomic Handle, Microswitch to be assembled on Handle

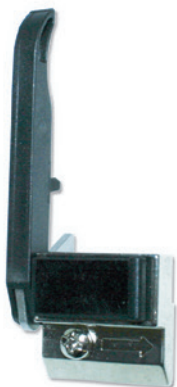
Description	Part-No.
Front top, rear bottom	81-300-00
Front bottom, rear top	81-301-00



3.5.1.2 Ergonomic Handle, Microswitch to be assembled on Front Panel or Board

- Switching pin on lever handle

Description	Part-No.
Front bottom, rear top	81-301-01



3: Handles

3.5.2 ATCA Classic Handle

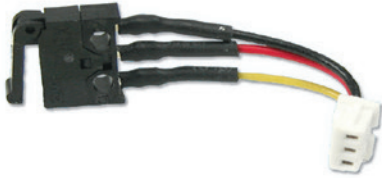


3.5.2 ATCA Classic Handle

- Easy operation
- Material: stainless steel
- With latching (hot-swap)
- For self installation
- **Scope of delivery:**
 - 2 steel handles
 - 2 shoulder screws M2.5, Torx size T10
 - 4 + 4 washers
 - 2 latch spring clips
 - Assembly instruction

Description	Part-No.
2 handles	12T130

3.5.3 Microswitch Technical Data and Function



3.5.3.1 Microswitch for Injector/Ejector Handle

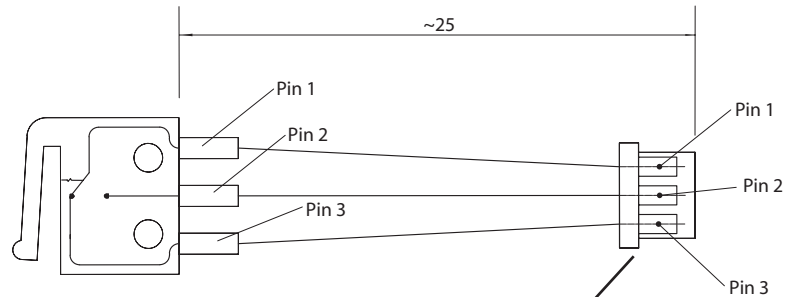
Description	Part-No.
	10 pcs.
Microswitch with pre-assembled wire cable length (25 mm)	81-088-1

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	

Switch function:

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



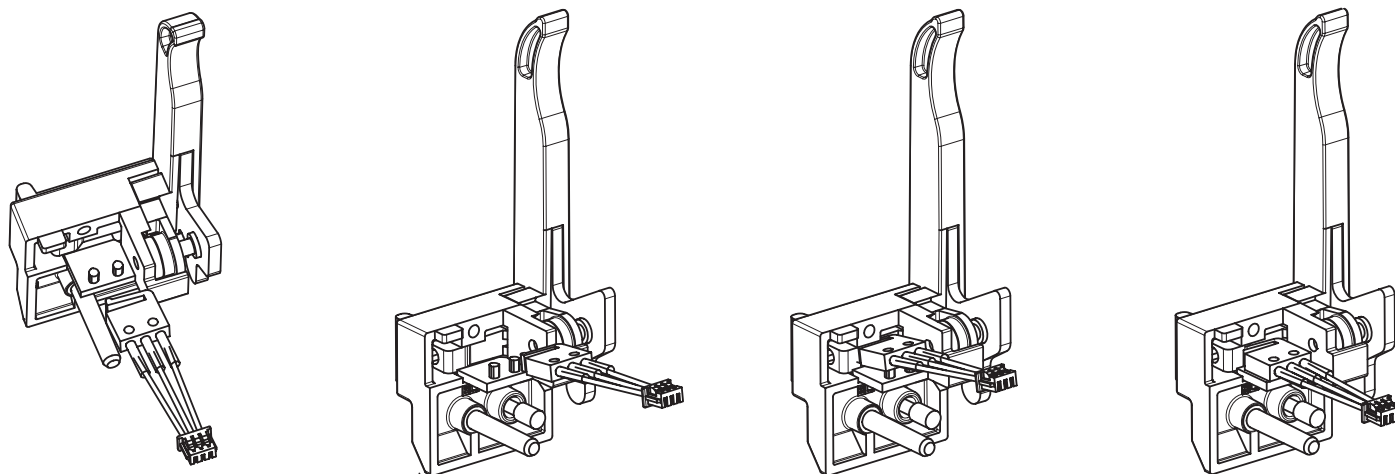
Molex Plug
Part-No. 51021-0300

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

3: Handles

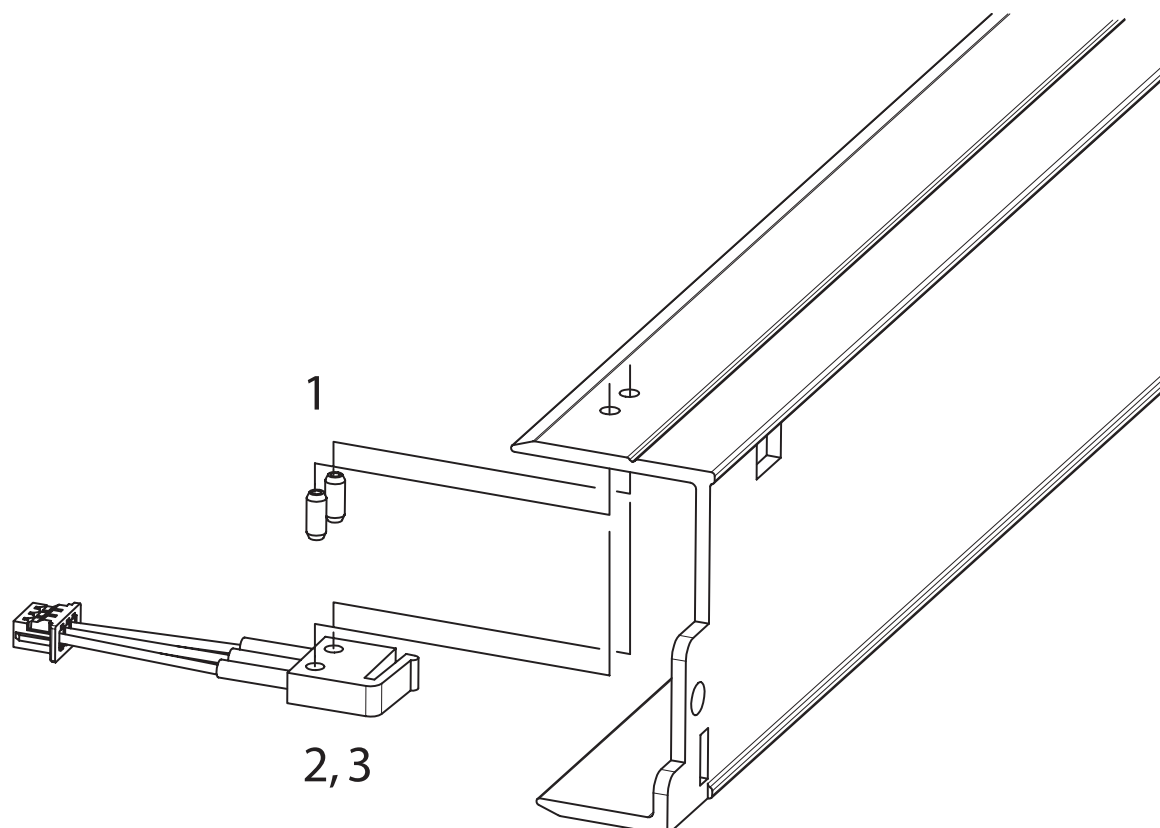
3.5.3.1.1 Mounting Microswitch to ATCA Ergonomic Handle:

- Possible without tools
1. Handle stays in the locked (closed) position
 2. Check the microswitch orientation according the drawing below
 3. Push microswitch onto the handle



3.5.3.1.2 Mounting Microswitch to Front Panel:

1. Press studs (Elma part number: 5686-05) into the panel
2. Check the microswitch orientation according the drawing below
3. Push microswitch onto the studs



3.5.4 Fixing material



3.5.4.1 Rounded Head Screw M2.5 x 5 mm

- For front panel mounting
- Self securing (Tuflok)
- Steel, nickel plated
- Philips #1

Description	Part-No.
Rounded head screw M2.5 x 5 mm	5306-11



3.5.4.2 Rounded Head Screw M3 x 12.7 mm

- Captive screw for mounting handle to rack
- Steel, nickel plated
- Freedrive, Philips #2

Description	Part-No.
Rounded head screw M3 x 12.7 mm	61-296



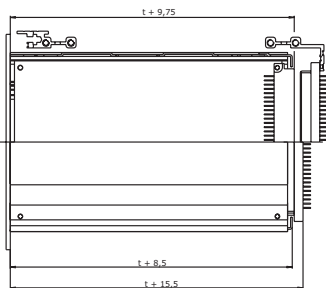
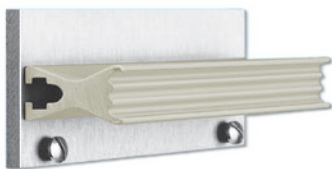
3.5.4.3 Spezial Screw M2.5 x 8.3 mm

- Screw for mounting PCB to ATCA Ergonomic handle
- Self securing (Tuflok)
- Steel, gavanised, clear passivated
- Philips #1

Description	Part-No.
Rounded head screw M2.5 x 8.3 mm	5441-38

4: Cassettes and Modules

C



4.1 Cassette A C | 4_2

4.1.1 Cassette A, for Several Eurocards C | 4_3

4.1.2 Card Guides C | 4_4

4.1.3 Rear Panel C | 4_4

4.2 Module B C | 4_5

4.2.1 Module B, for One Eurocard and Bulky Components C | 4_5

4.3 Module C C | 4_6

4.3.1 Module C, for One Eurocard and Bulky Components C | 4_6

4.4 Accessories for Cassettes and Modules C | 4_7

4.4.1 Card Guides C | 4_7

4.4.2 Fluted Handles C | 4_7

4.4.3 Side Wall Extrusion C | 4_7

4.4.4 Depth Extrusion C | 4_7

4.5 Line Drawings C | 4_8

4.5.1 3 U Cassettes and Modules C | 4_8

4.5.2 6 U Cassettes and Modules C | 4_9

4.5.3 Rear Panel C | 4_9

4.5.4 Fixing Methods C | 4_10

4: Cassettes and Modules

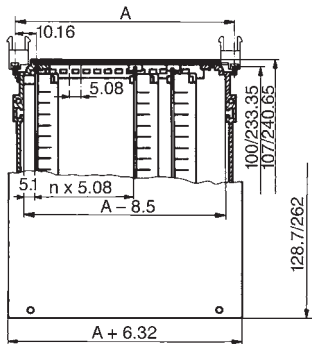


- Designed to accept single or double eurocards
- Depths 160 mm (6.29") or 220 mm (8.66")
- Aligned for connectors conforming to IEC 60603-2
- External dimensions meet the requirements for attachment to sub racks as specified in IEC 60297
- Plug-in units
- PCB firmly attached to the side extrusions

4.1 Cassette A

- Accepts several PCBs on horizontal pitch of 1 HP (5.08 mm, 0.20")
- IEC60603-2 connectors can be mounted internally at rear
- Connectors can be interwired to form a functional plug-in unit
- Suitable for use with all sub racks, adaptation kits for mounting eurocards and eurocard mounting sets
- Several eurocards 100 x 160 mm (3.93" x 6.29") or 100 x 220 mm (3.93" x 8.66") can be fitted
- Several double eurocards 233.35 x 160 mm (9.18" x 6.29") or 233.35 x 220 mm (9.18" x 8.66") can be fitted
- Possibility to mount 100 x 160 mm (3.93" x 6.29") PCBs recessed inside a 100 x 220 mm (3.93" x 8.66") cassette with insertion from front or rear (see wiring example)
- Edge connectors used for interwiring are attached to connector mounting angles at the rear of the cassette
- Card guides are used to locate the cassette in the sub rack
- Right and left side extrusions with grooves for sliding in a PCB
- Installation of further PCB's by assembly of card guides in the perforated bottom/top covers
- **Scope of delivery:**
 - Front panel
 - Side extrusions
 - Top/bottom covers
 - Mounting angle
 - Extension piece
 - Assembly material
 - Rear panel (6 U version only)
 - Side covers (6 U version only)
- Front panel screws, see 4.1.1
- Handles, see 4.4.2

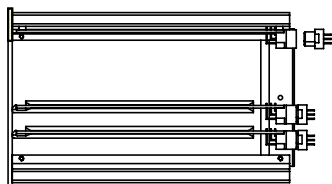
4: Cassettes and Modules



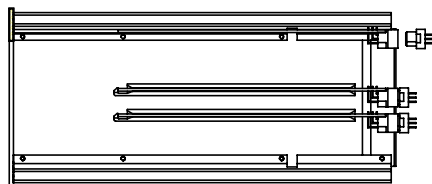
Dimensions Cassette A

Width	A mm	A inch
14 HP	64.60	2.54
21 HP	100.16	3.94
28 HP	135.72	5.34
42 HP	206.84	8.14

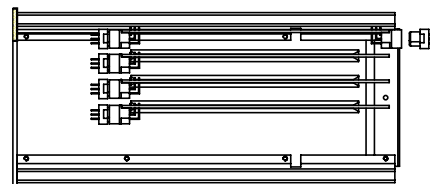
Mounting Possibilities



Card Depth 160/220 mm



Card Depth 160 mm Recessed



Card Depth 160 mm Rear Insertion*

* When 160 mm cards are inserted from the rear of a 220 mm cassette, a rear panel is required (see 4.1.5)

4.1.1 Cassette A, for Several Eurocards



4.1.1 Cassette A, for Several Eurocards

Depth	Width	3 U	6 U
160 mm 6.29"	14 HP	23A302	-
	21 HP	23A312	-
	28 HP	23A322	-
	42 HP	23A332	-
220 mm 8.66"	14 HP	-	23A603
	-	-	-

Front Panel Screws

- Set of 10 screws, M2.5 x 11.3
- With screw retainer
- Per cassette A 4 screws are needed

Description	Part-No. 10 pcs.
Torx screws, size T8, with plastic screw retainer	63K159
Rounded head screws recessed, with plastic screw retainer	63-159

For more front panel screws refer to chapter E

4: Cassettes and Modules

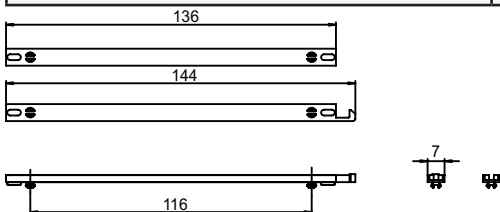
4.1.2 Card Guides



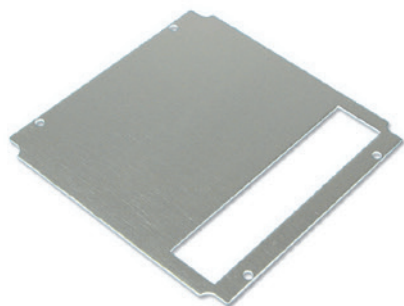
4.1.2 Card Guides

- For mounting PCBs in cassettes
- Assembly in the perforated bottom/top covers
- Light grey UL94 V-0

Description	Card Depth	Part-No. 1 Pair
Card guides in cassettes	160/220 mm (6.29"/8.66")	61-034



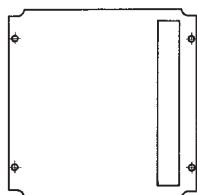
4.1.3 Rear Panel



4.1.3 Rear Panel

- For mounting from rear for 160 mm (6.29") cards in cassettes 220 mm (8.66")

Connector Body Style, acc. IEC60603-2	Height	14 HP	21 HP	28 HP
B, C, D	for 3 U	-	23-386-1	23-387-1
E, F, H	for 3 U	23-385-2	23-386-2	-



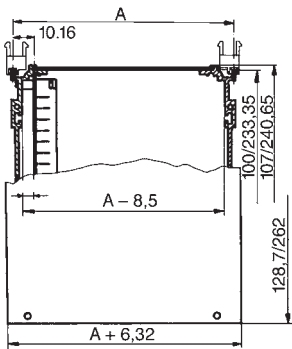
Please note:

For front panels, handles and front panel screws must be ordered separately. Card guides for use inside cassettes, card guides to locate cassettes, edge connector mounting pieces and special screws for mounting connectors need to be ordered separately.

4: Cassettes and Modules

4.2 Module B

- Accepts one PCB and various non-standard and bulky components which can be mounted using the grooves formed in the side extrusions
- By interwiring the components, the module can be used as functional plug-in unit
- Suitable for use with all sub racks, adaptation kits for mounting eurocards and euro-card mounting sets
- Accepts a eurocard 100 x 160 mm (3.93" x 6.29") or 100 x 220 mm (3.93" x 8.66") and double eurocards 233.35 x 160 mm (9.18" x 6.29") or 233.35 x 220 mm (9.18" x 8.66") fastened to the side extrusions and leaving room for non-standard and bulky components
- Card guides are used to locate the module in the sub rack
- **Scope of delivery:**
 - Front panel
 - Side extrusions
 - Top/bottom covers
 - Rear panel
 - Assembly material
 - Side covers (6 U versions only)
- Front panel screws, see 4.2.1
- Handles see 4.4.2



Dimensions Module B

Width	A mm	A inch
14 HP	64.60	2.54
21 HP	100.16	3.94
28 HP	135.72	5.34

4.2.1 Module B, for One Eurocard and Bulky Components



4.2.1 Module B, for One Eurocard and Bulky Components

Depth	Width	Connector Body Style acc. IEC 60603-2	3 U	6 U
160 mm 6.29"	21 HP	B, C, D	23B312-1	23B612-1
		E, F, H	23B312-2	-
220 mm 8.66"	14 HP	E, F, H	23B303-2	23B603-2
	21 HP	E, F, H	23B313-2	23B613-2

Front Panel Screws

- Set of 10 screws, M2.5 x 11.3
- With screw retainer
- Per module B 4 screws are needed

Description	Part-No. 10 pcs.
Torx screws, size T8, incl. plastic screw retainer	63K159
Rounded head screws recessed, incl. plastic screw retainer	63-159

For more front panel screws refer to chapter 7

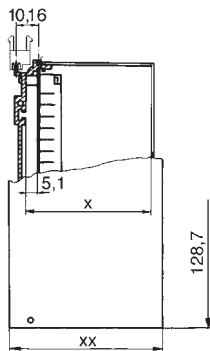
Please note:

Handles for front panels, front panel screws and card guides to locate the module need to be ordered separately.

4: Cassettes and Modules

4.3 Module C

- These narrow modules can be used for the shielding and mechanical protection of single PCBs or as small functional plug-in units
- Suitable for use with all sub racks and eurocard mounting sets
- The C-type module accepts one eurocard 100 x 160 mm (3.93" x 6.29") or 100 x 220 mm (3.93" x 8.66") with edge connector to IEC60603-2, types B, C, D
- The closed module provides good shielding and also mechanical protection for sensitive components
- Card guides are used to slide the module into the sub rack
- **Scope of delivery:**
 - Front panel
 - Side extrusion
 - Cover
 - Assembly material
- Front panel screws, see 4.3.1
- Handles see 4.4.2



Dimensions Module C

Width	x mm	x inch	xx mm	xx inch
7 HP	24.48	0.96	35.36	1.39
10 HP	39.72	1.56	50.60	1.99
14 HP	60.04	2.36	70.92	2.79

4.3.1 Module C, for One Eurocard and Bulky Components



4.3.1 Module C, for One Eurocard and Bulky Components

Depth	Width	Cover	3 U
160 mm 6.29"	7 HP	solid	23C307-10
	10 HP	solid	23C310-10
		perforated	23C310-11
220 mm 8.66"	14 HP	solid	23C314-10
		perforated	23C314-11
220 mm 8.66"	7 HP	solid	23C307-30
		perforated	23C307-31

Front Panel Screws

- Set of 10 screws, M2.5 x 11.3
- With screw retainer
- Module C width 7 HP = 2 screws; ≥ 10 HP = 4 screws

Description	Part-No. 10 pcs.
Torx screws, size T8	63K159
Rounded head screws recessed	63-159

For more front panel screws refer to chapter E

Please note:

Handles for front panels, front panel screws and card guides to locate the module need to be ordered separately.

4: Cassettes and Modules

4.4 Accessories for Cassettes and Modules

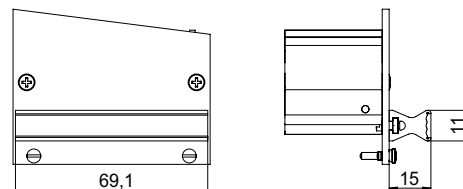
4.4.1 Card Guides



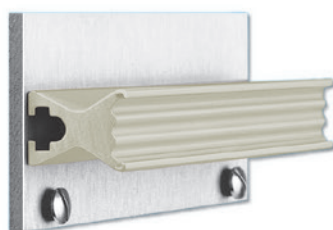
4.4.1 Card Guides

- Used to locate the module in the sub rack
- Black plastic UL94 V-0

Card Depth		Part-No.
mm	inch	
160	6.29	61-044
220	8.66	61-039

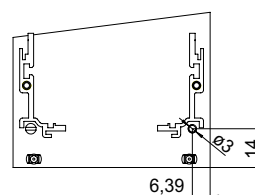


4.4.2 Fluted Handles



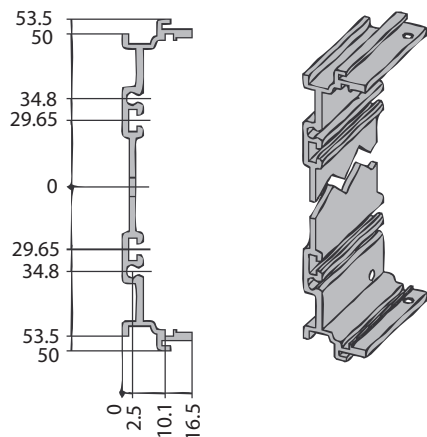
4.4.2 Fluted Handles

- 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



7 HP	10 HP	14 HP
23-060	23-061	23-062

4.4.3 Side Wall Extrusion

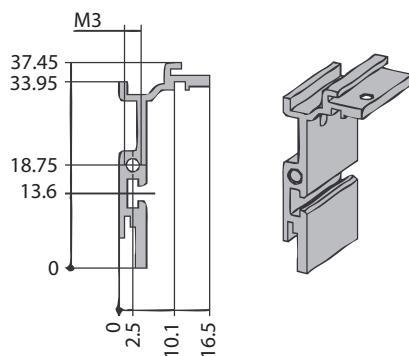


4.4.3 Side Wall Extrusion

- To build up customised solutions
- For 3 U type 23 cassettes and modules
- **Scope of delivery:**
 - 1 side wall extrusion
- Assembly material has to be ordered separately

Length mm	Length inch	Part-No. Clear Passivation	Part-No. Raw
165.7	6.52	66-106-20	—
225.7	8.87	66-106-21	—
1350.0	53.14	—	66-106-14

4.4.4 Depth Extrusion



4.4.4 Depth Extrusion

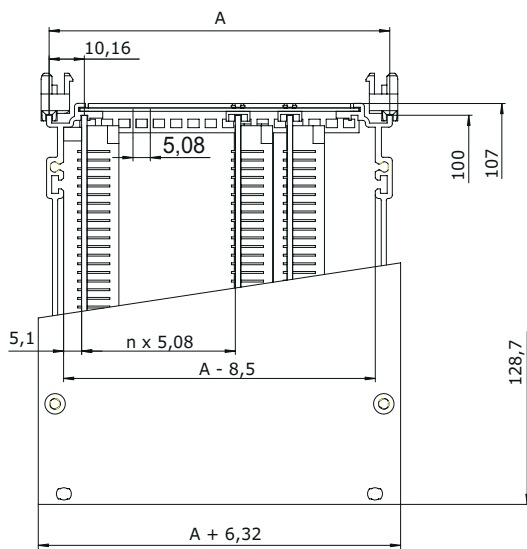
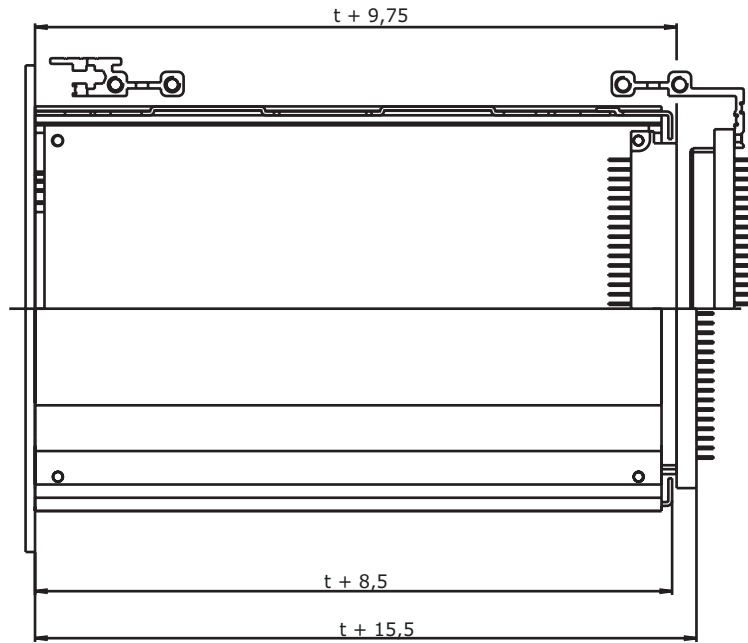
- To build up customised solutions
- For 6 U cassettes and modules type 23
- **Scope of delivery:**
 - 1 depth extrusion
- Assembly material has to be ordered separately

Length mm	Length inch	Part-No. Clear Passivation	Part-No. Raw
165.7	6.52	66-188-20	—
225.7	8.87	66-188-22	—
1350.0	53.14	—	66-188-14

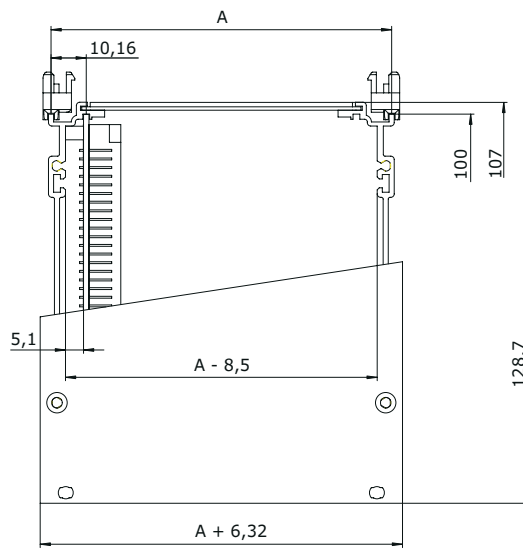
4: Cassettes and Modules

4.5 Line Drawings

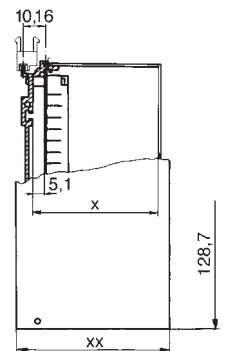
4.5.1 3 U Cassettes and Modules



Cassette A



Module B



Module C

Cassette A and Module B

Width	A mm	A inch
14 HP	64.60	2.54
21 HP	100.16	3.94
28 HP	135.72	5.34
42 HP	206.84	8.14

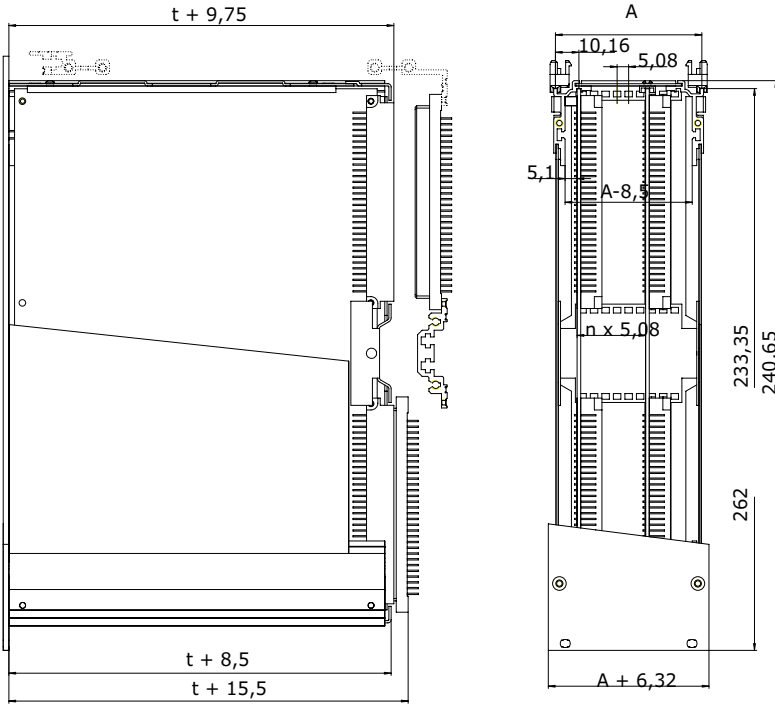
Module C

Width	x mm	x inch	xx mm	xx inch
7 HP	24.48	0.96	35.36	1.39
10 HP	39.72	1.56	50.60	1.99
14 HP	60.04	2.36	70.92	2.79

t = card depth = 160/220 mm (6.29"/8.66")

4: Cassettes and Modules

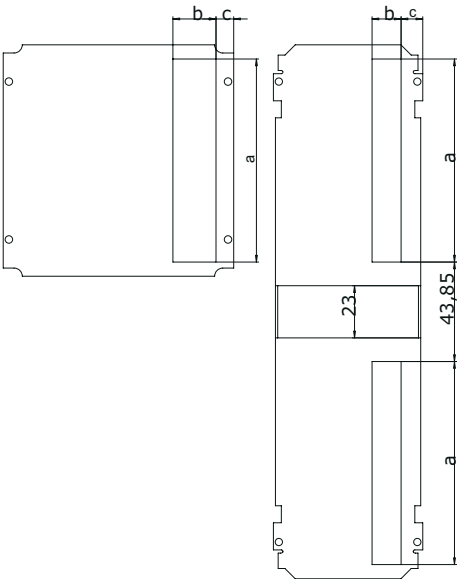
4.5.2 6 U Cassettes and Modules



Width	A mm	A inch
14 HP	64.60	2.53
21 HP	100.16	3.94
28 HP	135.72	5.34
42 HP	206.84	8.14

t = Card Depth = 160/220 mm (6.29"/8.66")

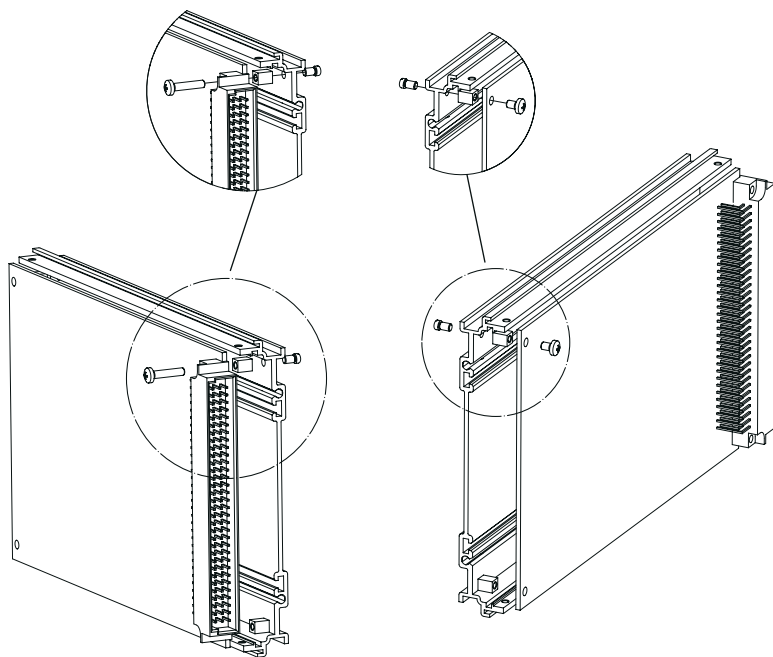
4.5.3 Rear Panel



	Height	IEC60603-2 Connectors			
		B, C, D mm	B, C, D inch	E, F, H mm	E, F, H inch
a	3 U	89.5	3.52	89.5	3.52
	6 U	89.5	3.52	89.5	3.52
b	3 U	12.0	0.47	19.0	0.74
	6 U	12.8	0.50	19.1	0.75
c	3 U	9.65	0.38	7.80	0.30
	6 U	9.55	0.37	7.75	0.30

4: Cassettes and Modules

4.5.4 Fixing Methods

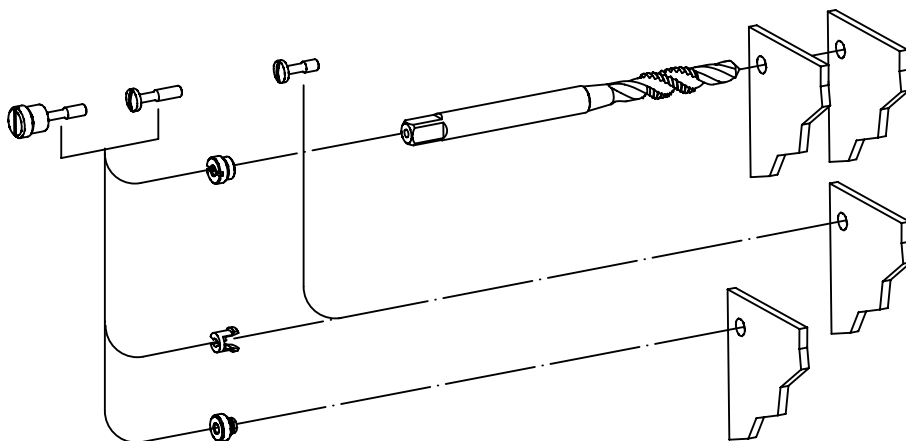


Rear Fastening

Front Fastening

The PCB can be fastened to the front or rear of the side extrusions

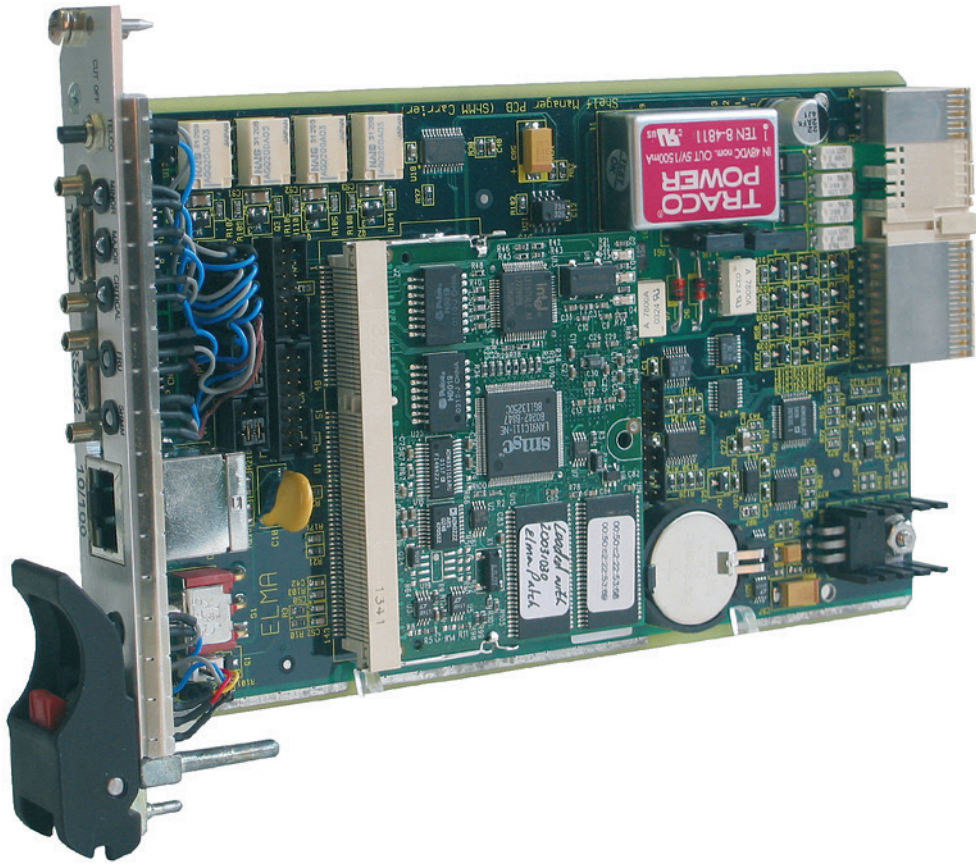
Fixing of Front Panel Screws



- Fixing screw only
- Screw with threaded bush
- Screw with retainer
- Screw with press-fit bush (M2.5 only)

If threaded bushes are used, the fixing holes must be drilled out and tapped, M5 x 0.5. Elma will perform this task on request.

No reworking is necessary when press-fit bushes are used.



Source: Elma Group



MicroTCA 5U shelf

- Application: Telecommunications and enterprise computer network equipment
- Full redundancy provided by two MCHs (MicroTCA Carrier Hubs), two cooling units and two power modules for $-48\text{ V}/-60\text{ V}$
- 12 AMC Single modules, Compact-size and Full-size
- All pluggable components are hot-swappable and controlled via IPMI

www.elma.com

ELMA
Your Solution Partner



5.1 Fan Module 84 HP

- The fan module is designed for vertical ventilation of a sub rack or desktop case.
- Modules for depths of 160 mm and 220 mm have 3 fans.
- These are arranged in an optimum configuration to ensure cooling of the printed PCBs over the entire width of the rack.
- Fan modules with 84 HP front panels (with on/off switch) are for mounting in withdrawable units and desktop cases acc. to DIN 41494, part 5, being run in and out on card guides.
- An AMP socket is used for the mains connection

5.1.1 Fan Module Vertical 84 HP

- 230V/50Hz (115 V on request)
- **Scope of delivery:**
 - 1 fan module 84 HP
- Front panel screws see below



5.1.1.1 Assembled, Ready for Connection

Height	Fan Type	Card Depth		Part-No.
		mm	inch	
1 U	69-430-20	160	6.29	27-110-02

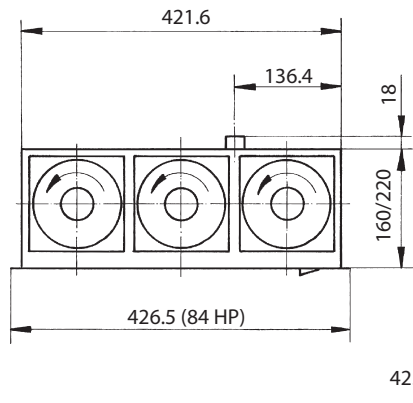
5.1.1.2 Front Panel Screws

- For mounting fan module in housing
- Set of 10 screws
- With screw retainer

Description	Part-No. 10 pcs.
Torx screws M2.5 x 11.3 , size T8, with plastic screw retainer	63K159
Rounded head screws recessed M2.5 x 11.3, with plastic screw retainer	63-159

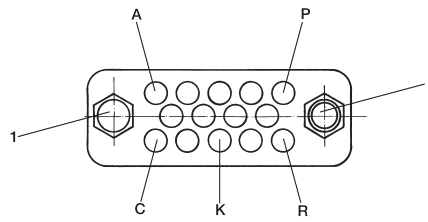
5: Ventilation

5.1.2 Line Drawing and Technical Information



Power Supply

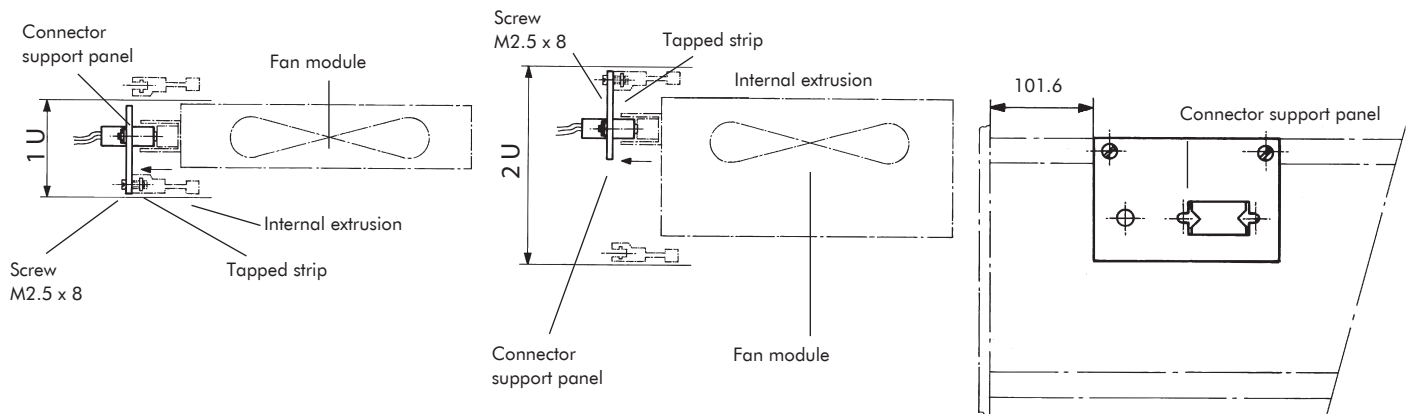
AMP connector, "M" series, 14 pole (pin)
Standard in fan modules 84 HP



- 1 coding socket
- 2 coding pin
- A-N -blue
- C-Na -blue
- K-PE -green / yellow
- P-L -brown
- R-La -brown

The fan module is inserted in the case or rack on card guides.

The AMP connector on the inserted fan module makes contact with the socket mounted on the rear extrusion.





5.2 Accessories for Ventilation

5.2.1 Fan



5.2.1.1 Fan 12V DC

- Brushless
- Sealed ball bearings
- Polarity and electronic locked rotor protection (autorestart)
- Air exhaust in over struts (can be mounted directly on a perforated front panel)
- Connector 2.8 x 0.5 (except fan with speed sensor)
- Fan case and wheel plastic UL94 V-0
- Operating temperature $-20\text{ }^{\circ}\text{C}$ to $+70\text{ }^{\circ}\text{C}$
- CE, UL, CSA, VDE standard
- Life expectancy L10 = 70 000 hours at $40\text{ }^{\circ}\text{C}$
- Special configuration with speed sensor

VDC	Voltage range VDC	Power consumption W**	Current consumption mA**	Rotational speed min^{-1}	Noise dB (A)**	max. stat. pressure $\text{mm H}_2\text{O}$	Flow rate m^3/h	Dimensions						Part-No.
								A		B		C		
								mm	inch	mm	inch	mm	inch	
12	6.0-13.8	6.80	570	2400	39	5.0	153	119.0	4.68	105.0	4.13	25.0	0.98	69-430-26
12	6.0-13.8	3.80	315	3200	41	4.8	93	92.0	3.62	82.5	3.24	25.0	0.98	69-430-32*

* with speed sensor

** with free exhaust

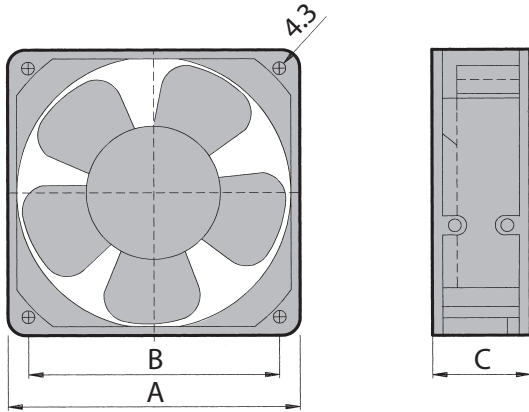
5: Ventilation

5.2.1.2 Fan 230V/115V AC

- Split-pole motor
- Sealed ball bearings
- Impedance protection resp. integrated thermal switch
- Connector 2.8 x 0.5
- Air exhaust in over struts (can be mounted directly on a perforated front panel)
- Fan case: aluminium
- Fan wheel: plastic UL94 V-0
- Operating temperature -40°C to $+70^{\circ}\text{C}$
- CE, UL, CSA, VDE standard
- Life expectancy L10 = 50 000 hours at 40°C

VAC	Freq. Hz	Power consumption W**	Current consumption mA**	Rotational speed min^{-1}	Noise dB (A)**	max. stat. pressure $\text{mm H}_2\text{O}$	Flow rate m^3/h	Dimensions						Part-No.
								A		B		C		
								mm	inch	mm	inch	mm	inch	
230	50/60	14.0/11.0	100/90	2300/2700	34/38	4.25/4.25	108/120	119.0	4.68	105.0	4.13	25.0	0.98	69-430-20
230	50/60	15.0/14.0	120/100	2600/2900	37/41	9.0/7.3	162/192	119.0	4.68	105.0	4.13	38.0	1.51	1925-79

** with free exhaust



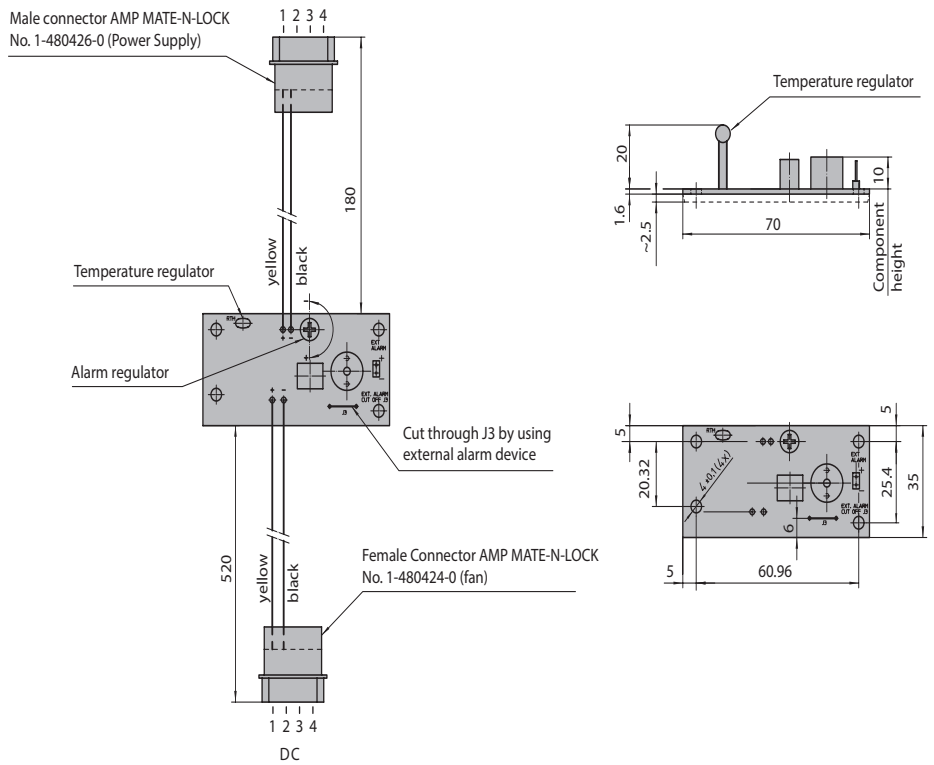
5: Ventilation

5.2.4 Fan Speed Control

- Temperature regulator with acoustic alarm signal
- Simple conversion to external optical signal
- Range of regulation
 - Fan regulating range: min. speed up to 34 °C
max. speed at 48°C
 - Alarm regulating range: adjustable between 45°C and 54°C
- Voltage 12 V/DC, voltage range 10-14 VDC
- Temperature regulator current consumption 50 mA
- Max. current consumption 0,6 A
- Operating temperature 0°C to 65°C
- Storage temperature -20°C to +80°C

5.6.3 Fan Speed Control

Description	Part-No.
Fan speed control (incl. wiring)	7731-02



5: Ventilation



5.3 General Accessories for Ventilation

5.3.1 Fan Mounting Panels

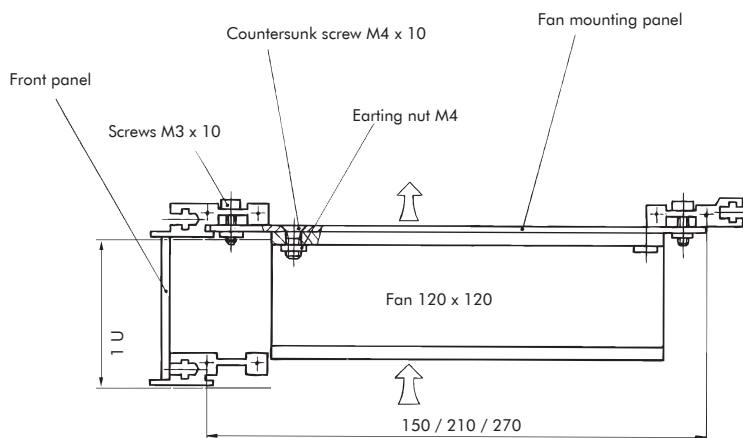
- The fan-mounting panel are designed for easy fitting of axial-flow fans for vertical and cross-flow ventilation of 160 mm deep cards in cases and modules.
- The panels are fixed to the horizontal extrusion using 6/4 screws (M3x10)
- Aluminium 1.5 mm, raw
- **Scope of delivery:**
 - 1 fan mounting panel
- Assembly material see below

5.3.1.1 Fan Mounting Panels for Vertical Ventilation

Case Width	No. of Fans	Fan Size		Mounting Panel Size		Part-No.
		mm	inch	mm	inch	
42 - 84 HP	1	120x120	4.8x4.8	149x150	5.86x5.90	27-048
84 HP (card depth 160 mm)	3	120x120	4.8x4.8	148x430.8	5.82x16.96	27-043

Assembly Material

Description	Part-No.
Cross recessed milled edge screw M3 x 10	5330-10
Cross recessed countersunk screw M4 x 10	5342-10
Earthing nut M4	61-095



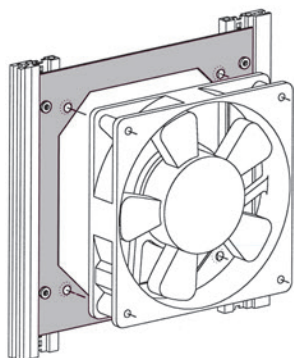
5.3.1.2 Fan Mounting Panels for Cross-flow Ventilation (Horizontal Mounting Kits)



Mounting Height	No. of Fans	Fan Size		Mounting Panel Size		Part-No.
		mm	inch	mm	inch	
3 U	1	90x90	3.6x3.6	105.5 x 149	4.15 x 5.86	27-049
4 U	1	120x120	4.8x4.8	150 x 149	5.90 x 5.86	27-048

Assembly Material

Description	Part-No.
Cross recessed milled edge screw M3 x 10	5330-10
Cross recessed countersunk screw M4 x 10	5342-10
Earthing nut M4	61-095

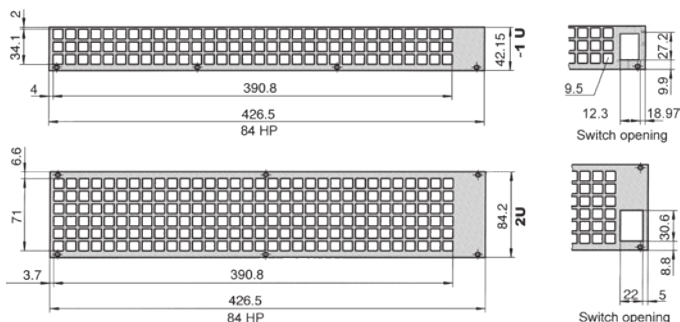




5.3.2 Fan Front Panels

5.3.2.1 Fan Front Panel 84 HP for Vertical Ventilation

- Fan front panels are flat, perforated and designed to ensure an optimum air flow rate
- Available with or without switch cut-out (switch opening 1 U = 12.3 x 27.2 mm / 2 U = 22 x 30.6 mm)
- Aluminium 2.5 mm, clear anodised (non-conductive)
- **Scope of delivery:**
 - 1 perforated fan front panel
- Front panel screws see below
- On-off switch see below



5.3.2.1 Fan Front Panel 84 HP for Vertical Ventilation

Description	Height	Air passage		Part-No.
		mm ²	sq. inch	
Without switch opening	~ 1 U	8664	13.42	21N084-01
With switch opening	~ 1 U	8664	13.42	21N084-02
Without switch opening	2 U	17328	26.85	21N284-01
With switch opening	2 U	17328	26.85	21N284-02

Front Panel Screws

- Set of 10 screws
- With screw retainer
- Fan front panel ~1 U = 4 screws; 2 U = 6 screws

Description	Part-No. 10 pcs.
Torx screws M2.5 x 11.3, size T8, with plastic screw retainer	63K159
Rounded head screws recessed M2.5 x 11.3, with plastic screw retainer	63-159

On-Off Switch

- Black body, plastic
- 2 pole
- 250V, 16A
- Quick-connect terminal 6.3 x 0.8 mm
- Cut-out for 4426-00: 22 x 30.6 mm (0.87" x 1.20")
- Cut-out others: 12.3 x 27.2 mm (0.48" x 1.07")

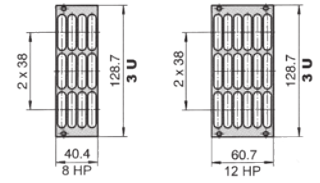
Description	Part-No.
On-off switch, indicator light green	69-410-04
On-off switch, without signal light	69-410-09



5: Ventilation

5.3.2.2 Fan Front Panel for Horizontal Ventilation

- Aluminium 2.5 mm, clear anodised (non-conductive)
- Scope of delivery:**
 - 1 perforated fan front panel
- Front panel screws see below



5.3.2.2 Fan Front Panel for Horizontal Ventilation



Height	Width	Air passage		Part-No.
		mm ²	sq. inch	
3 U	8 HP	3195	4.95	21N308-01
	12 HP	4793	7.42	21N312-01

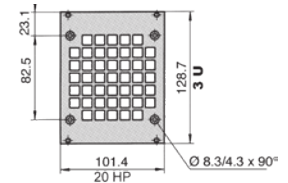
Front Panel Screws

- Set of 10 screws
- With screw retainer
- Fan front panel width up to 8 HP = 2 screws; ≥ 12 HP = 4 screws

Description	Part-No. 10 pcs.
Torx screws M2.5 x 11.3 , size T8, with plastic screw retainer	63K159
Rounded head screws recessed M2.5 x 11.3, with plastic screw retainer	63-159

5.3.2.3 Fan Front Panels for Direct Fan Mounting

- Aluminium 2.5 mm, clear anodised (non-conductive)
- Scope of delivery:**
 - 1 perforated fan front panel
- Front panel screws see below
- Assembly material for fan mounting see below



5.3.2.3 Fan Front Panels for Direct Fan Mounting



Description	Height	Width	Air passage		Part-No. 10 pcs.
			mm ²	sq. inch	
Without switch opening	3 U	20 HP	4051	6.27	21N320-04

Front Panel Screws

- Set of 10 screws
- With screw retainer
- Per front panel 4 screws are needed

Description	Part-No. 10 pcs.
Torx screws M2.5 x 11.3 , size T8, with plastic screw retainer	63K159
Rounded head screws recessed M2.5 x 11.3, with plastic screw retainer	63-159

Assembly Material for Fan Mounting

Description	Part-No.
Countersunk screw, recessed M4 x 10	5342-10
Hexagonal nut M4, 0.8D	5620-51
Countersunk self-tapping screw cross.recessed, 13 mm	5441-55

5.3.3 Air Baffle Cover

- When 84 HP fan modules are used, an air baffle cover can be fitted to regulate the cooling air flow and ensure maximum dissipation of the heat generated by the electronic devices.
- The air baffle cover is fixed to the internal extrusions by means of 4 screws.
- The air supplied to the printed PCBs (160 and 220 mm deep) above the baffle plate is regulated by opening or closing the vanes.
- To optimise the cooling air flow, a cover panel can be fitted to the back of the fan assembly. This will prevent internal air circulation.



5.3.3 Air Baffle Cover

- **Scope of delivery:**
 - 1 air baffle cover
 - Assembly material see below

Description	Card Depth		Part-No.
	mm	inch	
Air baffle cover	160	6.29	27-290
Air baffle cover	220	8.66	27-291

5.3.3.1 Assembly Material

Description	Part-No.
Torx cylinder head earthing screw M3 x 6, size T10	5443-04
Cross recessed milled edge earthing screw M3 x 6	61-283



MicroTCA 5U shelf

- Application: Telecommunications and enterprise computer network equipment
- Full redundancy provided by two MCHs (MicroTCA Carrier Hubs), two cooling units and two power modules for $-48\text{ V}/-60\text{ V}$
- 12 AMC Single modules, Compact-size and Full-size
- All pluggable components are hot-swappable and controlled via IPMI

www.elma.com

ELMA
Your Solution Partner