KO4700 Series

Ideal for industrial applications. Small to large in size, KO4700 enclosures can accommodate 8 to132 terminals for field wire connections. Series KO4700 enclosures can be customized to the exact number of terminals required. Standard enclosures are equipped with the maximum number of terminal strips and terminals.The KO4700 series are available with two types of terminations for connecting external wires. The Pressure Plate type terminals,with a center line spacing of 9mm (.35 in.) and the Box Clamp design, which has a 5mm (.19 in.) center line spacing for much higher density.

MATERIALS

Housing

Housing Shell: Polycarbonate, 10% Glass Filled
Cover: Polycarbonate, 10% Glass Filled
Cover Panel: Clear Polycarbonate or Glass Filled Polycarbonate

Terminals

Pressure Plate: Zinc Plated, Chromated Steel
Terminal Screw: Zinc Plated, Chromated Steel
Clamp: Nickel Plated Brass
Busbar: Tin Plated Bronze
Connector Contact: Beryllium Copper, Tin Plated
(gold plating available)

Temperature Rating:

125°C (257°F), UL94VO
Housing Shell Color: Black
Terminal Cover Color: Tan

PROTECTION

KO4700 enclosures have an IP20 rating (finger protected) and meet VBG4 and other European accident prevention requirements.

CONSTRUCTION

The KO4700 enclosure series consists of a black housing shell and a tan cover with integral terminals and terminal-to-board connections. They are supplied unassembled.

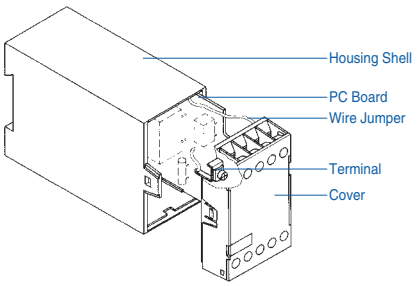
The housing shell has molded printed circuit board guides to save time when inserting printed circuit boards, prevent misconnections and to keep the boards from moving. Integral tabs on the bottom of the shell further help to hold boards in place, eliminating lateral movement. KO4700 housing shells can be potted.

Printed circuit boards can be mounted in three ways:

- Behind the Front Cover
- Horizontally
- Vertically

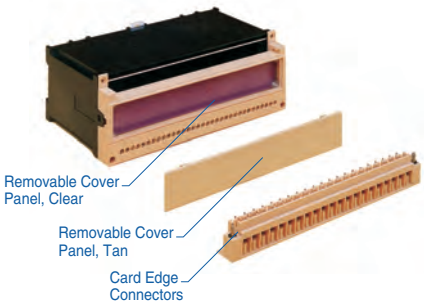
Depending on the enclosure type, one board can be mounted directly behind the front cover (parallel to the DIN rail).Boards can also be mounted horizontally (parallel to the DIN rail) or vertically (perpendicular to the DIN rail). (Refer to the Ordering Pages for board patterns and location of board guides.)

The housing cover snaps onto the housing shell. Two keyed tabs lock the cover firmly in place. Removal of the cover is possible for service and repair.



COVER DESIGNS

Single piece, tan color covers are typically used with the smaller enclosures. They incorporate terminals and connections to the inside of the enclosure. In some of the smaller enclosures, the cover doubles as a plug. A printed circuit board can be mounted directly behind the front cover. This board is ideal for mounting components used for setting, adjusting and monitoring such as switches, potentiometer, LEDs and LCDs. There is no interference with any other boards mounted within the enclosure.

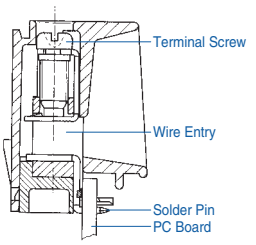


Modular covers consist of a one-piece tan frame with matching flat front panel. Some versions have a front cover panel that is removable and offered in matching tan or clear. The front covers can be custom imprinted or marking plates can be produced and installed behind the transparent front cover panel.

TERMINAL DESIGNS

Select from Pressure Plate or Box Clamp terminals with wire protectors, and fixed or pluggable terminal-to-board connections. (Please refer to the Ordering Pages). Removable fixed or pluggable terminal strips can be replaced by terminal plugs if not all of the external connections of the standard enclosure are needed. The terminal screws used with both the pressure plate and box clamp designs can be operated with a flat tip or a #1 or #2 Philips type screwdriver.

Pressure Plate Termination



This type of terminal consists of a pressure plate (captive to the terminal screw) and the terminal bottom. The pressure plate rises automatically when the screw is loosened. One or two wires, of equal or different sizes up to 2.5mm² (14 AWG) can be terminated. The grooved corners of the pressure plate ensure positive retention of wire(s). The flat bottom of the terminal extends to the inside of the enclosure and connects the terminal to the board(s) inside.

Box Clamp Termination

The box clamp terminal accepts wires up to 4mm² (12 AWG). When the terminal screw is tightened, the serrated bottom of the wire protector pushes the wire to be terminated against the serrated busbar. The busbar extends to the inside of the enclosure to provide the terminal-to-board connection.

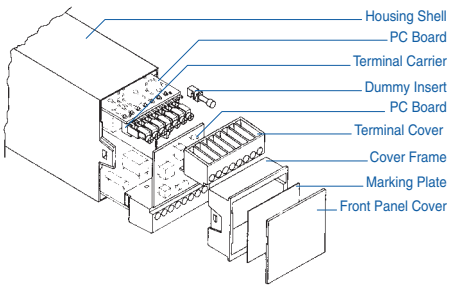
TERMINAL-TO-BOARD CONNECTIONS

The KO4700 Series offers fixed and pluggable terminal-to-board connection possibilities. (Please refer to the Ordering Pages on the following pages for your selection.)

Fixed Connections

Fixed terminal-to-board connections can be made by Wire Jumper, Fast On tabs, Solder tabs, or Machine Solderable Pins.

Fast On tabs, 2.8mm (.11in.) accept industry standard Fast On connectors. Use with wire jumpers to connect to board(s).



Wire Jumper connections can also be made by soldering a wire jumper between the center hole of the Fast On tab and the printed circuit board(s).

Solder Tab can be hand soldered to the board.

Machine Solderable Pins can be machine soldered to the board in the same step as the other components, saving assembly time. The metal parts of the terminals are supplied as separate strips which snap into the terminal housing after soldering.

Pluggable Connections

The pluggable terminal strips of the KO4700 series fit across the width of the enclosure and plug directly into the board(s) by using a Card Edge connector. Enclosures equipped with pressure plate terminals also provide Solder Tabs for terminal-to-board connections when mounting an additional board directly behind the front cover. A Wire Jumper can be soldered to these tabs as well.

For better retention, the strips have captive screws at each end that insert into brass bushings, molded into the housing shell. The pluggable versions are ideal whenever quick connections and replacement of boards and devices is important. They also reduce the danger of misconnected wires and downtime.

MOUNTING

The KO4700 Series enclosures are designed to be mounted on standard 35 x 7.5mm DIN rail but will also fit on the 35 x15mm DIN rail. The extra high enclosures should be mounted on the deeper, 35 x 15mm DIN rail. (Refer to the Ordering Pages on the following pages to determine the correct size rail for the enclosure you select.)

KO4700 series enclosures can also be panel mounted using pull-out tabs on the base of the enclosure. One tab is factory installed on each enclosure. Up to a total of 6 pull-out mounting tabs can be installed (See Accessories) (Refer to page 49 for mounting instructions.)

MARKING

KO4700 enclosures have a flat center area on the cover for marking and mounting of components. Several types have removable front cover panels, which can be marked at a separate location. Imprinted marking plates can be used in conjunction with the transparent, removable cover panel.

ACCESSORIES

- Terminal Cover Strips
- Pull-Out Panel Mounting Tabs
- Screws for Mounting Printed Circuit Board
- 35 x 7.5mm DIN Rail
- 35 x 15mm DIN Rail

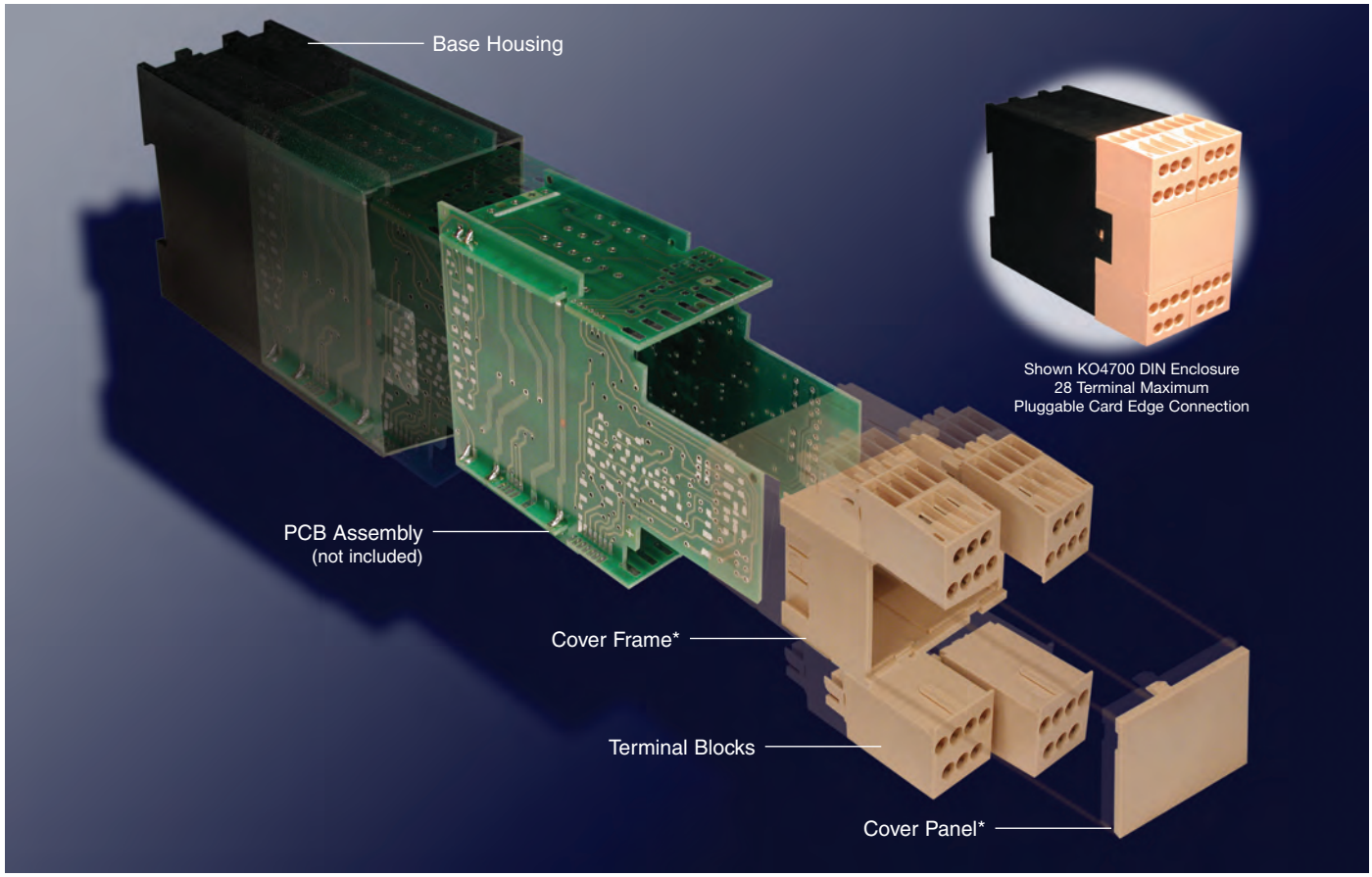
CUSTOMIZATION

Enclosures can be customized to the exact number of terminals needed. We can punch, drill or cut custom cutouts and holes for potentiometers, switches, LEDs or LDCs. Custom colors and special markings are also available. Please call us for further information.

MODULAR ENCLOSURES *(pages 32-39)*

A group of modular enclosures is available in the KO4700 series. These enclosures can be ordered in a variety of terminal arrangements allowing for many different customized configurations. Terminal sets are available in 3, 4 and 7 pole blocks as well as blank blocks without terminals. High Current terminals are also available on some models. This modular terminal design allows anywhere from 0 to 56 terminals for field wire connections.

The KO4700 modular enclosures have the same design features of the standard series as well as the same materials. The terminals are of the box clamp style. The standard terminals feature pluggable connections while solder connections are used on the high current terminals. Printed circuit board placement is horizontal (parallel to the DIN rail) or vertical (perpendicular to the DIN rail).



Ordering Information

The modular enclosures are ordered in separate pieces. A complete enclosure consists of a base, cover frame*, cover panel* and the appropriate number of terminal blocks. Standard terminal blocks can be ordered as blank blocks with no termination points or with 3, 4, or 7 terminations. High current terminal blocks are available on some models. Theses blocks can also be ordered as blank blocks with no terminations or with 3 terminations. (Please refer to the Ordering Pages on the following pages for a list of how many blocks should be ordered per enclosure).

* High current versions have one piece center cover section instead of this two piece design.

8 Terminal
Solder Connection

TECHNICAL INFORMATION

Electrical:
16A, 300V, 22-12 AWG
Housing Material:
Glass-filled Polycarbonate
Cover Material:
Glass-filled Polycarbonate
Temperature Range:
Up to 125°C (257°F)
Flammability Rating:
UL94 V-O (V-2 Clear Panel)
Color:
Black Housing with Tan Cover

Terminal Type:
Box Clamp
Terminal Screw Size:
M3.5
Recommended Torque:
0.8Nm
Max. PCB's:
(2) Vertical
(1) Behind cover
Mounting:
35mm DIN Rail or optional panel mounting*

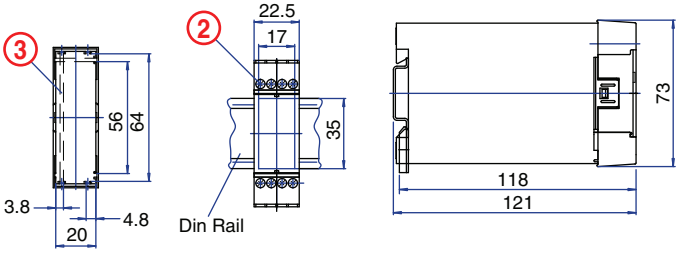
ORDERING INFORMATION

Part Number	Type	Description	PCB Connection
90.201	KO4712	Solid Cover	Machine Solderable Pins
90.201.1	KO4712	Removable Cover Panel, Tan	Machine Solderable Pins
90.201.2	KO4712	Removable Cover Panel, Clear	Machine Solderable Pins

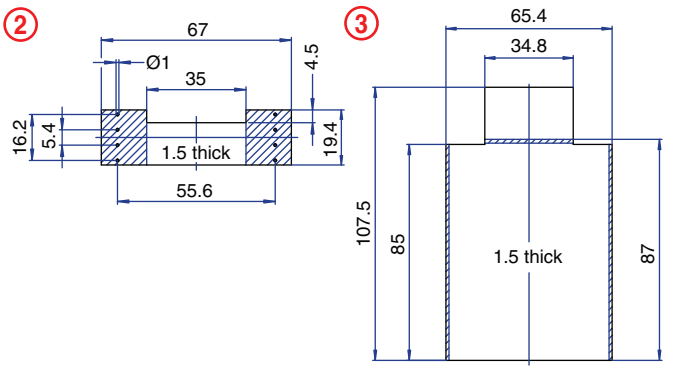
ACCESSORIES

Accessories	Part Number	Type
1 Meter DIN Rail	2511120/1M	TS35x7.5/1M
*Panel Mount Tab	93.001.2	PMA

ENCLOSURE DRAWING (To convert to inches divide by 25.4.)



PCB DRAWING (To convert to inches divide by 25.4.)



unused space

8 Terminal
Solder/Tab Connection

TECHNICAL INFORMATION

Electrical:
16A, 300V, 22-12 AWG
Housing Material:
Glass-filled Polycarbonate
Cover Material:
Glass-filled Polycarbonate
Temperature Range:
Up to 125°C (257°F)
Flammability Rating:
UL94 V-O (V-2 Clear Panel)
Color:
Black Housing with Tan Cover

Terminal Type:
Box Clamp
Terminal Screw Size:
M3.5
Recommended Torque:
0.8Nm
Max. PCB's:
(2) Vertical
Mounting:
35mm DIN Rail or optional panel mounting*

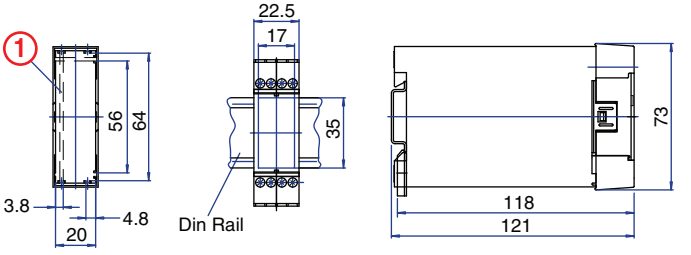
ORDERING INFORMATION

Part Number	Type	Description	PCB Connection
90.202	KO4712B	Solid Cover	Wire Jumper
90.202.1	KO4712B	Removable Cover Panel, Tan	Wire Jumper
90.202.2	KO4712B	Removable Cover Panel, Clear	Wire Jumper

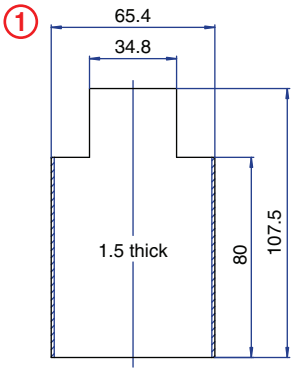
ACCESSORIES

Accessories	Part Number	Type
1 Meter DIN Rail	2511120/1M	TS35x7.5/1M
*Panel Mount Tab	93.001.2	PMA

ENCLOSURE DRAWING (To convert to inches divide by 25.4.)



PCB DRAWING (To convert to inches divide by 25.4.)



unused space

10 Terminal
Spring Clamp
Solder/Tab Connection

TECHNICAL INFORMATION

Electrical:
16A, 300V, 24-14 AWG
Housing Material:
Glass-filled Polycarbonate
Cover Material:
Glass-filled Polycarbonate
Temperature Range:
Up to 125°C (257°F)
Flammability Rating:
UL94 V-O
Color:
Black Housing with Tan Cover

Terminal Type:
Spring Cage Clamp
Terminal Screw Size:
–
Recommended Torque:
–
Max. PCB's:
(2) Vertical
Mounting:
35mm DIN Rail

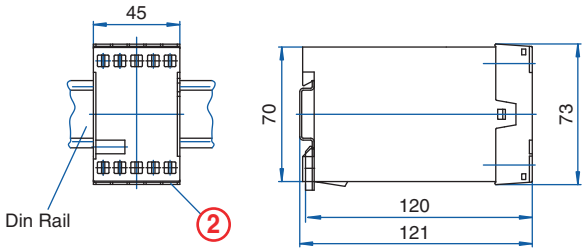
ORDERING INFORMATION

Part Number	Type	Description	PCB Connection
90.215	KO4761	Solid Cover	Wire Jumper/ Fast On

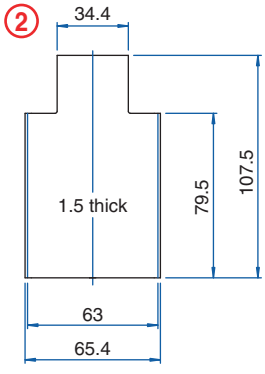
ACCESSORIES

Accessories	Part Number	Type
1 Meter DIN Rail	2511120/1M	TS35x7.5/1M

ENCLOSURE DRAWING (To convert to inches divide by 25.4.)



PCB DRAWING (To convert to inches divide by 25.4.)



unused space

10 Terminal
Solder/Tab Connection

TECHNICAL INFORMATION

Electrical:
25A, 300V, 22-14 AWG
Housing Material:
Glass-filled Polycarbonate
Cover Material:
Glass-filled Polycarbonate
Temperature Range:
Up to 125°C (257°F)
Flammability Rating:
UL94 V-O
Color:
Black Housing with Tan Cover

Terminal Type:
Screw / Pressure Plate
Terminal Screw Size:
M3.5
Recommended Torque:
0.8Nm
Max. PCB's:
(2) Vertical
Mounting:
35mm DIN Rail

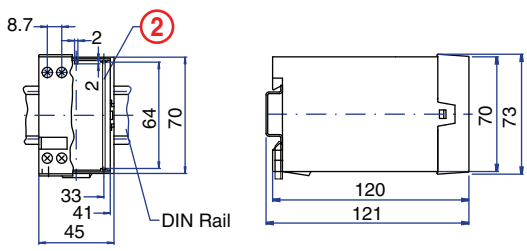
ORDERING INFORMATION

Part Number	Type	Description	PCB Connection
90.230	KO4762	Solid Cover	Wire Jumper/ Fast On

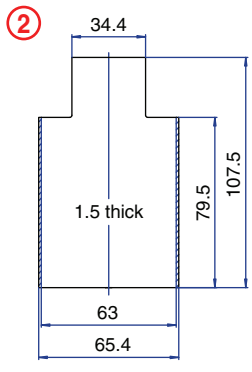
ACCESSORIES

Accessories	Part Number	Type
1 Meter DIN Rail	2511120/1M	TS35x7.5/1M

ENCLOSURE DRAWING (To convert to inches divide by 25.4.)



PCB DRAWING (To convert to inches divide by 25.4.)



unused space

16 Terminal
Solder Connection

TECHNICAL INFORMATION

Electrical:
16A, 300V, 22-12 AWG
Housing Material:
Glass-filled Polycarbonate
Cover Material:
Glass-filled Polycarbonate
Temperature Range:
Up to 125°C (257°F)
Flammability Rating:
UL94 V-O (V-2 clear panel)
Color:
Black Housing with Tan Cover

Terminal Type:
Box Clamp
Terminal Screw Size:
M3.5
Recommended Torque:
0.8Nm
Max. PCB's:
(2) Vertical
(1) Horizontal
Mounting:
35mm DIN Rail

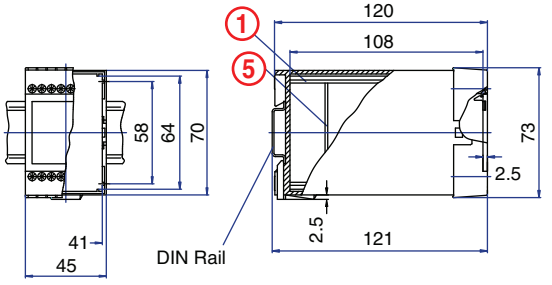
ORDERING INFORMATION

Part Number	Type	Description	PCB Connection
90.290	KO4763A	Solid Cover	Machine Solderable Pins
90.291	KO4763A	Removable Cover Panel, Tan	Machine Solderable Pins
90.292	KO4763A	Removable Cover Panel, Clear	Machine Solderable Pins

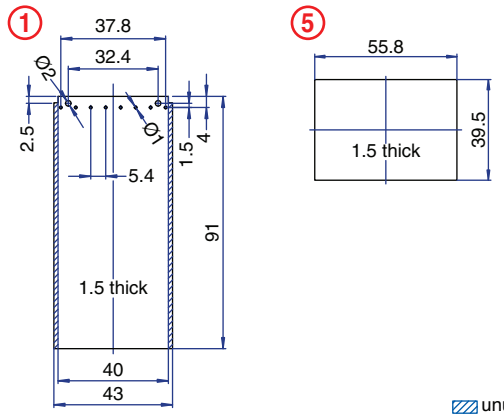
ACCESSORIES

Accessories	Part Number	Type
1 Meter DIN Rail	2511120/1M	TS35x7.5/1M

ENCLOSURE DRAWING (To convert to inches divide by 25.4.)



PCB DRAWING (To convert to inches divide by 25.4.)



unused space

16 Terminal
Solder/Tab Connection

TECHNICAL INFORMATION

Electrical:
16A, 300V, 22-12 AWG
Housing Material:
Glass-filled Polycarbonate
Cover Material:
Glass-filled Polycarbonate
Temperature Range:
Up to 125°C (257°F)
Flammability Rating:
UL94 V-O (V-2 clear panel)
Color:
Black Housing with Tan Cover

Terminal Type:
Box Clamp
Terminal Screw Size:
M3.5
Recommended Torque:
0.8Nm
Max. PCB's:
(2) Vertical
Mounting:
35mm DIN Rail

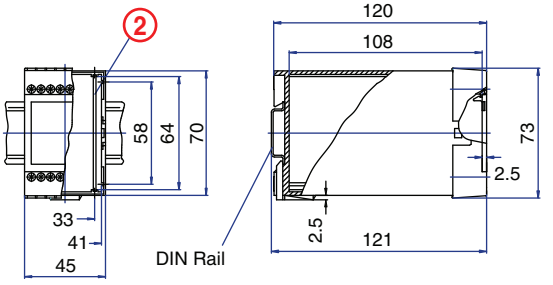
ORDERING INFORMATION

Part Number	Type	Description	PCB Connection
90.300	KO4763B	Solid Cover	Wire Jumper
90.301	KO4763B	Removable Cover Panel, Tan	Wire Jumper
90.302	KO4763B	Removable Cover Panel, Clear	Wire Jumper

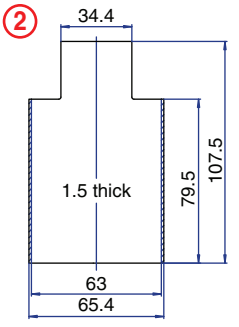
ACCESSORIES

Accessories	Part Number	Type
1 Meter DIN Rail	2511120/1M	TS35x7.5/1M

ENCLOSURE DRAWING (To convert to inches divide by 25.4.)



PCB DRAWING (To convert to inches divide by 25.4.)



unused space

16 Terminal
Pluggable Connection

TECHNICAL INFORMATION

Electrical:
10A, 300V, 22-12 AWG
Housing Material:
Glass-filled Polycarbonate
Cover Material:
Glass-filled Polycarbonate
Temperature Range:
Up to 125°C (257°F)
Flammability Rating:
UL94 V-O (V-2 clear panel)
Color:
Black Housing with Tan Cover

Terminal Type:
Box Clamp
Terminal Screw Size:
M3.5
Recommended Torque:
0.8Nm
Max. PCB's:
(2) Vertical
(1) Horizontal
Mounting:
35mm DIN Rail

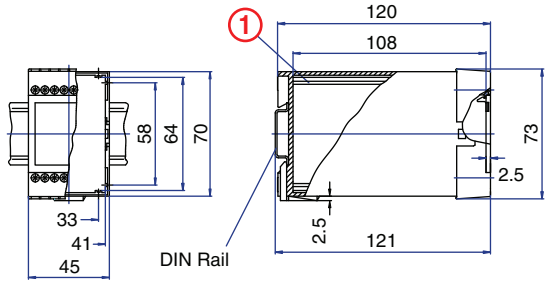
ORDERING INFORMATION

Part Number	Type	Description	PCB Connection
90.320	KO4763P	Solid Cover	Card Edge
90.321	KO4763P	Removable Cover Panel, Tan	Card Edge
90.322	KO4763P	Removable Cover Panel, Clear	Card Edge

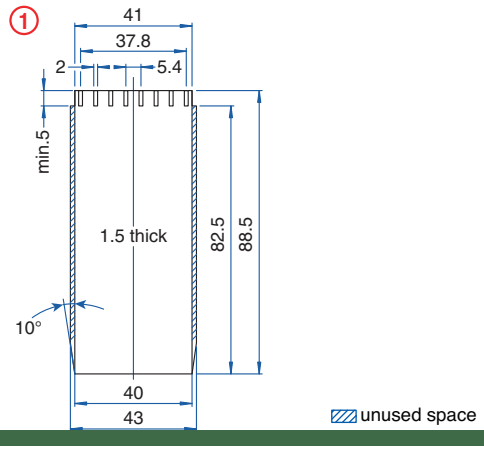
ACCESSORIES

Accessories	Part Number	Type
1 Meter DIN Rail	2511120/1M	TS35x7.5/1M

ENCLOSURE DRAWING (To convert to inches divide by 25.4.)



PCB DRAWING (To convert to inches divide by 25.4.)



20 Terminal
Pluggable Connection

TECHNICAL INFORMATION

Electrical:
10A, 300V, 22-14 AWG
Housing Material:
Glass-filled Polycarbonate
Cover Material:
Glass-filled Polycarbonate
Temperature Range:
Up to 125°C (257°F)
Flammability Rating:
UL94 V-O (V-2 clear panel)
Color:
Black Housing with Tan Cover

Terminal Type:
Screw / Pressure Plate
Terminal Screw Size:
M3.5
Recommended Torque:
0.8Nm
Max. PCB's:
(5) Vertical
(1) Horizontal behind cover
Mounting:
35mm DIN Rail or optional panel mounting*

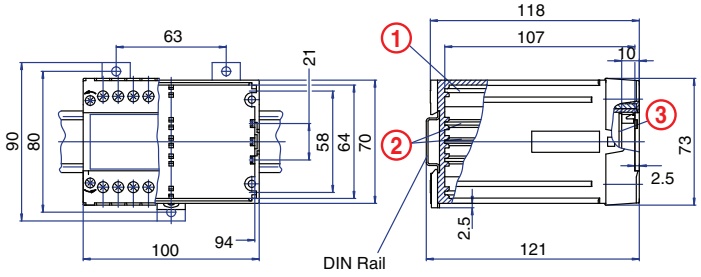
ORDERING INFORMATION

Part Number	Type	Description	PCB Connection
90.350	KO4718P	Solid Cover	Card Edge/ Wire Jumper
90.351	KO4718P	Removable Cover Panel, Tan	Card Edge/ Wire Jumper
90.352	KO4718P	Removable Cover Panel, Clear	Card Edge/ Wire Jumper

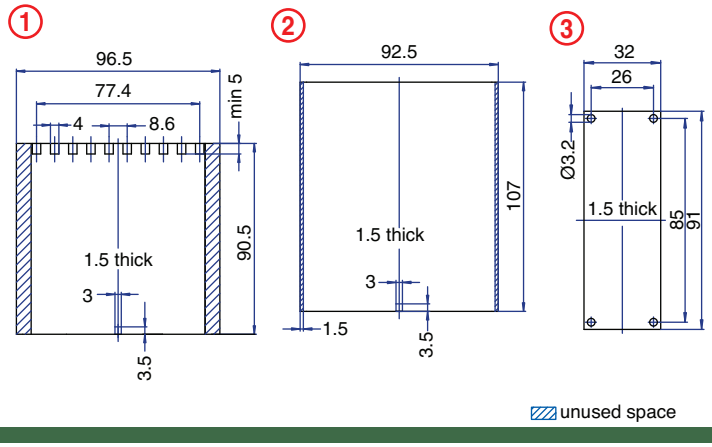
ACCESSORIES

Accessories	Part Number	Type
1 Meter DIN Rail	2511120/1M	TS35x7.5/1M
*Panel Mount Tab (need 2)	93.001.2	PMA

ENCLOSURE DRAWING (To convert to inches divide by 25.4.)



PCB DRAWING (To convert to inches divide by 25.4.)



22 Terminal
Solder Connection

TECHNICAL INFORMATION

Electrical:
16A, 300V, 22-12 AWG

Housing Material:
Glass-filled Polycarbonate

Cover Material:
Glass-filled Polycarbonate

Temperature Range:
Up to 125°C (257°F)

Flammability Rating:
UL94 V-O (V-2 Clear Panel)

Color:
Black Housing with Tan Cover

Terminal Type:
Box Clamp

Terminal Screw Size:
M3.5

Recommended Torque:
0.8Nm

Max. PCB's:
(5) Vertical
(1) Behind cover

Mounting:
35mm DIN Rail or optional panel mounting*

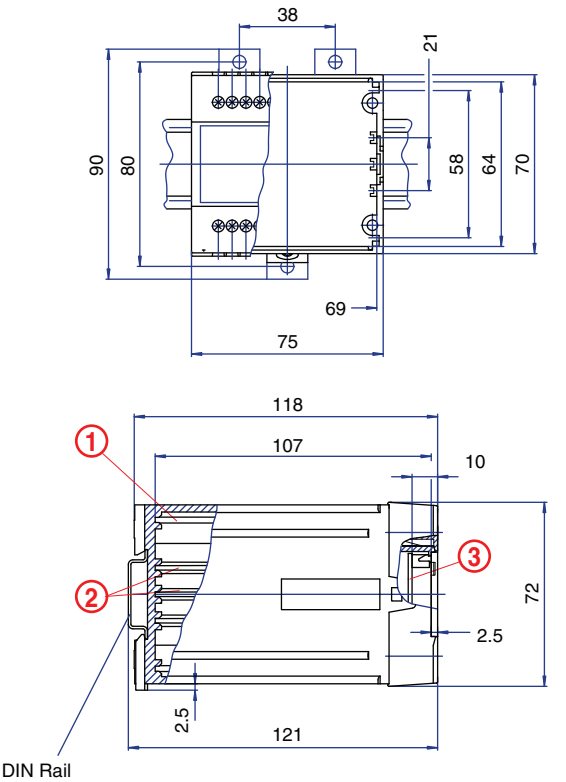
ORDERING INFORMATION

Part Number	Type	Description	PCB Connection
90.380	KO4713A	Solid Cover	Machine Solderable Pins
90.381	KO4713A	Removable Cover Panel, Tan	Machine Solderable Pins
90.382	KO4713A	Removable Cover Panel, Clear	Machine Solderable Pins

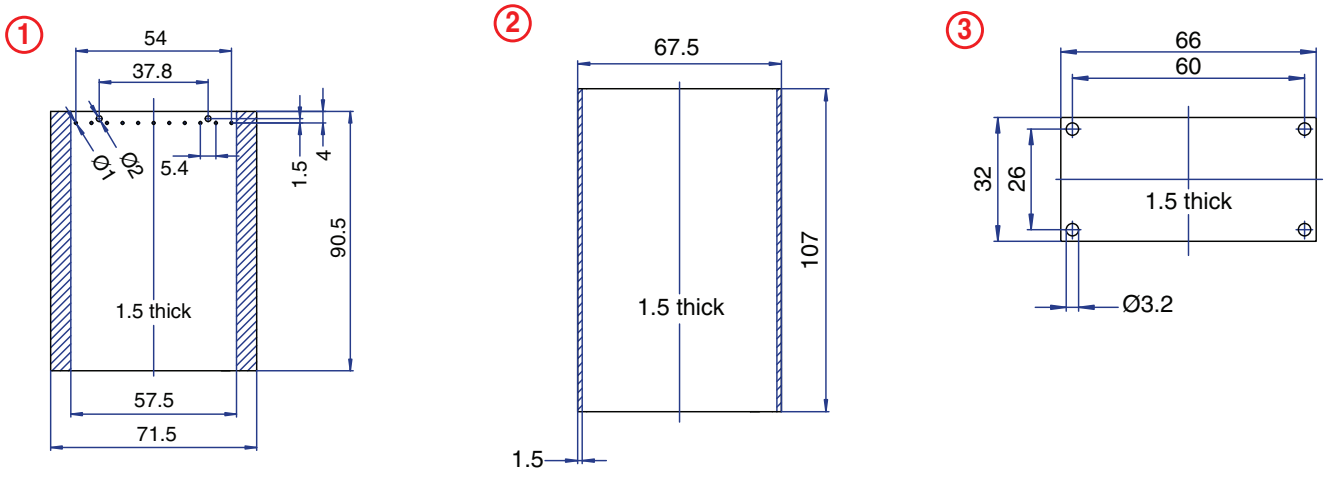
ACCESSORIES

Accessories	Part Number	Type
1 Meter DIN Rail	2511120/1M	TS35x7.5/1M
*Panel Mount Tab (need 2)	93.001.2	PMA

ENCLOSURE DRAWING (To convert to inches divide by 25.4.)



PCB DRAWING (To convert to inches divide by 25.4.)



22 Terminal
Pluggable Connection

TECHNICAL INFORMATION

Electrical:
10A, 300V, 22-12 AWG

Housing Material:
Glass-filled Polycarbonate

Cover Material:
Glass-filled Polycarbonate

Temperature Range:
Up to 125°C (257°F)

Flammability Rating:
UL94 V-O (V-2 clear panel)

Color:
Black Housing with Tan Cover

Terminal Type:
Box Clamp

Terminal Screw Size:
M3.5

Recommended Torque:
0.8Nm

Max. PCB's:
(5) Vertical
(1) Behind cover

Mounting:
35mm DIN Rail or
optional panel mounting*

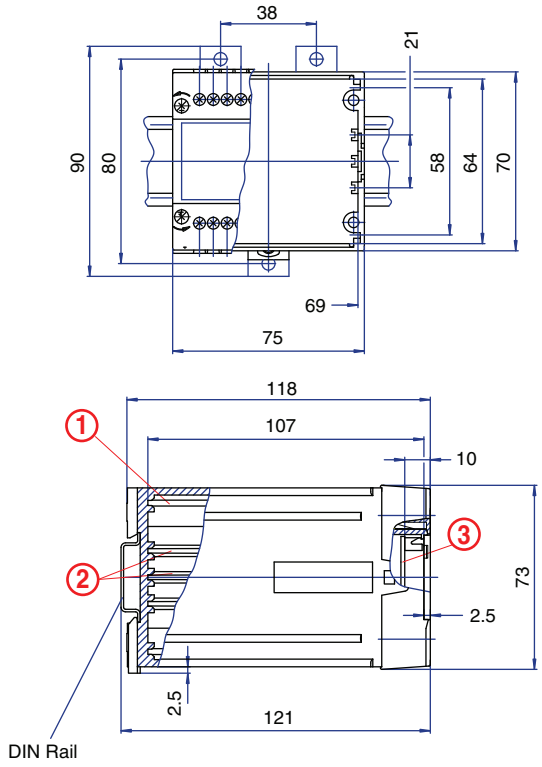
ORDERING INFORMATION

Part Number	Type	Description	PCB Connection
90.410	KO4713P	Solid Cover	Card Edge
90.411	KO4713P	Removable Cover Panel, Tan	Card Edge
90.412	KO4713P	Removable Cover Panel, Clear	Card Edge

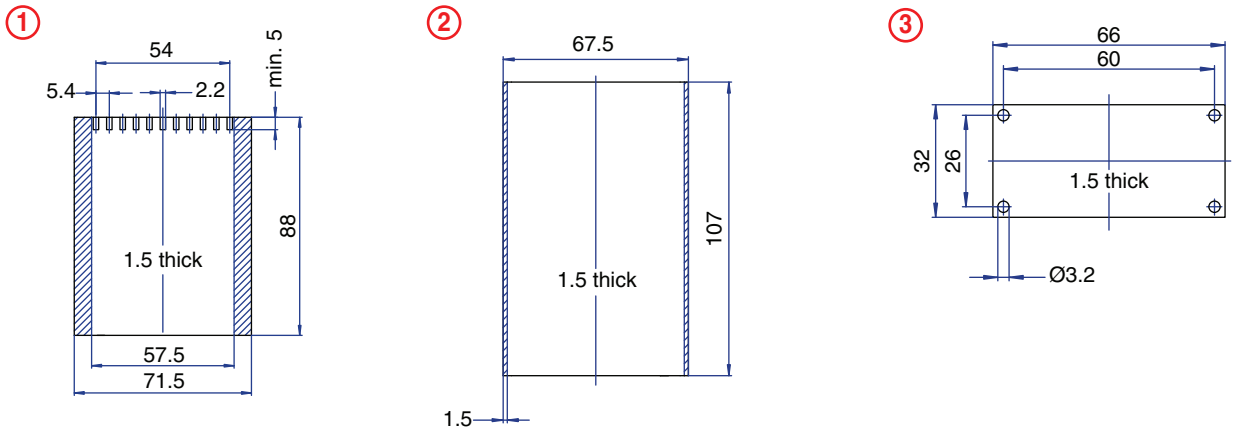
ACCESSORIES

Accessories	Part Number	Type
1 Meter DIN Rail	2511120/1M	TS35x7.5/1M
*Panel Mount Tab (need 2)	93.001.2	PMA

ENCLOSURE DRAWING (To convert to inches divide by 25.4.)

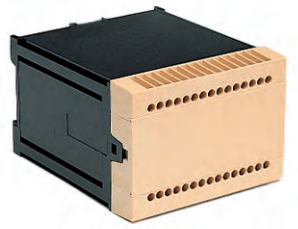


PCB DRAWING (To convert to inches divide by 25.4.)



unused space

30 Terminal
Solder Connection



TECHNICAL INFORMATION

Electrical:
16A, 300V, 22-12 AWG

Housing Material:
Glass-filled Polycarbonate

Cover Material:
Glass-filled Polycarbonate

Temperature Range:
Up to 125°C (257°F)

Flammability Rating:
UL94 V-O (V-2 clear panel)

Color:
Black Housing with Tan Cover

Terminal Type:
Box Clamp

Terminal Screw Size:
M3.5

Recommended Torque:
0.8Nm

Max. PCB's:
(5) Vertical
(1) Behind Cover

Mounting:
35mm DIN Rail or optional panel mounting*

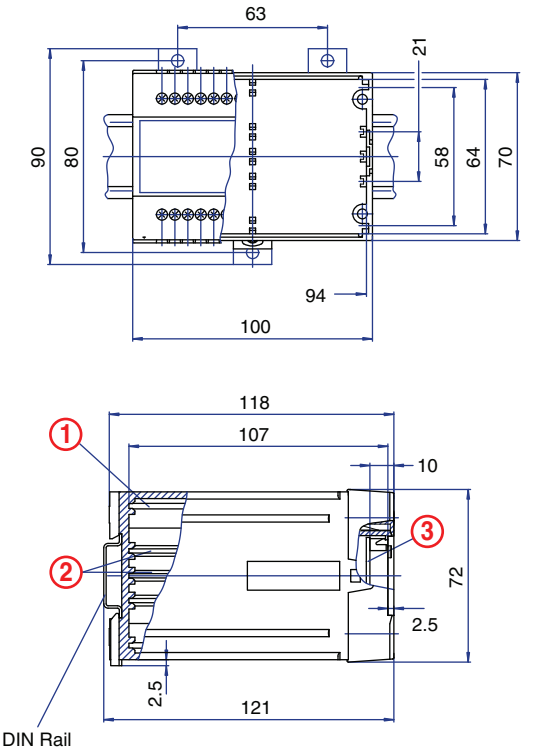
ORDERING INFORMATION

Part Number	Type	Description	PCB Connection
90.440	KO4717A	Solid Cover	Machine Solderable Pins
90.441	KO4717A	Removable Cover Panel, Tan	Machine Solderable Pins
90.442	KO4717A	Removable Cover Panel, Clear	Machine Solderable Pins

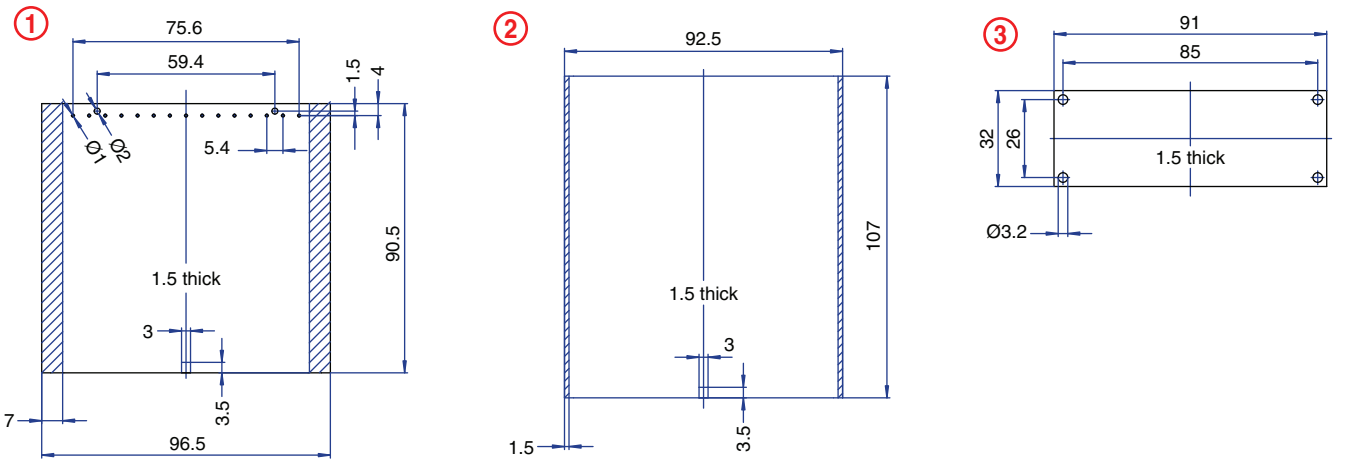
ACCESSORIES

Accessories	Part Number	Type
1 Meter DIN Rail	2511120/1M	TS35x7.5/1M
*Panel Mount Tab (need 2)	93.001.2	PMA

ENCLOSURE DRAWING (To convert to inches divide by 25.4.)



PCB DRAWING (To convert to inches divide by 25.4.)



unused space

30 Terminal
Pluggable Connection

TECHNICAL INFORMATION

Electrical:
10A, 300V, 22-12 AWG

Housing Material:
Glass-filled Polycarbonate

Cover Material:
Glass-filled Polycarbonate

Temperature Range:
Up to 125°C (257°F)

Flammability Rating:
UL94 V-O (V-2 clear panel)

Color:
Black Housing with Tan Cover

Terminal Type:
Box Clamp

Terminal Screw Size:
M3.5

Recommended Torque:
0.8Nm

Max. PCB's:
(5) Vertical
(1) Behind Cover

Mounting:
35mm DIN Rail or optional panel mounting*

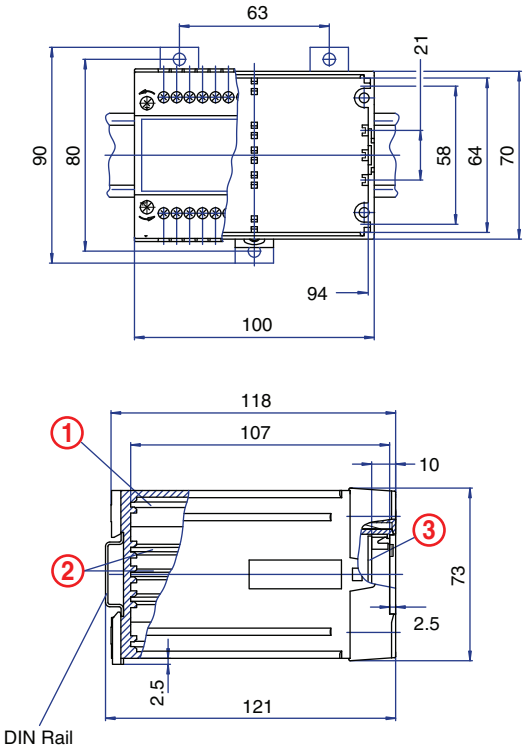
ORDERING INFORMATION

Part Number	Type	Description	PCB Connection
90.470	KO4717P	Solid Cover	Card Edge
90.471	KO4717P	Removable Cover Panel, Tan	Card Edge
90.472	KO4717P	Removable Cover Panel, Clear	Card Edge

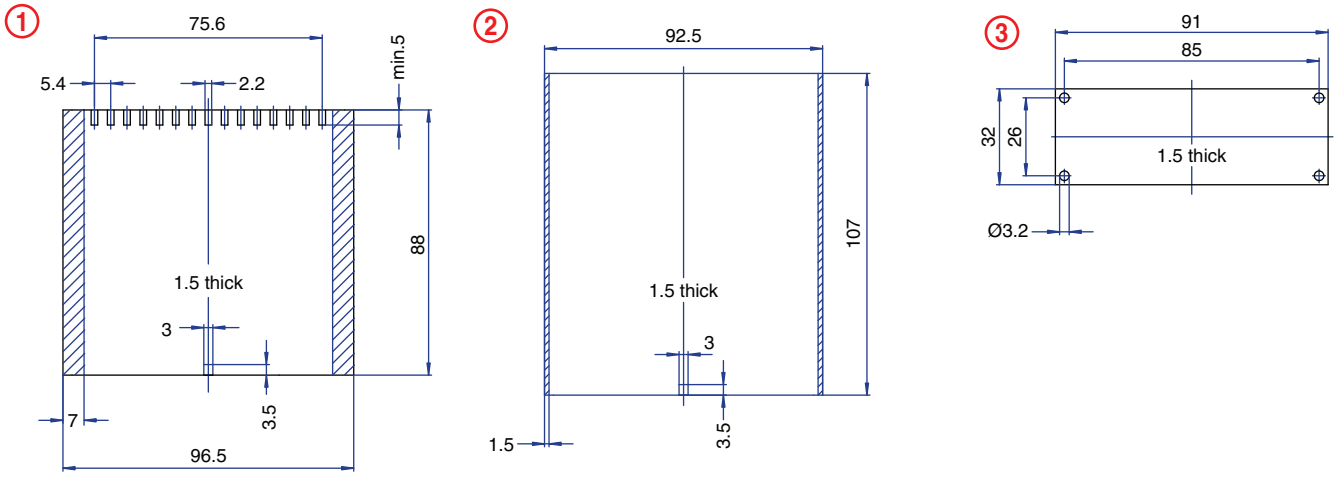
ACCESSORIES

Accessories	Part Number	Type
1 Meter DIN Rail	2511120/1M	TS35x7.5/1M
*Panel Mount Tab (need 2)	93.001.2	PMA

ENCLOSURE DRAWING (To convert to inches divide by 25.4.)



PCB DRAWING (To convert to inches divide by 25.4.)



unused space

32 Terminal

Pluggable and Solder Connection

TECHNICAL INFORMATION

Electrical:
10A, 300V, 22-14 AWG

Housing Material:
Glass-filled Polycarbonate

Cover Material:
Glass-filled Polycarbonate

Temperature Range:
Up to 125°C (257°F)

Flammability Rating:
UL94 V-O (V-2 clear panel)

Color:
Black Housing with Tan Cover

Terminal Type:
Screw/ Pressure Plate

Terminal Screw Size:
M3.5

Recommended Torque:
0.8Nm

Max. PCB's:
(5) Vertical
(1) Behind cover
(1) Base Mount

Mounting:
35mm DIN Rail or optional panel mounting*

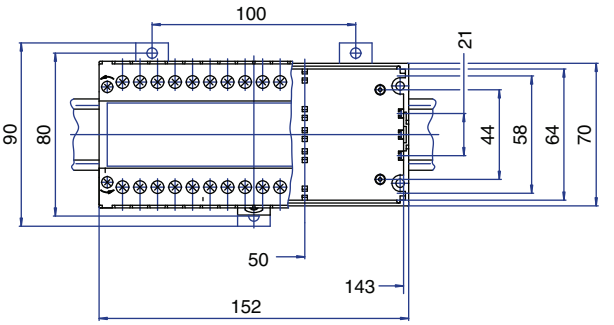
ORDERING INFORMATION

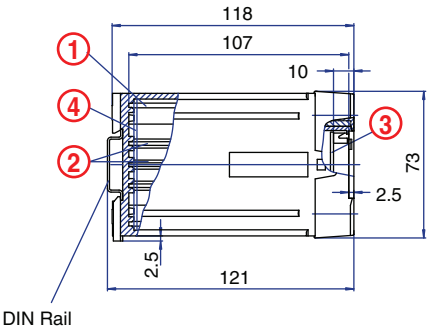
Part Number	Type	Description	PCB Connection
90.500	KO4719P	Solid Cover	Card Edge/ Wire Jumper
90.501	KO4719P	Removable Cover Panel, Tan	Card Edge/ Wire Jumper
90.502	KO4719P	Removable Cover Panel, Clear	Card Edge/ Wire Jumper

ACCESSORIES

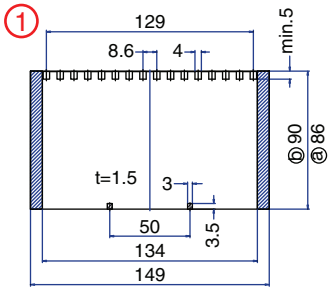
Accessories	Part Number	Type
1 Meter DIN Rail	2511120/1M	TS35x7.5/1M
*Panel Mount Tab (need 3)	93.001.2	PMA

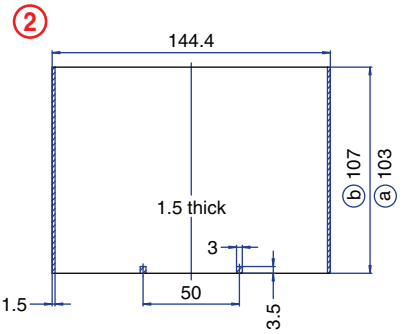
ENCLOSURE DRAWING (To convert to inches divide by 25.4.)

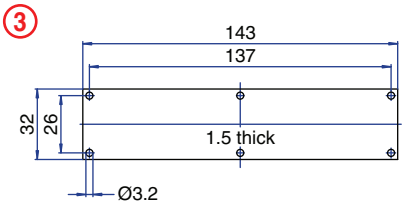


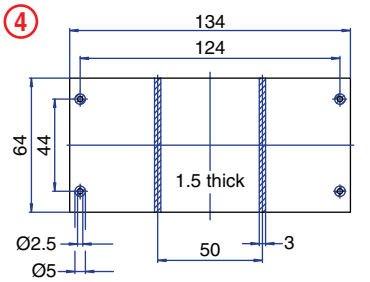


PCB DRAWING (To convert to inches divide by 25.4.)









unused space
ⓐ with base mount PCB
ⓑ without base mount PCB

42 Terminal

Pluggable and Solder Connection

TECHNICAL INFORMATION

Electrical:
10A, 300V, 22-14 AWG

Housing Material:
Glass-filled Polycarbonate

Cover Material:
Glass-filled Polycarbonate

Temperature Range:
Up to 125°C (257°F)

Flammability Rating:
UL94 V-O (V-2 clear panel)

Color:
Black Housing with Tan Cover

Terminal Type:
Screw/ Pressure Plate

Terminal Screw Size:
M3.5

Recommended Torque:
0.8Nm

Max. PCB's:
(5) Vertical
(1) Behind cover

Mounting:
35mm DIN Rail or optional panel mounting*

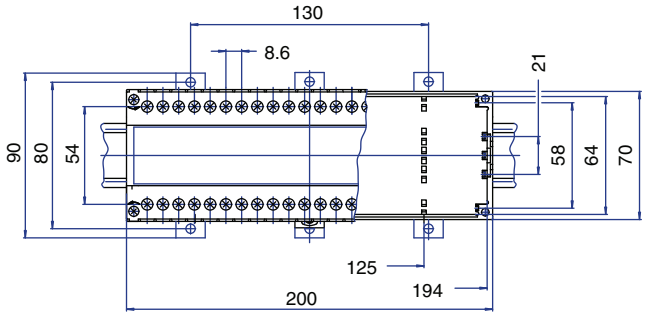
ORDERING INFORMATION

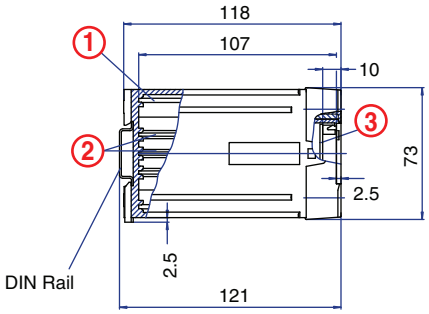
Part Number	Type	Description	PCB Connection
90.530	KO4720P	Solid Cover	Card Edge/ Wire Jumper
90.531	KO4720P	Removable Cover Panel, Tan	Card Edge/ Wire Jumper
90.532	KO4720P	Removable Cover Panel, Clear	Card Edge/ Wire Jumper

ACCESSORIES

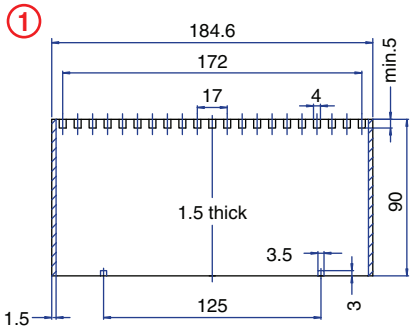
Accessories	Part Number	Type
1 Meter DIN Rail	2511120/1M	TS35x7.5/1M
*Panel Mount Tab (need 3)	93.001.2	PMA

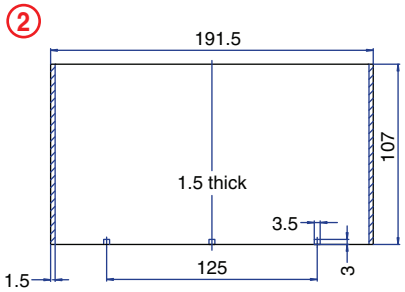
ENCLOSURE DRAWING (To convert to inches divide by 25.4.)

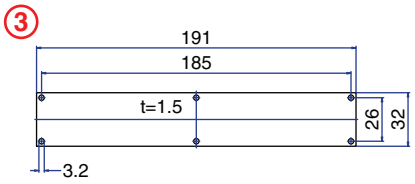




PCB DRAWING (To convert to inches divide by 25.4.)







unused space

42 Terminal

Pluggable and Solder Connection

TECHNICAL INFORMATION

Electrical:
10A, 300V, 22-14 AWG

Housing Material:
Glass-filled Polycarbonate

Cover Material:
Glass-filled Polycarbonate

Temperature Range:
Up to 125°C (257°F)

Flammability Rating:
UL94 V-O

Color:
Black Housing with Tan Cover

Terminal Type:
Screw/ Pressure Plate

Terminal Screw Size:
M3.5

Recommended Torque:
0.8Nm

Max. PCB's:
(11) Vertical
(1) Base Mount

Mounting:
35mm DIN Rail or optional panel mounting*

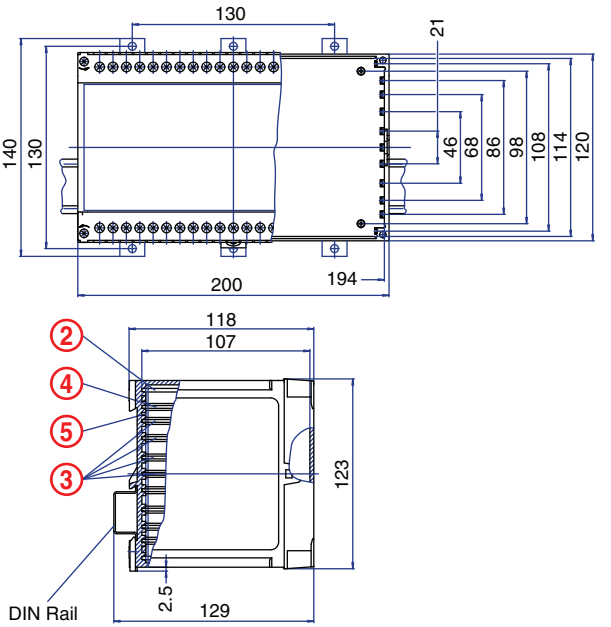
ORDERING INFORMATION

Part Number	Type	Description	PCB Connection
90.560	KO4722SP	Solid Cover	Card Edge/ Wire Jumper

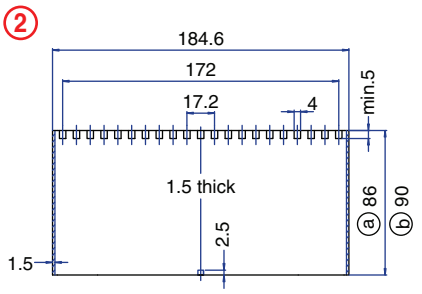
ACCESSORIES

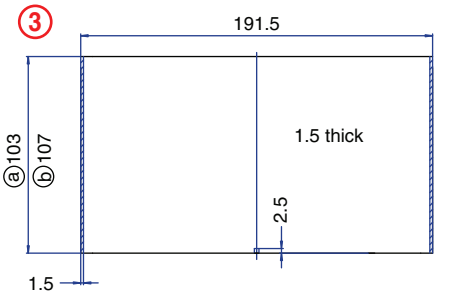
Accessories	Part Number	Type
1 Meter DIN Rail	CA701/15-S	TS35x15/1M
*Panel Mount Tab (need 3)	93.001.2	PMA

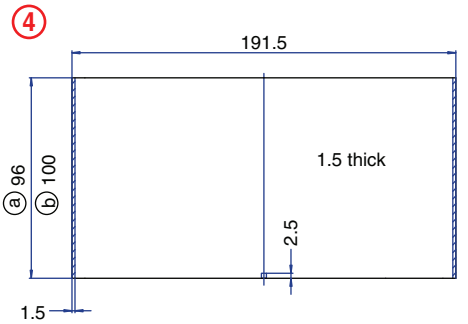
ENCLOSURE DRAWING (To convert to inches divide by 25.4.)

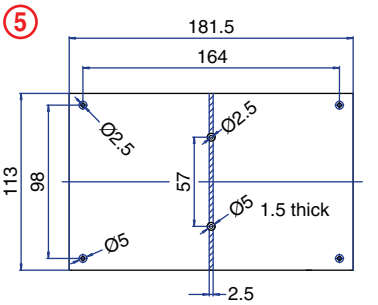


PCB DRAWING (To convert to inches divide by 25.4.)









unused space
ⓐ with base mount PCB
ⓑ without base mount PCB

50 Terminal

Solder Connection

TECHNICAL INFORMATION

Electrical:
16A, 300V, 22-12 AWG

Housing Material:
Glass-filled Polycarbonate

Cover Material:
Glass-filled Polycarbonate

Temperature Range:
Up to 125°C (257°F)

Flammability Rating:
UL94 V-O (V-2 Clear Panel)

Color:
Black Housing with Tan Cover

Terminal Type:
Box Clamp

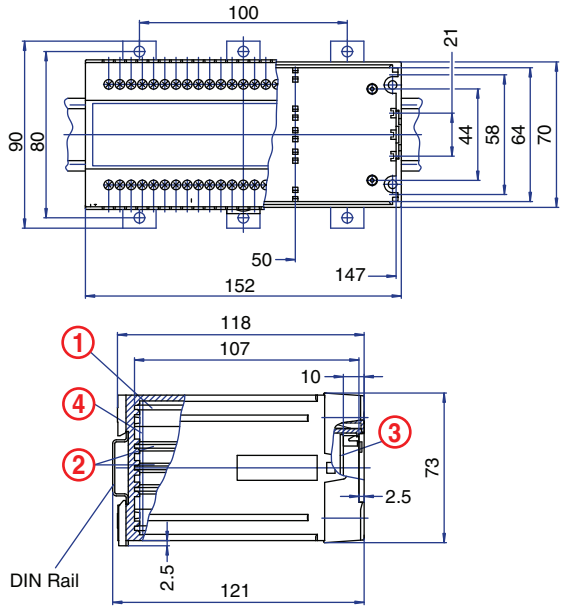
Terminal Screw Size:
M3.5

Recommended Torque:
0.8Nm

Max. PCB's:
(5) Vertical
(1) Behind Cover
(1) Base Mount

Mounting:
35mm DIN Rail or
optional panel mounting*

ENCLOSURE DRAWING (To convert to inches divide by 25.4.)



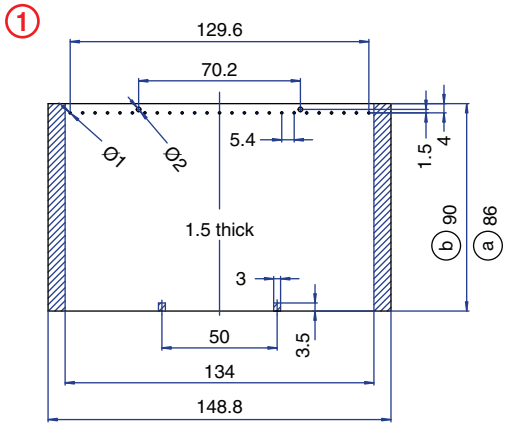
ORDERING INFORMATION

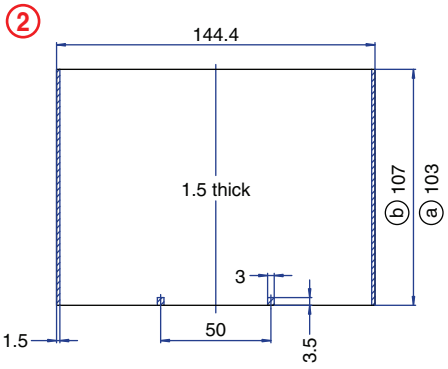
Part Number	Type	Description	PCB Connection
90.590	KO4716A	Solid Cover	Machine Solderable Pins
90.591	KO4716A	Removable Cover Panel, Tan	Machine Solderable Pins
90.592	KO4716A	Removable Cover Panel, Clear	Machine Solderable Pins

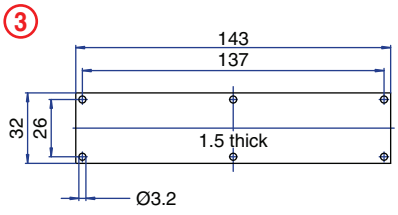
ACCESSORIES

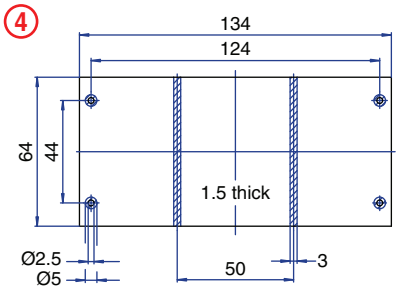
Accessories	Part Number	Type
1 Meter DIN Rail	2511120/1M	TS35x7.5/1M
*Panel Mount Tab (need 3)	93.001.2	PMA

PCB DRAWING (To convert to inches divide by 25.4.)









unused space
ⓐ with base mount PCB
ⓑ without base mount PCB

50 Terminal

Pluggable Connection

TECHNICAL INFORMATION

Electrical:
10A, 300V, 22-12 AWG

Housing Material:
Glass-filled Polycarbonate

Cover Material:
Glass-filled Polycarbonate

Temperature Range:
Up to 125°C (257°F)

Flammability Rating:
UL94 V-O (V-2 Clear Panel)

Color:
Black Housing with Tan Cover

Terminal Type:
Box Clamp

Terminal Screw Size:
M3.5

Recommended Torque:
0.8Nm

Max. PCB's:
(5) Vertical
(1) Behind cover
(1) Base Mount

Mounting:
35mm DIN Rail or
optional panel mounting*

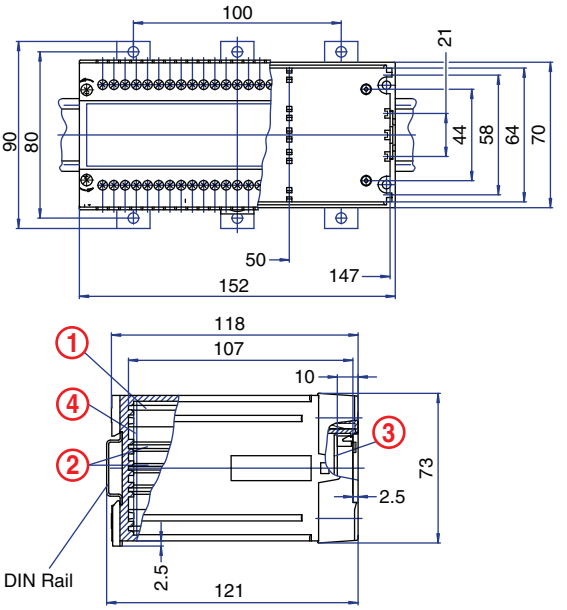
ORDERING INFORMATION

Part Number	Type	Description	PCB Connection
90.620	KO4716P	Solid Cover	Card Edge
90.621	KO4716P	Removable Cover Panel, Tan	Card Edge
90.622	KO4716P	Removable Cover Panel, Clear	Card Edge

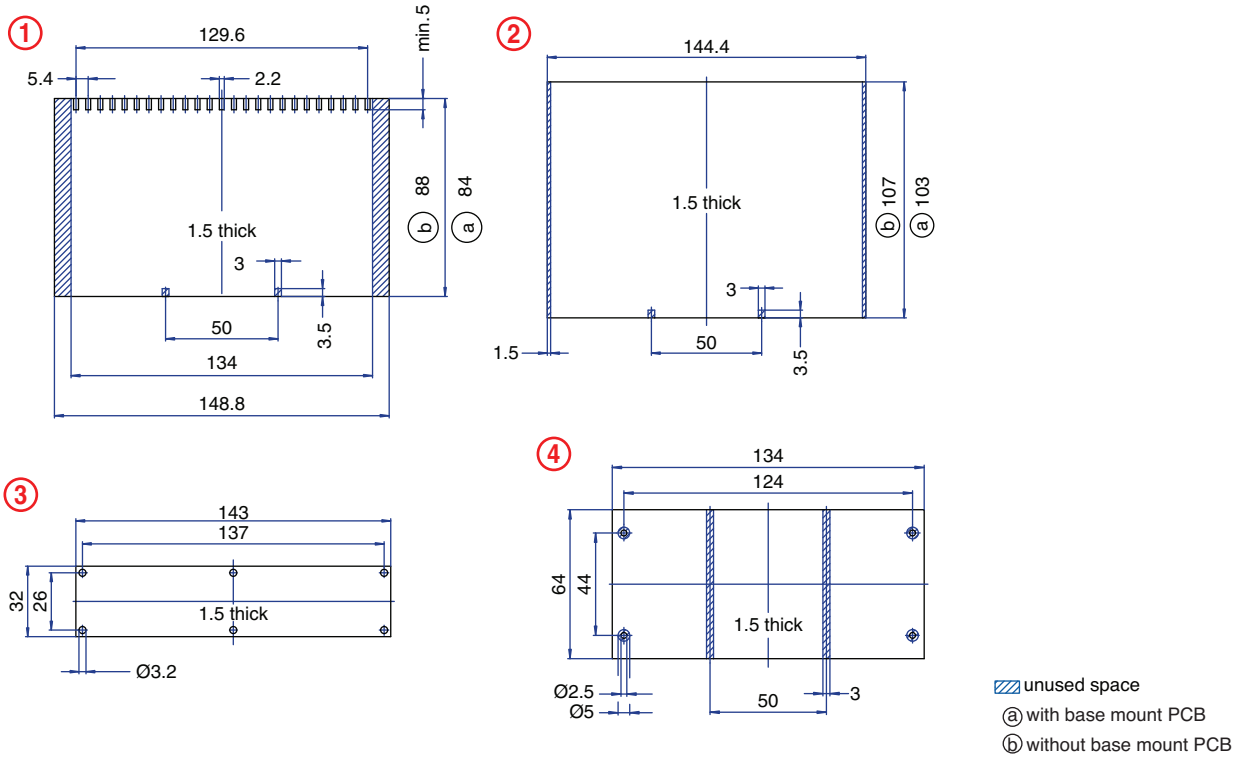
ACCESSORIES

Accessories	Part Number	Type
1 Meter DIN Rail	2511120/1M	TS35x7.5/1M
*Panel Mount Tab (need 3)	93.001.2	PMA

ENCLOSURE DRAWING (To convert to inches divide by 25.4.)



PCB DRAWING (To convert to inches divide by 25.4.)



unused space
ⓐ with base mount PCB
ⓑ without base mount PCB

66 Terminal
Pluggable Connection

TECHNICAL INFORMATION

Electrical:
10A, 300V, 22-12 AWG

Housing Material:
Glass-filled Polycarbonate

Cover Material:
Glass-filled Polycarbonate

Temperature Range:
Up to 125°C (257°F)

Flammability Rating:
UL94 V-O (V-2 Clear Panel)

Color:
Black Housing with Tan Cover

Terminal Type:
Box Clamp

Terminal Screw Size:
M3.5

Recommended Torque:
0.8Nm

Max. PCB's:
(5) Vertical
(1) Behind cover

Mounting:
35mm DIN Rail or
optional panel mounting*

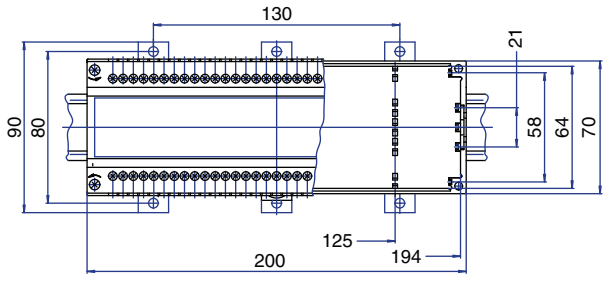
ORDERING INFORMATION

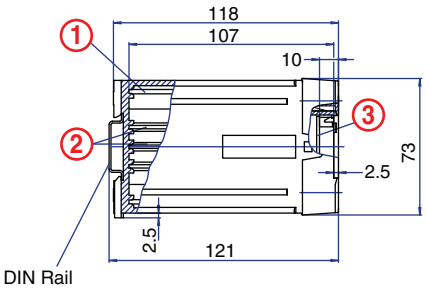
Part Number	Type	Description	PCB Connection
90.680	KO4721P	Solid Cover	Card Edge
90.681	KO4721P	Removable Cover Panel, Tan	Card Edge
90.682	KO4721P	Removable Cover Panel, Clear	Card Edge

ACCESSORIES

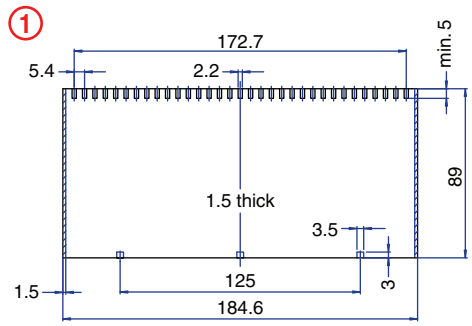
Accessories	Part Number	Type
1 Meter DIN Rail	2511120/1M	TS35x7.5/1M
*Panel Mount Tab (need 3)	93.001.2	PMA

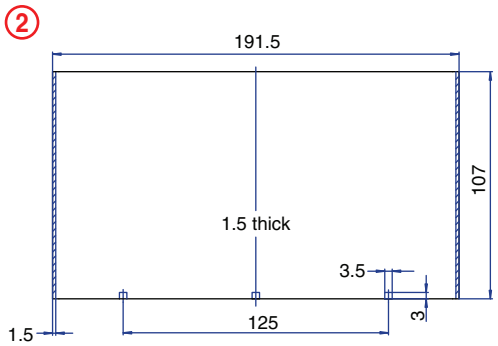
ENCLOSURE DRAWING (To convert to inches divide by 25.4.)

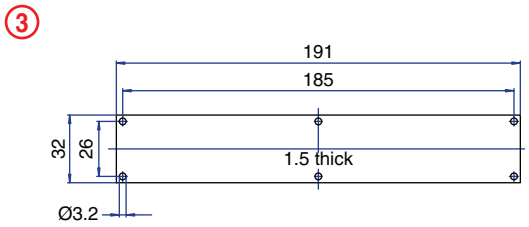




PCB DRAWING (To convert to inches divide by 25.4.)







unused space

66 Terminal

Pluggable Connection

TECHNICAL INFORMATION

Electrical:
10A, 300V, 22-12 AWG

Housing Material:
Glass-filled Polycarbonate

Cover Material:
Glass-filled Polycarbonate

Temperature Range:
Up to 125°C (257°F)

Flammability Rating:
UL94 V-O

Color:
Black Housing with Tan Cover

Terminal Type:
Box Clamp

Terminal Screw Size:
M3.5

Recommended Torque:
0.8Nm

Max. PCB's:
(11) Vertical
(1) Base Mount

Mounting:
35mm DIN Rail or
optional panel mounting*

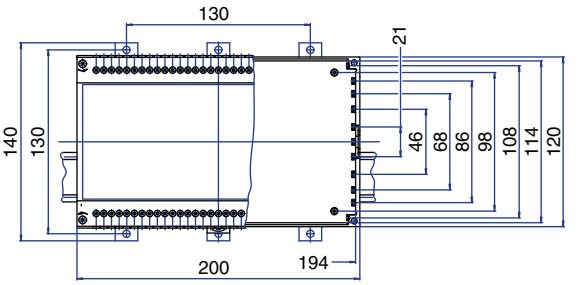
ORDERING INFORMATION

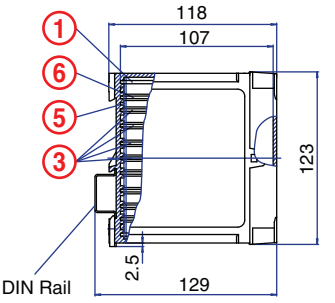
Part Number	Type	Description	PCB Connection
90.710	KO4723SP	Solid Cover	Card Edge

ACCESSORIES

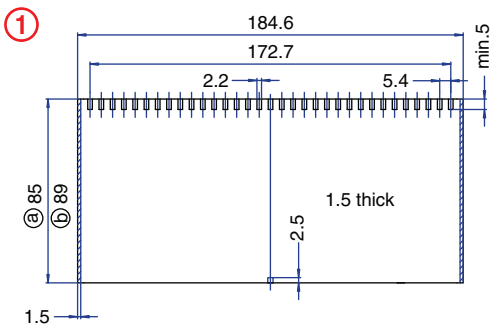
Accessories	Part Number	Type
1 Meter DIN Rail	2511120/1M	TS35x7.5/1M
*Panel Mount Tab (need 3)	93.001.2	PMA

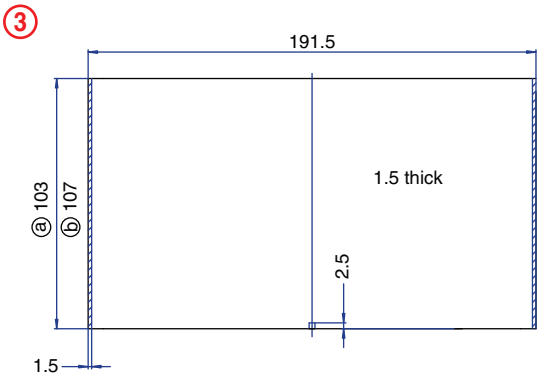
ENCLOSURE DRAWING (To convert to inches divide by 25.4.)

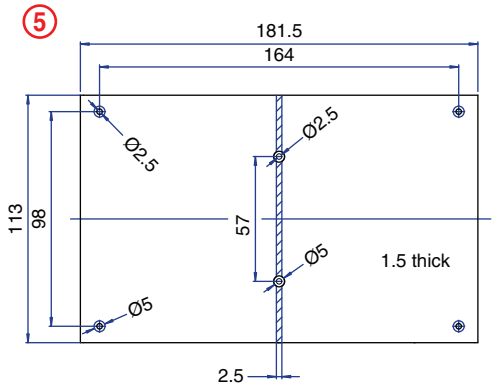


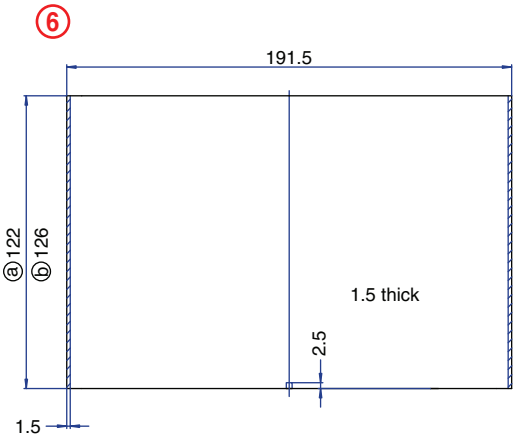


PCB DRAWING (To convert to inches divide by 25.4.)









unused space
ⓐ with base mount PCB
ⓑ without base mount PCB

84 Terminal

Pluggable and Solder Connection

TECHNICAL INFORMATION

Electrical:
10A, 300V, 22-14 AWG

Housing Material:
Glass-filled Polycarbonate

Cover Material:
Glass-filled Polycarbonate

Temperature Range:
Up to 125°C (257°F)

Flammability Rating:
UL94 V-O

Color:
Black Housing with Tan Cover

Terminal Type:
Screw / Pressure Plate

Terminal Screw Size:
M3.5

Recommended Torque:
0.8Nm

Max. PCB's:
(11) Vertical
(1) Base Mount

Mounting:
35mm DIN Rail or optional panel mounting*

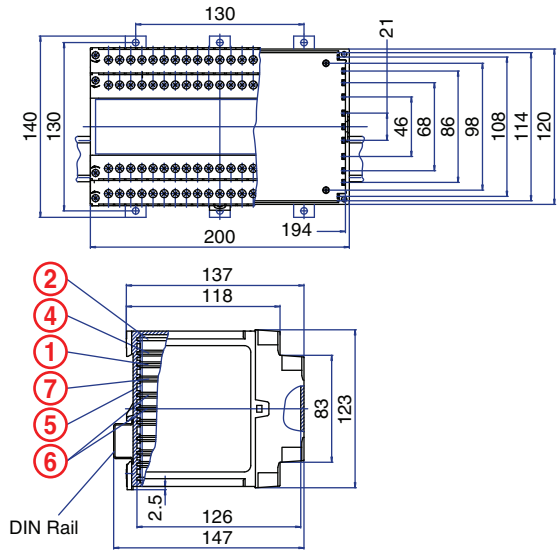
ORDERING INFORMATION

Part Number	Type	Description	PCB Connection
90.740	KO4722DP	Solid Cover	Card Edge/ Wire Jumper

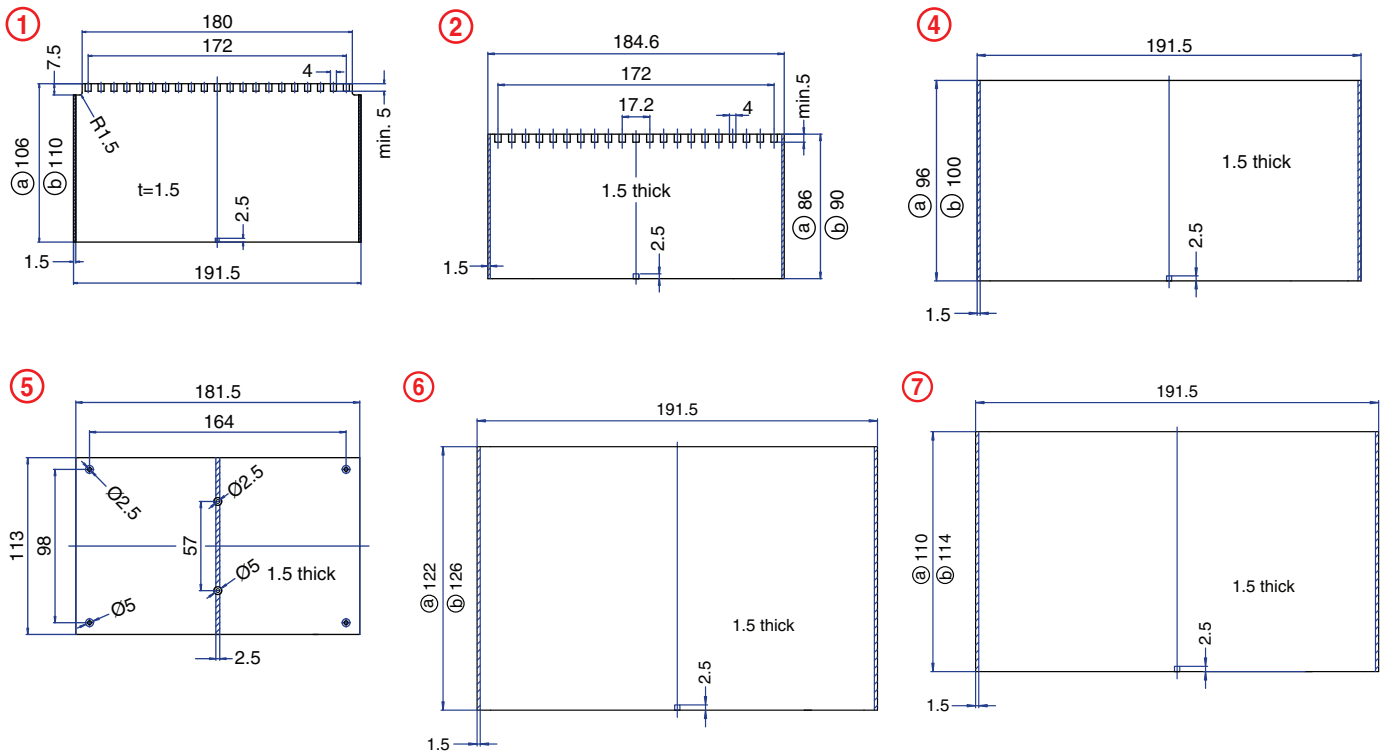
ACCESSORIES

Accessories	Part Number	Type
1 Meter DIN Rail	CA701/15-S	TS35x15/1M
*Panel Mount Tab (need 3)	93.001.2	PMA

ENCLOSURE DRAWING (To convert to inches divide by 25.4.)



PCB DRAWING (To convert to inches divide by 25.4.)



unused space
ⓐ with base mount PCB
ⓑ without base mount PCB

132 Terminal

Pluggable Connection

TECHNICAL INFORMATION

Electrical:
10A, 300V, 22-12 AWG

Housing Material:
Glass-filled Polycarbonate

Cover Material:
Glass-filled Polycarbonate

Temperature Range:
Up to 125°C (257°F)

Flammability Rating:
UL94 V-O

Color:
Black Housing with Tan Cover

Terminal Type:
Box Clamp

Terminal Screw Size:
M3.5

Recommended Torque:
0.8Nm

Max. PCB's:
(11) Vertical
(1) Base Mount

Mounting:
35mm DIN Rail or optional panel mounting*

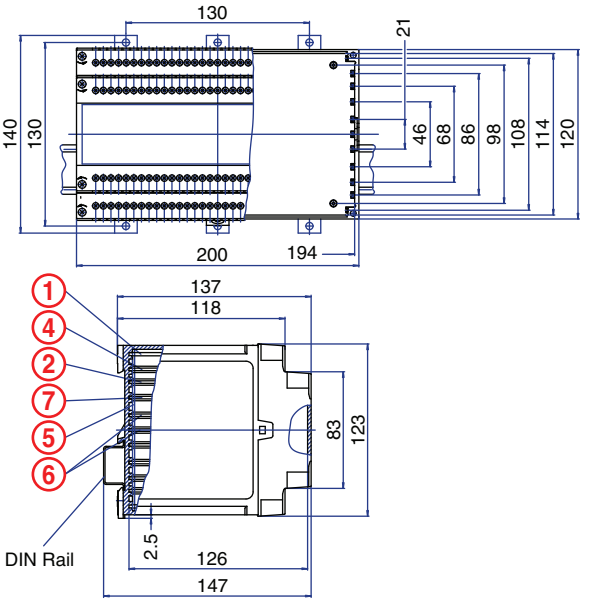
ORDERING INFORMATION

Part Number	Type	Description	PCB Connection
90.770	KO4723DP	Solid Cover	Card Edge

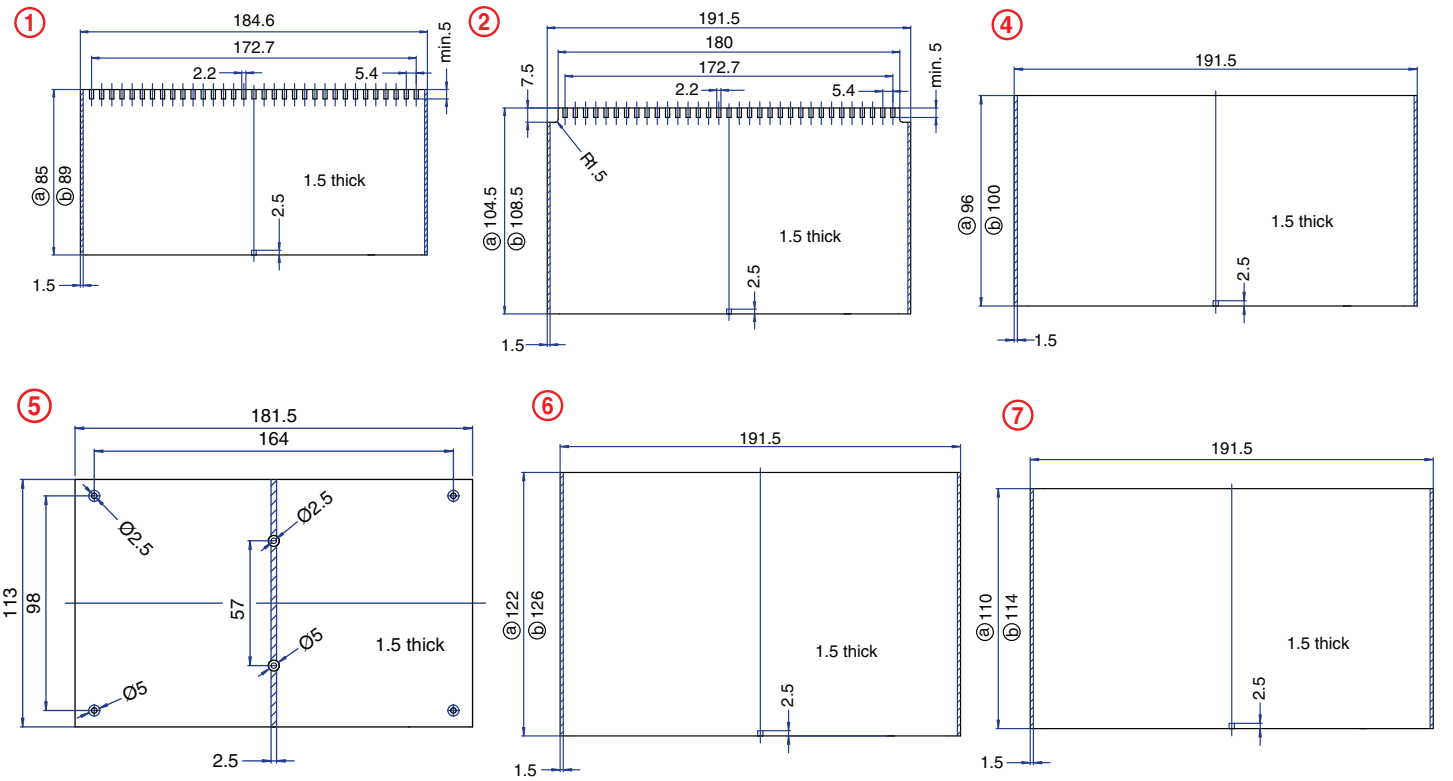
ACCESSORIES

Accessories	Part Number	Type
1 Meter DIN Rail	CA701/15-S	TS35x15/1M
*Panel Mount Tab (need 3)	93.001.2	PMA

ENCLOSURE DRAWING (To convert to inches divide by 25.4.)



PCB DRAWING (To convert to inches divide by 25.4.)



unused space
ⓐ with base mount PCB
ⓑ without base mount PCB

6 Terminal

with 6 High Current Terminals

Solder Connection

TECHNICAL INFORMATION

Electrical:
40A, 300V, 18-8 AWG

Housing Material:
Glass-filled Polycarbonate

Cover Material:
Glass-filled Polycarbonate

Temperature Range:
Up to 125°C (257°F)

Flammability Rating:
UL94 V-O

Color:
Black Housing with Tan Cover

Terminal Type:
Box Clamp

Terminal Screw Size:
M3.5

Recommended Torque:
0.8Nm

Max. PCB's:
(2) Vertical
(2) Horizontal

Mounting:
35mm DIN Rail or
optional panel mounting*

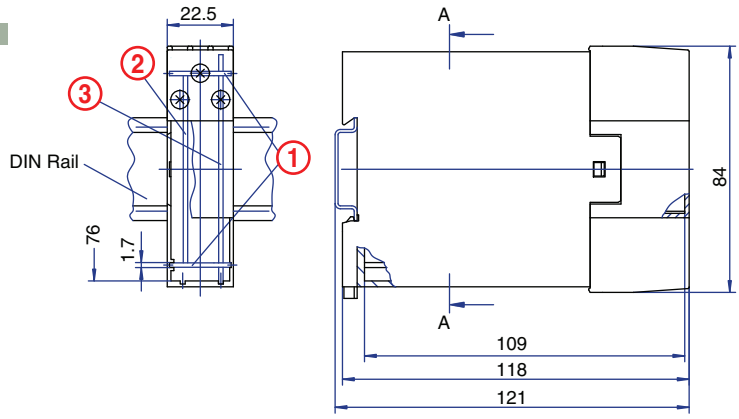
ORDERING INFORMATION

Part Number	Type	Description
90.815	KO4734	Removable High Current Wire Jumper Terminals

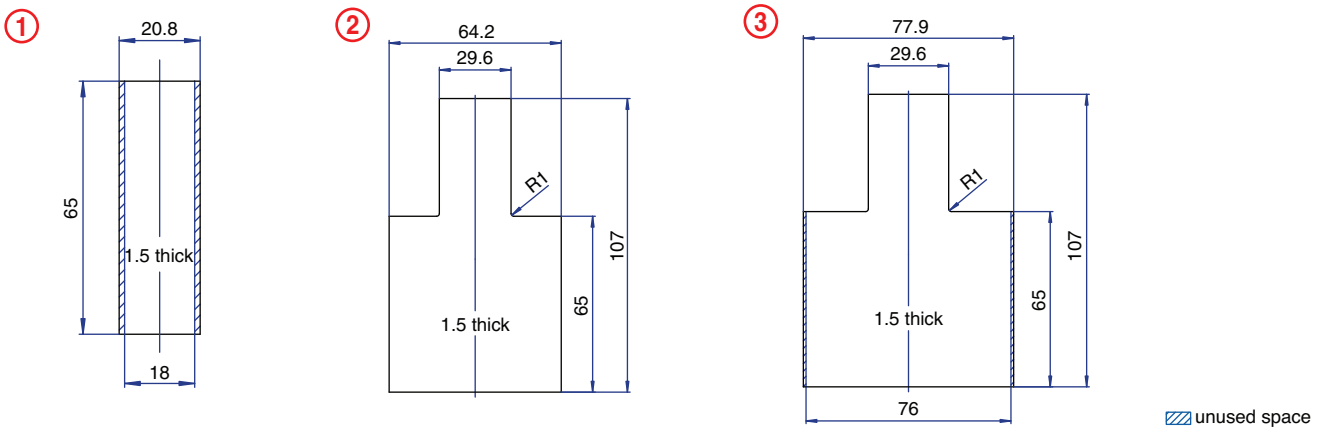
ACCESSORIES

Accessories	Part Number	Type
1 Meter DIN Rail	2511120/1M	TS35x7.5/1M
*Panel Mount Tab	93.001.2	PMA

ENCLOSURE DRAWING (To convert to inches divide by 25.4.)



PCB DRAWING (To convert to inches divide by 25.4.)



14 Terminal Maximum

Pluggable Card Edge Connection

TECHNICAL INFORMATION

Electrical:
see chart for Amperages, 300V, 22-12 AWG

Housing Material:
Glass-filled Polycarbonate

Cover Material:
Glass-filled Polycarbonate

Temperature Range:
Up to 125°C (257°F)

Flammability Rating:
UL94 V-O (V-2 Clear Panel)

Color:
Black Housing with Tan Cover

Terminal Type:
Box clamp

Terminal Screw Size:
M3.5

Recommended Torque:
0.8Nm

Max. PCB's:
(2) Vertical
(2) Horizontal

Mounting:
35mm DIN Rail or optional panel mounting*

COMPLETE ENCLOSURE CONSISTS OF

(1) Base Housing
(1) Cover Frame
(1) Cover Panel
(2) Terminal or blanking blocks

ORDERING INFORMATION

Part Number	Type	Description
90.810	KO4730H	Base Housing
90.810.1	KO4730F	Cover Frame
90.810.2	KO4730P	Cover Panel, Tan
90.810.3	KO4730P-C	Cover Panel, Clear
90.810.4	KO4730P/S	Cover Panel with terminal release slots, Tan
90.810.5	KO4730P-C/S	Cover Panel with terminal release slots, Clear
90.803	KO473xT/3	Terminal Block, 3 terminals
90.804	KO473xT/4	Terminal Block, 4 terminals
90.807	KO473xT/7	Terminal Block, 7 terminals
90.800	KO473xT/B	Blanking Block, 0 terminals

ACCESSORIES

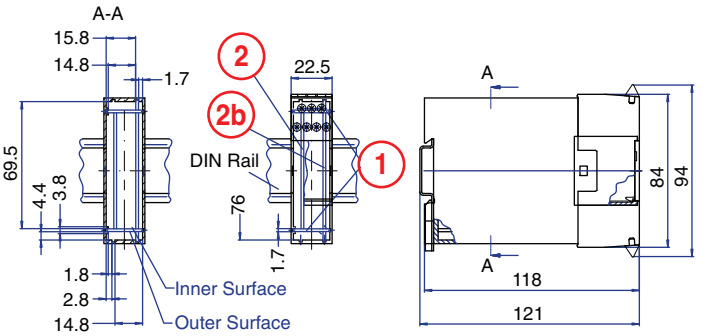
Accessories	Part Number	Type
1 Meter DIN Rail	2511120/1M	TS35x7.5/1M
*Panel Mount Tab	93.001.2	PMA

AMPERAGE CHART

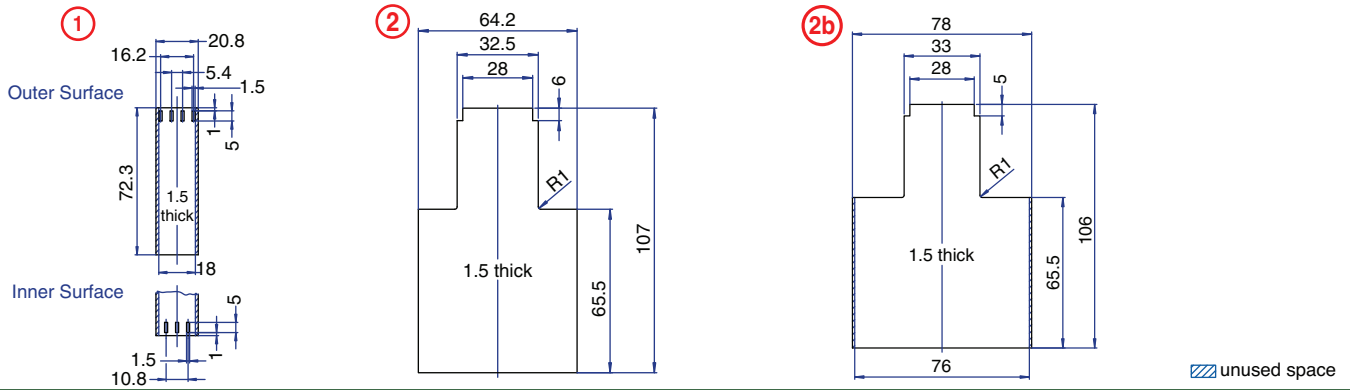
Max. Current Carrying Capacity of Terminal Blocks

	3 pole ○○○	4 pole ○○○○	7 pole ○○○ ○○○○
Max Amperage of Terminal Blocks	15A	28A	15A top row 28A bottom row
Max Amperage Per Terminal Point	5A	8A	5A top row 8A bottom row

ENCLOSURE DRAWING (To convert to inches divide by 25.4.)



PCB DRAWING (To convert to inches divide by 25.4.)



20 Terminal Maximum
with 6 High Current Terminals
Pluggable Card Edge Connection/ Solder Connection

TECHNICAL INFORMATION

Electrical:
see chart for Amperages, 300V, 22-12 AWG standard 18-8 AWG high current

Housing Material:
Glass-filled Polycarbonate

Cover Material:
Glass-filled Polycarbonate

Temperature Range:
Up to 125°C (257°F)

Flammability Rating:
UL94 V-O (V-2 Clear Panel)

Color:
Black Housing with Tan Cover

Terminal Type:
Box clamp

Terminal Screw Size:
M3.5

Recommended Torque:
0.8Nm

Max. PCB's:
(2) Vertical
(2) Horizontal

Mounting:
35mm DIN Rail or optional panel mounting*

COMPLETE ENCLOSURE CONSISTS OF

(1) Base Housing
(1) Cover Frame
(1) Cover Panel
(2) Terminal or blanking blocks
(2) High current terminal blocks

ORDERING INFORMATION

Part Number	Type	Description
90.825	KO4735H	Base Housing
90.825.1	KO4735F	Cover Frame
90.820.2	KO4731/5P	Cover Panel, Tan
90.820.3	KO4731/5P-C	Cover Panel, Clear
90.820.4	KO4731/5P/S	Cover Panel with terminal release slots, Tan
90.820.5	KO4731/5P-C/S	Cover Panel with terminal release slots, Clear
90.803	KO473xT/3	Terminal Block, 3 terminals
90.804	KO473xT/4	Terminal Block, 4 terminals
90.807	KO473xT/7	Terminal Block, 7 terminals
90.800	KO473xT/B	Blanking Block, 0 terminals
90.808	KO473xHCT	High Current Block, 3 terminals

ACCESSORIES

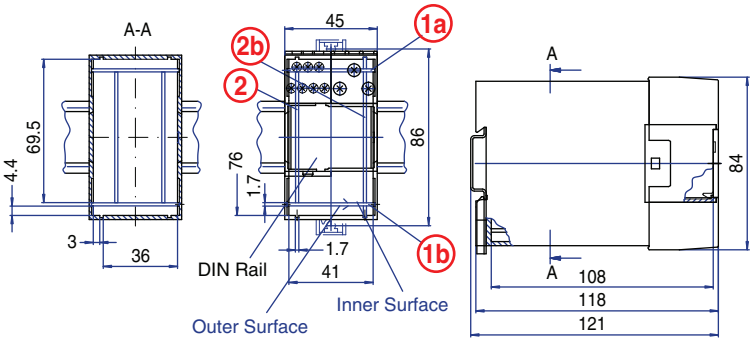
Accessories	Part Number	Type
1 Meter DIN Rail	2511120/1M	TS35x7.5/1M
*Panel Mount Tab	93.001.2	PMA

AMPERAGE CHART

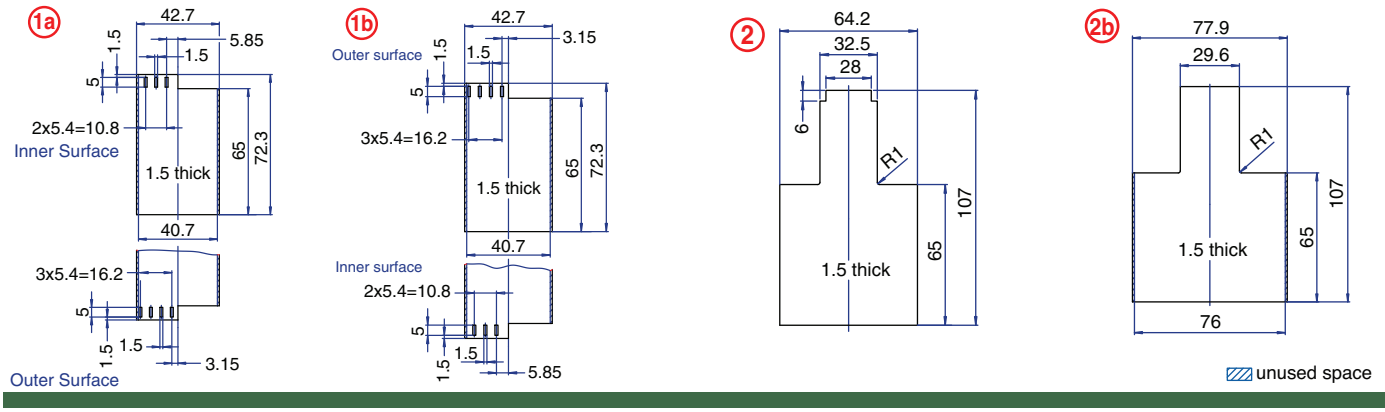
Max. Current Carrying Capacity of Terminal Blocks

	3 pole ○○○	4 pole ○○○○	7 pole ○○○ ○○○○	High Current ○ ○
Max Amperage of Terminal Blocks	15A	28A	15A top row 28A bottom row	40A
Max Amperage Per Terminal Point	8A	8A	5A top row 8A bottom row	40A

ENCLOSURE DRAWING (To convert to inches divide by 25.4.)



PCB DRAWING (To convert to inches divide by 25.4.)



28 Terminal Maximum

Pluggable Card Edge Connection

TECHNICAL INFORMATION

Electrical:
see chart for Amperages, 300V, 22-12 AWG

Housing Material:
Glass-filled Polycarbonate

Cover Material:
Glass-filled Polycarbonate

Temperature Range:
Up to 125°C (257°F)

Flammability Rating:
UL94 V-O (V-2 Clear Panel)

Color:
Black Housing with Tan Cover

Terminal Type:
Box clamp

Terminal Screw Size:
M3.5

Recommended Torque:
0.8Nm

Max. PCB's:
(2) Vertical
(2) Horizontal

Mounting:
35mm DIN Rail or optional panel mounting*

COMPLETE ENCLOSURE CONSISTS OF

(1) Base Housing
(1) Cover Frame
(1) Cover Panel
(4) Terminal or blanking blocks

ORDERING INFORMATION

Part Number	Type	Description
90.820	KO4731H	Base Housing
90.820.1	KO4731F	Cover Frame
90.820.2	KO4731/5P	Cover Panel, Tan
90.820.3	KO4731/5P-C	Cover Panel, Clear
90.820.4	KO4731/5P/S	Cover Panel with terminal release slots, Tan
90.820.5	KO4731/5P-C/S	Cover Panel with terminal release slots, Clear
90.803	KO473xT/3	Terminal Block, 3 terminals
90.804	KO473xT/4	Terminal Block, 4 terminals
90.807	KO473xT/7	Terminal Block, 7 terminals
90.800	KO473xT/B	Blanking Block, 0 terminals

ACCESSORIES

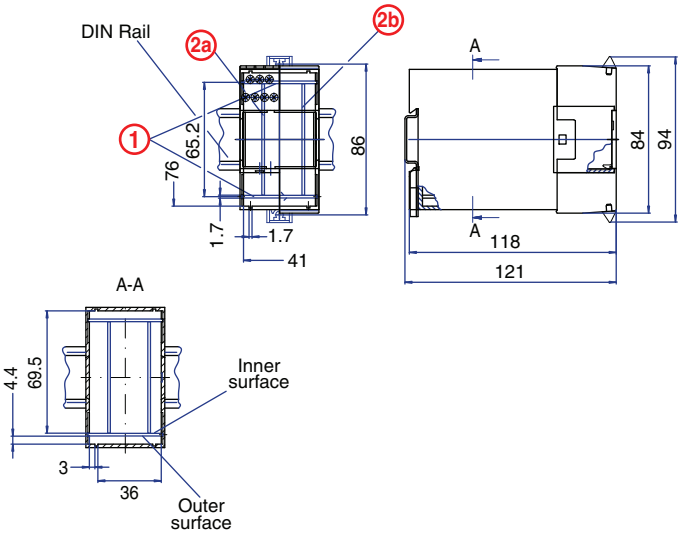
Accessories	Part Number	Type
1 Meter DIN Rail	2511120/1M	TS35x7.5/1M
*Panel Mount Tab	93.001.2	PMA

AMPERAGE CHART

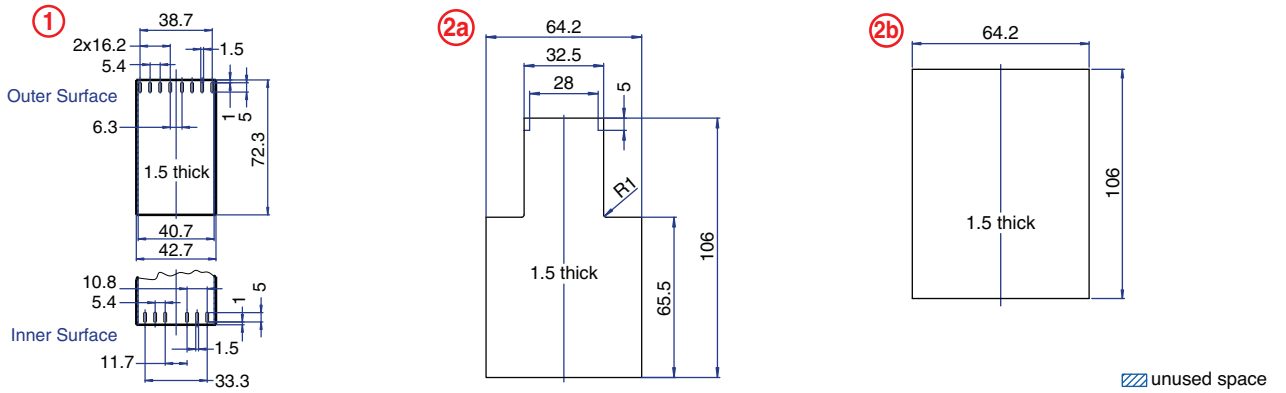
Max. Current Carrying Capacity of Terminal Blocks

	3 pole ○○○	4 pole ○○○○	7 pole ○○○ ○○○○
Max Amperage of Terminal Blocks	15A	28A	15A top row 28A bottom row
Max Amperage Per Terminal Point	5A	8A	5A top row 8A bottom row

ENCLOSURE DRAWING (To convert to inches divide by 25.4.)



PCB DRAWING (To convert to inches divide by 25.4.)



34 Terminal Maximum
with 6 High Current Terminals
Pluggable Card Edge
Connection/ Solder Connection

TECHNICAL INFORMATION

Electrical:
see chart for Amperages,
300V, 22-12 AWG standard
18-8 AWG high current

Housing Material:
Glass-filled Polycarbonate

Cover Material:
Glass-filled Polycarbonate

Temperature Range:
Up to 125°C (257°F)

Flammability Rating:
UL94 V-O (V-2 Clear Panel)

Color:
Black Housing with Tan Cover

Terminal Type:
Box clamp

Terminal Screw Size:
M3.5

Recommended Torque:
0.8Nm

Max. PCB's:
(3) Vertical
(2) Horizontal
(1) Parallel with cover

Mounting:
35mm DIN Rail or
optional panel mounting*

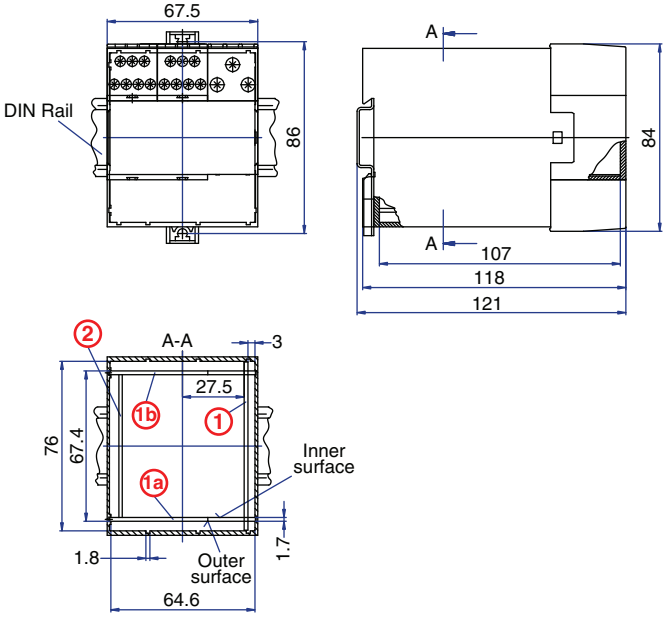
COMPLETE ENCLOSURE CONSISTS OF

(1) Base Housing
(1) Center Cover
(4) Terminal or blanking blocks
(2) High current terminal blocks

ORDERING INFORMATION

Part Number	Type	Description
90.830	KO4732/6H	Base Housing
90.830.6	KO4736F	Center Cover
90.803	KO473xT/3	Terminal Block, 3 terminals
90.804	KO473xT/4	Terminal Block, 4 terminals
90.807	KO473xT/7	Terminal Block, 7 terminals
90.800	KO473xT/B	Blanking Block, 0 terminals
90.808	KO473xHCT	High Current Block, 3 terminals

ENCLOSURE DRAWING (To convert to inches divide by 25.4.)



ACCESSORIES

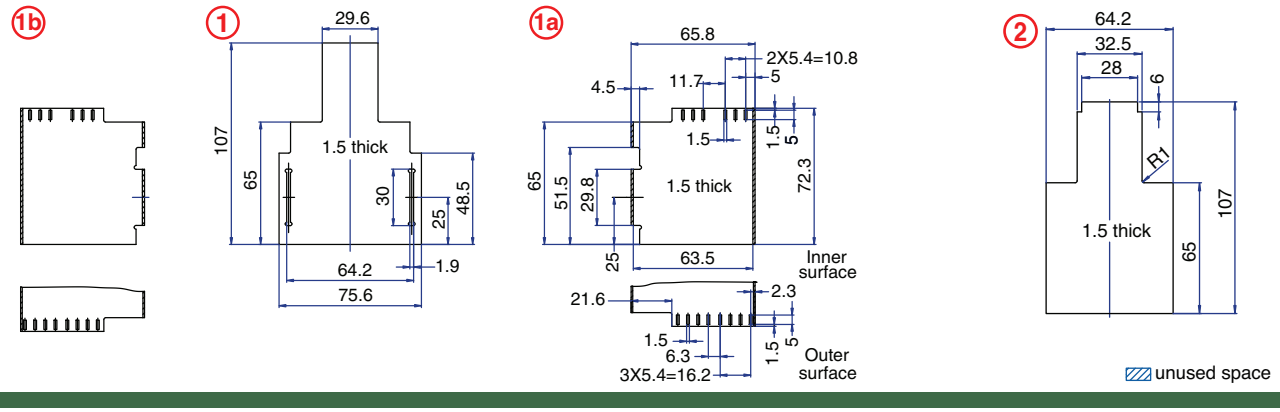
Accessories	Part Number	Type
1 Meter DIN Rail	2511120/1M	TS35x7.5/1M
*Panel Mount Tab (need 2)	93.001.2	PMA

AMPERAGE CHART

Max. Current Carrying Capacity of Terminal Blocks

	3 pole ○○○	4 pole ○○○○	7 pole ○○○ ○○○○	High Current ○○
Max Amperage of Terminal Blocks	15A	28A	15A top row 28A bottom row	40A
Max Amperage Per Terminal Point	8A	8A	5A top row 8A bottom row	40A

PCB DRAWING (To convert to inches divide by 25.4.)



40 Terminal Maximum
with 12 High Current Terminals
Pluggable Card Edge
Connection/ Solder Connection

TECHNICAL INFORMATION

Electrical:
see chart for Amperages, 300V, 22-12 AWG standard 18-8 AWG high current

Housing Material:
Glass-filled Polycarbonate

Cover Material:
Glass-filled Polycarbonate

Temperature Range:
Up to 125°C (257°F)

Flammability Rating:
UL94 V-O (V-2 Clear Panel)

Color:
Black Housing with Tan Cover

Terminal Type:
Box clamp

Terminal Screw Size:
M3.5

Recommended Torque:
0.8Nm

Max. PCB's:
(4) Vertical
(2) Horizontal
(1) Parallel with cover

Mounting:
35mm DIN Rail or optional panel mounting*

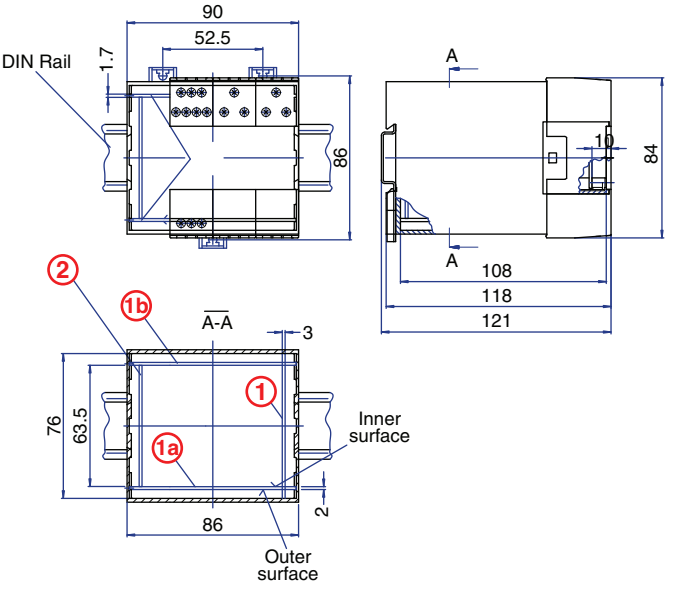
COMPLETE ENCLOSURE CONSISTS OF

(1) Base Housing
(1) Center Cover
(4) Terminal or blanking blocks
(4) High current terminal blocks

ORDERING INFORMATION

Part Number	Type	Description
90.845	KO4737H	Base Housing
90.845.6	KO4737F	Center Cover
90.803	KO473xT/3	Terminal Block, 3 terminals
90.804	KO473xT/4	Terminal Block, 4 terminals
90.807	KO473xT/7	Terminal Block, 7 terminals
90.800	KO473xT/B	Blanking Block, 0 terminals
90.808	KO473xHCT	High Current Block, 3 terminals

ENCLOSURE DRAWING (To convert to inches divide by 25.4.)



ACCESSORIES

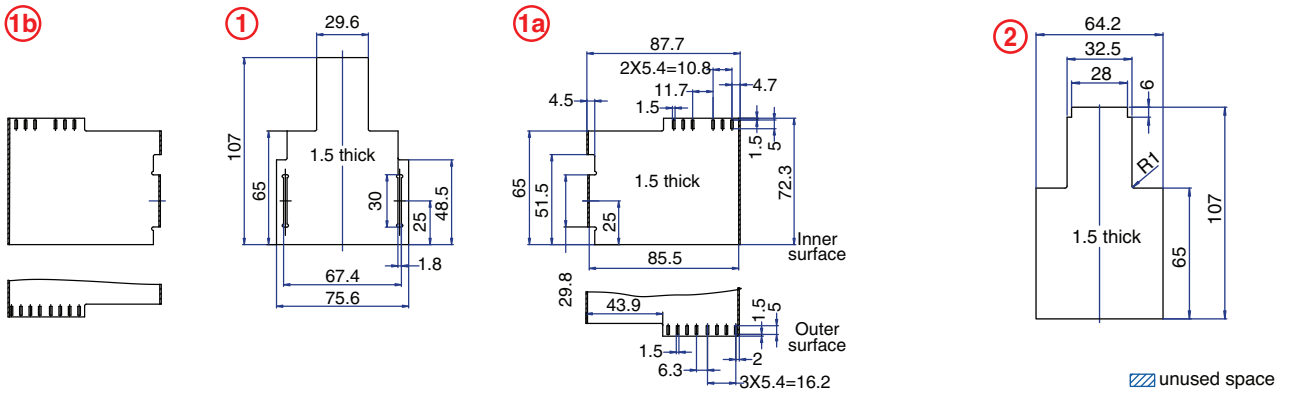
Accessories	Part Number	Type
1 Meter DIN Rail	2511120/1M	TS35x7.5/1M
*Panel Mount Tab (need 2)	93.001.2	PMA

AMPERAGE CHART

Max. Current Carrying Capacity of Terminal Blocks

	3 pole ○○○	4 pole ○○○○	7 pole ○○○ ○○○○	High Current ○○
Max Amperage of Terminal Blocks	15A	28A	15A top row 28A bottom row	40A
Max Amperage Per Terminal Point	8A	8A	5A top row 8A bottom row	40A

PCB DRAWING (To convert to inches divide by 25.4.)



42 Terminal Maximum

Pluggable Card Edge Connection

TECHNICAL INFORMATION

Electrical:
see chart for Amperages, 300V, 22-12 AWG

Housing Material:
Glass-filled Polycarbonate

Cover Material:
Glass-filled Polycarbonate

Temperature Range:
Up to 125°C (257°F)

Flammability Rating:
UL94 V-O (V-2 Clear Panel)

Color:
Black Housing with Tan Cover

Terminal Type:
Box clamp

Terminal Screw Size:
M3.5

Recommended Torque:
0.8Nm

Max. PCB's:
(3) Vertical
(2) Horizontal
(1) Parallel with cover

Mounting:
35mm DIN Rail or optional panel mounting*

COMPLETE ENCLOSURE CONSISTS OF

(1) Base Housing
(1) Cover Frame
(1) Cover Panel
(6) Terminal or blanking blocks

ORDERING INFORMATION

Part Number	Type	Description
90.830	KO4732/6H	Base Housing
90.830.1	KO4732F	Cover Frame
90.830.2	KO4732P	Cover Panel, Tan
90.830.3	KO4732P-C	Cover Panel, Clear
90.830.4	KO4732P/S	Cover Panel with terminal release slots, Tan
90.830.5	KO4732P-C/S	Cover Panel with terminal release slots, Clear
90.803	KO473xT/3	Terminal Block, 3 terminals
90.804	KO473xT/4	Terminal Block, 4 terminals
90.807	KO473xT/7	Terminal Block, 7 terminals
90.800	KO473xT/B	Blanking Block, 0 terminals

ACCESSORIES

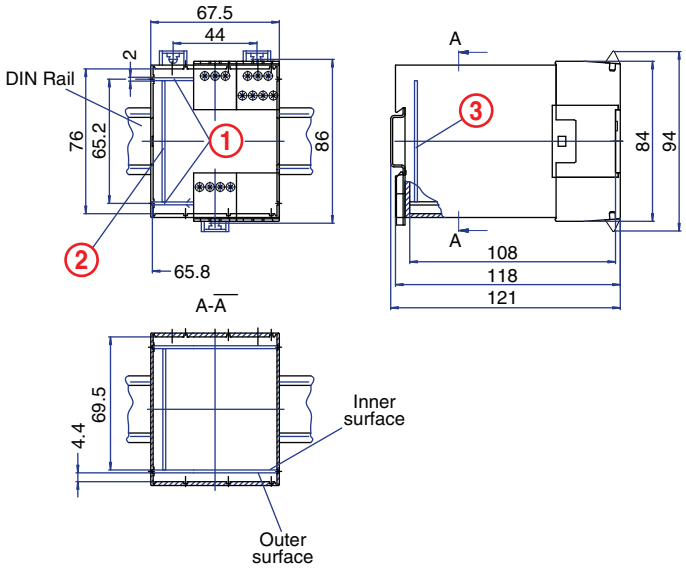
Accessories	Part Number	Type
1 Meter DIN Rail	2511120/1M	TS35x7.5/1M
*Panel Mount Tab (need 2)	93.001.2	PMA

AMPERAGE CHART

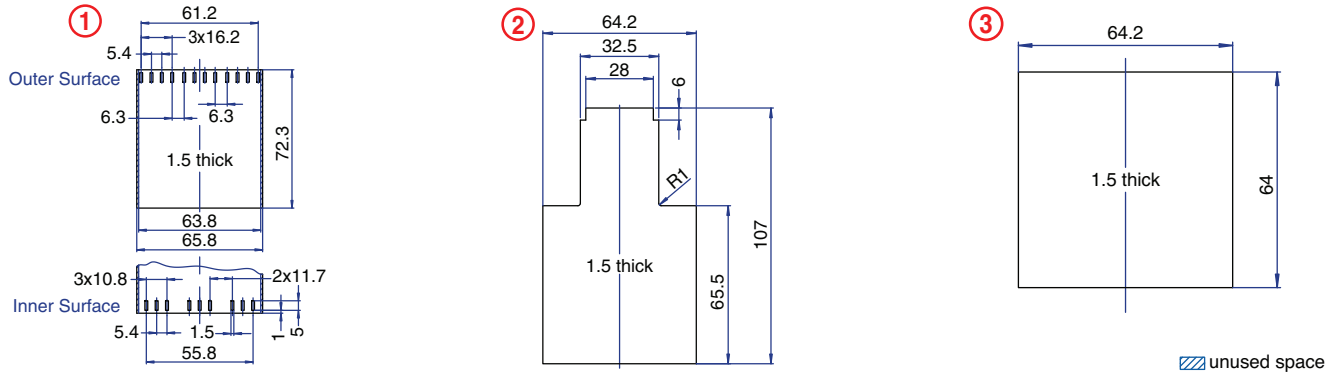
Max. Current Carrying Capacity of Terminal Blocks

	3 pole ○○○	4 pole ○○○○	7 pole ○○○ ○○○○
Max Amperage of Terminal Blocks	15A	28A	15A top row 28A bottom row
Max Amperage Per Terminal Point	5A	8A	5A top row 8A bottom row

ENCLOSURE DRAWING (To convert to inches divide by 25.4.)



PCB DRAWING (To convert to inches divide by 25.4.)



56 Terminal Maximum

Pluggable Card Edge Connection

TECHNICAL INFORMATION

Electrical:
see chart for Amperages, 300V, 22-12 AWG

Housing Material:
Glass-filled Polycarbonate

Cover Material:
Glass-filled Polycarbonate

Temperature Range:
Up to 125°C (257°F)

Flammability Rating:
UL94 V-O (V-2 Clear Panel)

Color:
Black Housing with Tan Cover

Terminal Type:
Box clamp

Terminal Screw Size:
M3.5

Recommended Torque:
0.8Nm

Max. PCB's:
(4) Vertical
(2) Horizontal
(1ea.) Parallel with/ behind cover

Mounting:
35mm DIN Rail or optional panel mounting*

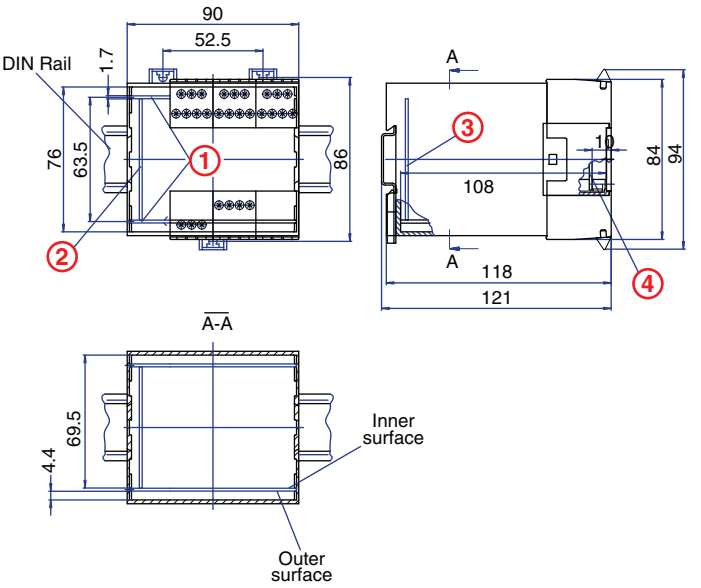
COMPLETE ENCLOSURE CONSISTS OF

(1) Base Housing
(1) Cover Frame
(1) Cover Panel
(8) Terminal or blanking blocks

ORDERING INFORMATION

Part Number	Type	Description
90.840	KO4733H	Base Housing
90.840.1	KO4733F	Cover Frame
90.840.2	KO4733P	Cover Panel, Tan
90.840.3	KO4733P-C	Cover Panel, Clear
90.840.4	KO4733P/S	Cover Panel with terminal release slots, Tan
90.840.5	KO4733P-C/S	Cover Panel with terminal release slots, Clear
90.803	KO473xT/3	Terminal Block, 3 terminals
90.804	KO473xT/4	Terminal Block, 4 terminals
90.807	KO473xT/7	Terminal Block, 7 terminals
90.800	KO473xT/B	Blanking Block, 0 terminals

ENCLOSURE DRAWING (To convert to inches divide by 25.4.)



ACCESSORIES

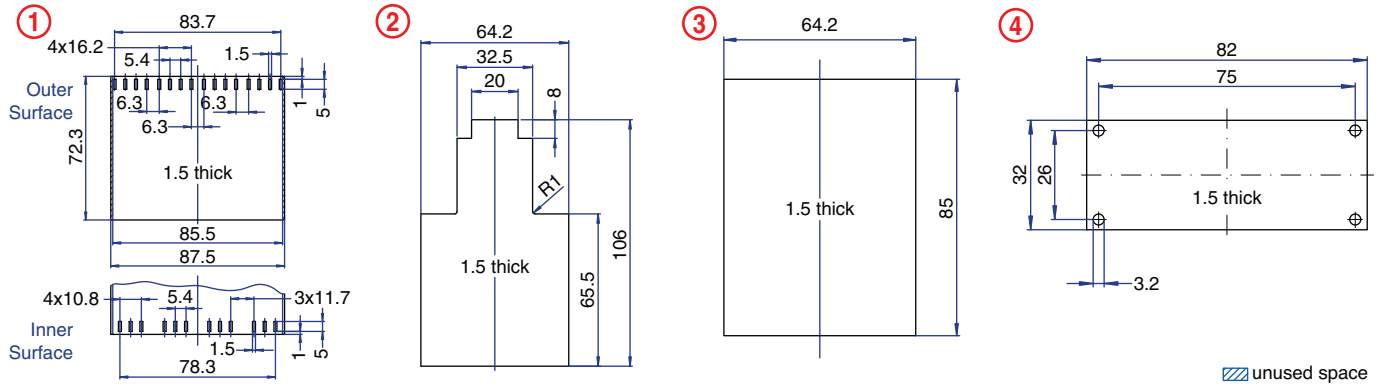
Accessories	Part Number	Type
1 Meter DIN Rail	2511120/1M	TS35x7.5/1M
*Panel Mount Tab (need 2)	93.001.2	PMA

AMPERAGE CHART

Max. Current Carrying Capacity of Terminal Blocks

	3 pole ○○○	4 pole ○○○○	7 pole ○○○ ○○○○
Max Amperage of Terminal Blocks	15A	28A	15A top row 28A bottom row
Max Amperage Per Terminal Point	5A	8A	5A top row 8A bottom row

PCB DRAWING (To convert to inches divide by 25.4.)



Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Altech:

90.440 90.470 90.590 90.500 90.530 90.290 90.560 90.230 90.410 90.380 90.320 90.350 90.680 91.001 90.770 90.710 90.740 90.620 90.202 90.201 90.621 90.840 90.622 90.291 90.352 90.302 90.441 90.804 90.502 90.501 90.201.2 90.201.1 90.202.1 90.292 90.532 90.300 90.301 90.381 90.591 90.682 90.351 90.411 90.803 90.592 90.472 90.531 90.215 90.800 90.471