Industriefunkuhren

hopf Elektronik GmbH

Technical Manual

Snap-in Module

FO-StarCoupler

Serie 4810

ENGLISH

Version: 01.01 – 16.12.2004

hopf Elektronik GmbH
Nottebohmstr. 41 • D-58511 Lüdenscheid • Tel.: +49 (0)2351 9386-86 • Fax: +49 (0)2351 9386-93 • Internet: http://www.hopf.com • E-Mail: info@hopf.com

Version number (Firmware / Description)

THE FIRST TWO DIGITS OF THE VERSION NUMBER OF THE TECHNICAL DESCRIPTION AND THE FIRST TWO DIGITS OF THE FIRMWARE VERSION MUST **COMPLY WITH EACH OTHER**.

THE DIGITS AFTER THE POINT IN THE VERSION NUMBER INDICATE CORRECTIONS IN THE FIRMWARE / DESCRIPTION THAT ARE OF NO SIGNIFICANCE FOR THE FUNCTION.

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Symbols and Characters

Operational Reliability

Disregard may cause damages to persons or material.

Functionality

Disregard may impact function of system/device.

Information

Notes and Information.

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Safety regulations

The safety regulations and observance of the technical data serve to ensure trouble-free operation of the device and protection of persons and material. It is therefore of utmost importance to observe and compliance with these regulations.

If these are not complied with, then no claims may be made under the terms of the warranty and no liability will be assumed for any ensuing damage.

Safety of the device

This device has been manufactured in accordance with the latest technological standards and approved safety regulations

The device should only be put into operation by trained and qualified staff. Care must be taken that all cable connections are laid and fixed in position correctly. The device should only be operated with the voltage supply indicated on the identification label.

The device should only be operated by qualified staff or employees who have received specific instruction.

If a device must be opened for repair, this should only be carried out by employees with appropriate qualifications or by ***hopf*** Elektronik GmbH.

Before a device is opened or a fuse is changed all power supplies must be disconnected.

If there are reasons to believe that the operational safety can no longer be guaranteed the device must be taken out of service and labelled accordingly.

The safety may be impaired when the device does not operate properly or if it is obviously damaged.

CE-Conformity

CE

This device fulfils the requirements of the EU directive 89/336/EWG "Electromagnetic compatibility" and 73/23/EWG "Low voltage equipment".

Therefore the device bears the CE identification marking (CE=Communauté Européenne)

CE = Communautes Europeénnes = European communities

The CE indicates to the controlling bodies that the product complies with the requirements of the EU directive - especially with regard to protection of health and safety for the operator and the user - and may be released for sale within the common markets.

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1 FO-StarCoupler - General

The ***hopf*** FO-StarCoupler[1] for 35mm DIN rail mounting (DIN EN 50 022) is a low cost solution for the active distribution of a FO-signal to up to 7 FO-outputs. All FO-components of the FO-StarCoupler are of ST (bayonet) type and designed for multi-mode cables. Each component of the FO-StarCoupler has its own status LED.

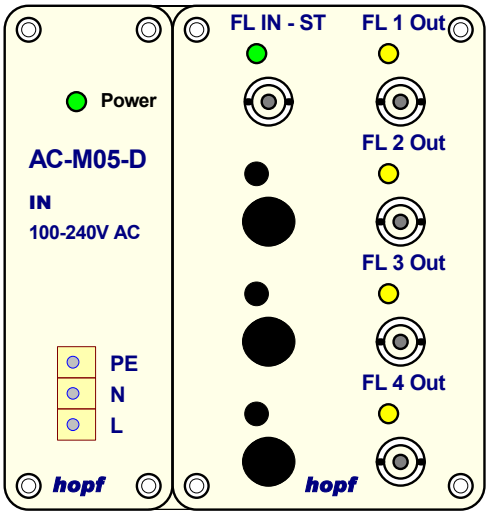
In order to facilitate its use on a worldwide scale, the power supply to the FO-StarCoupler has a wide input range. In this way the device can be installed in any place in the world without failing when the input voltage range changes.

Currently two versions of the ***hopf*** FO-StarCoupler are available.

1.1 FO-StarCoupler (1-IN/4-OUT)

FO-StarCoupler with:

- Nominal input voltage 100 - 240V AC via 3-pole screw terminal (plug-in)
- FO-components:
  - 1 FO-Receiver (820 nm, ST type, bayonet plug, multi-mode)
  - 4 FO-Transmitters (820 nm, ST type, bayonet plug, multi-mode)
- Each output signal individually invertible
- 6 status LEDs for:
  - Power supply unit
  - FO-Receiver
  - Each FO-Transmitter
- Robust aluminium housing:
  - 100 x 105 x 175 mm (W x H x D)
  - For rail mounting / for 35 mm DIN rails per DIN EN 50 022
  - IP40 Protection Class



FO-StarCoupler with one input and und 4 outputs.

[1] FO = Fiber Optic

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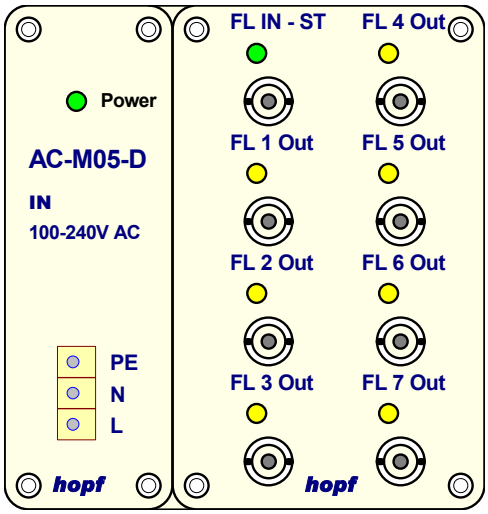
1.2 FO-StarCoupler (1-IN/7-OUT)

FO-StarCoupler with:

- Nominal input voltage 100 - 240V AC via 3-pole screw terminal (plug-in)
- FO-components:
  - 1 FO-Receiver (820 nm, ST type, bayonet plug, multi-mode)
  - 7 FO-Transmitters (820 nm, ST type, bayonet plug, multi-mode)
- Each output signal individually invertible
- 9 status LEDs for:
  - Power supply unit
  - FO-Receiver
  - Each FO-Transmitter
- Robust aluminium housing:
  - 100 x 105 x 175 mm (W x H x D)
  - For rail mounting / for 35 mm DIN rails per DIN EN 50 022
  - IP40 Protection Class



FO-StarCoupler with 1 input and 7 outputs.

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1.3 Housing Installation

The FO-StarCoupler can be clipped on to all DIN rails per DIN EN 50 022 and is designed for horizontal mounting.

Installation dimensions

The dimensions of the housing can be found in ***Chapter 4.4 Dimensions – Rail Mounting Housing***.

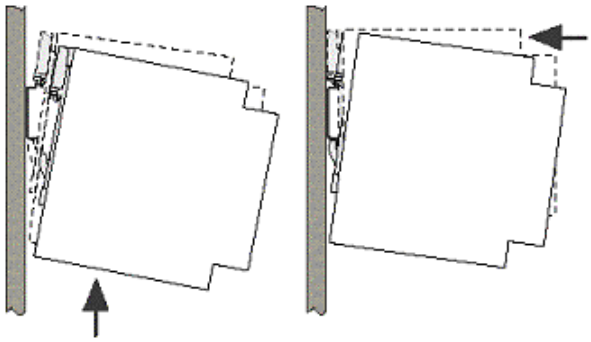
- FO-StarCoupler (**1-IN/4-OUT**) - **Housing: TYPE 5**
- FO-StarCoupler (**1-IN/7-OUT**) - **Housing: TYPE 5**

In order to guarantee satisfactory convection we recommend the following minimum distance from other modules:

- 5.0 cm in a vertical direction
- 1.0 cm in a horizontal direction

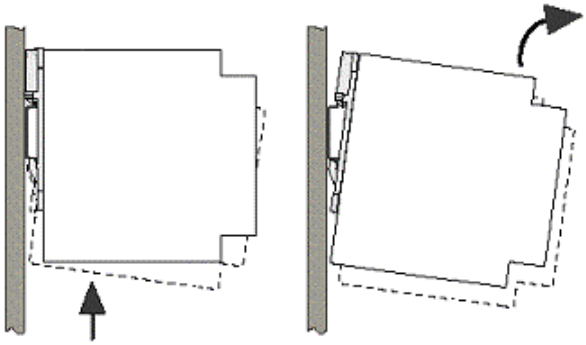
1.3.1 Mounting

Place the rail guide bar of the module against the lower edge of the DIN rail, push the module upwards and clip into place at the top.



1.3.2 Demounting

Push the module upwards and then tip forward to remove from the DIN rail.



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2 Power Supply

The FO-StarCoupler has an AC power supply unit with a wide input range.

2.1 Power Supply Unit Specifications

Internal Power Supply (with wide input range)	***hopf*** type: **AC-M05-D** (Long)

Input Data	
Nominal input voltage	100-240V AC (wide input range)
Input voltage range	85-264V AC 110-370V DC
Frequency	47-440Hz 0 Hz
Current consumption (at nominal values)	approx. 0.15 A (120V AC) / 0.1 A (230V AC)
Starting current	typically 15 A (I_O = 100%) 120V AC typically 30 A (I_O = 100%) 230V AC
Power supply failure jumper at nominal load	> 20 msec. (> 100V AC)
Switch-on time after connecting mains power	< 1 sec.
Transient suppression	Surge Voltage Categorie III (EN 60664-1)
Input fuse, internal	400 mA delayed action (device protection)
Recommended external fuse	Automatic cut-out 6 A, 10 A Characteristic B (EN 60898)
Leakage current to PE	< 0.5 mA (60Hz, per EN 60950)
Isolation voltage input / PE	2000V AC, 1 minute, residual current = 10 mA, 500V DC, 50 MOhm min. (at room temp.)

Output Data (internal only)	
Internal nominal output voltage	5V DC
Nominal output current I_N 0° C ... +55° C	1 A (U_{OUT} = 5V DC)
Efficiency	> 77% (at 230V AC and nominal values)
Function display (Power LED)	Green LED

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2.2 Safety and Warning Instructions

Please read these instructions thoroughly to facilitate safe operation of the equipment and to use all of its functions.

Warning: Never work on live equipment! Danger to life!

The ***hopf*** FO-StarCoupler is a built-in device. It is protected for installation in service access areas. Installation and commissioning may only be carried out by suitable specialist personnel. In doing so the respective country-specific regulations (e.g. VDE, DIN) are to be observed.

In particular, before commissioning please ensure that:

- The power connection has been installed correctly and there is guaranteed protection against electric shock.
- The device can be switched off externally to the power supply, in accordance with the provisions of EN 60950 (e.g. via the primary-side line protection).
- The ground wire is connected.
- All power cables are correctly fused and sized.
- All output lines are sized in accordance with the max. output current of the device or are specially fused.
- Sufficient convection is guaranteed.

The housing can become very hot dependent on the environment temperature and the load on the device.

The device contains components with life-threatening voltage and a high amount of stored energy.

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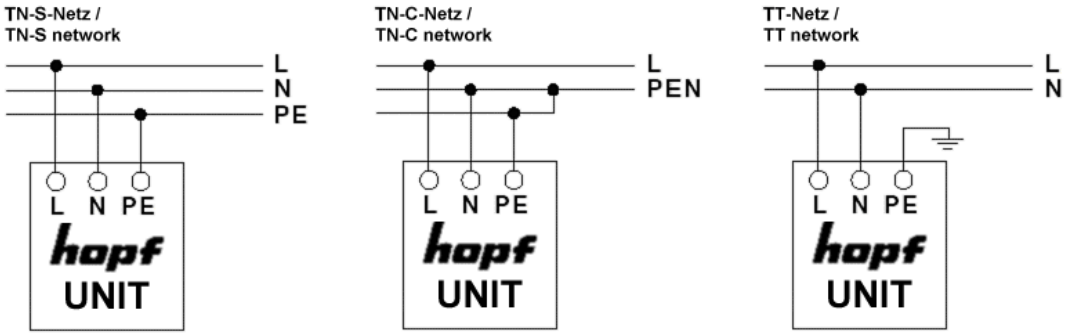
2.3 Power Connection and Control Display

Connection and operation of the FO-StarCoupler's power supply.

2.3.1 Connection to Several Power Networks



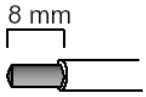
2.3.2 Connection of the Power Cable

The power cable is connected via a plug-in 3-pole screw connection. The following cable cross-sections can be connected to the input plug:

	Fixed [mm^2]	Flexible [mm^2]	AWG	Starting moment [Nm]
L, N, ⏚	0.2-2.5	0.2-2.5	24-12	0.5 – 0.6

For a reliable and secure contact:

Strip the insulation by 8 mm



The connector must always be mounted using the housing and strain relief fitting provided.

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2.3.3 Voltage Input / Fuse Protection

The 100-240V AC connection is made via the plug-in screw connections L, N and ⏚.

Primary Side Fuse Protection

The device must be installed in accordance with the provisions of EN 60950. There must be a suitable separating device external to the power supply capable of switching the device off.

The primary side line protection, for example, is suitable for this purpose.

Further equipment protection is not required because the device is fused internally.

Recommended External Fuse

Automatic cut-out 6 A or 10 A, Characteristic B (or equivalent in function).

A suitable external fuse is required for DC applications.

If the internal fuse trips it is highly likely that the device is faulty. In this case the equipment should be checked at the factory.

2.3.4 Power LED

The green Power LED enables functions to be evaluated on-site at the control cabinet.

LED lights	Normal power supply operation
LED off	No power supply is available or the device is faulty.

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3 FO-Components of the FO-StarCoupler

Description of the input and output components of the FO-StarCoupler.

3.1 Function of the FO-StarCoupler

The FO-StarCoupler is an active FO-distributor, whereby the signal fed via the FO-input is distributed directly to the outputs on a 1:1 basis.

Each output can be individually inverted for use in various applications. The Status LEDs of the outputs make it possible to recognize the respective configuration.

In order for the FO-StarCoupler to function it is necessary that the power supply unit is working and that the Power LED of the power supply unit is lit.

3.2 FO-Receiver (IN)

The FO-Receiver is identified with **IN** on the panel. A Status LED is assigned to the Receiver, which indicates its operating status.

3.2.1 Connection

The FO-input is of type ST (bayonet).

3.2.2 Status LED

The **green** Status LED of the FO-Receiver indicates the respective operating condition.

- LED lights ⇨ FO-Receiver is receiving an external signal
- LED off ⇨ FO-Receiver is **not** receiving an external signal

3.3 FO-Transmitter (OUT)

The FO-outputs are identified on the panel with **OUT - X -** .

3.3.1 Connection

The FO-outputs are of type ST (bayonet).

3.3.2 Status LED

The **yellow** Status LEDs indicate the current operating status of the respective FO-output.

- LED lights ⇨ FO-Transmitter **active**
- LED off ⇨ FO-Transmitter **not active**

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3.3.3 Configuration of the Signal Output

The signal output on the FO-outputs can be either inverted or not inverted. For this purpose the outputs of the FO-module have to be configured accordingly.

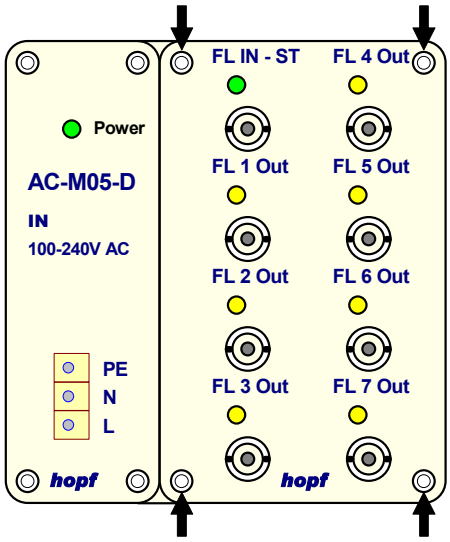
ESD

The FO-module contains components at risk from ESD, i.e. protective measures against ESD are to be taken when coming into contact with these components.

3.3.3.1 Opening the Device

In order to configure the FO-module it must be removed from the housing. To do this the following steps are to be carried out:

1. Switch off the power to the device.
2. Loosen the 4 corner screws (Phillips type) on the front panel of the FO-StarCoupler.



3. Carefully pull the FO-module out of the housing. In doing so, care is to be taken to ensure that the internal cable connections are not damaged or torn off.
4. Configure the FO-module via the JBx jumper.
5. Next carefully push the FO-module back into the housing taking care with the connection cable.
6. Fasten the front panel with the 4 corner screws (Phillips type).

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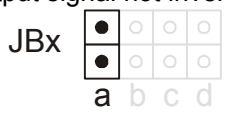
3.3.3.2 Signal Output inverted / not inverted

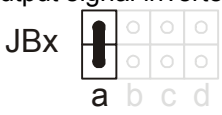
Signal configuration is carried out via jumpers.

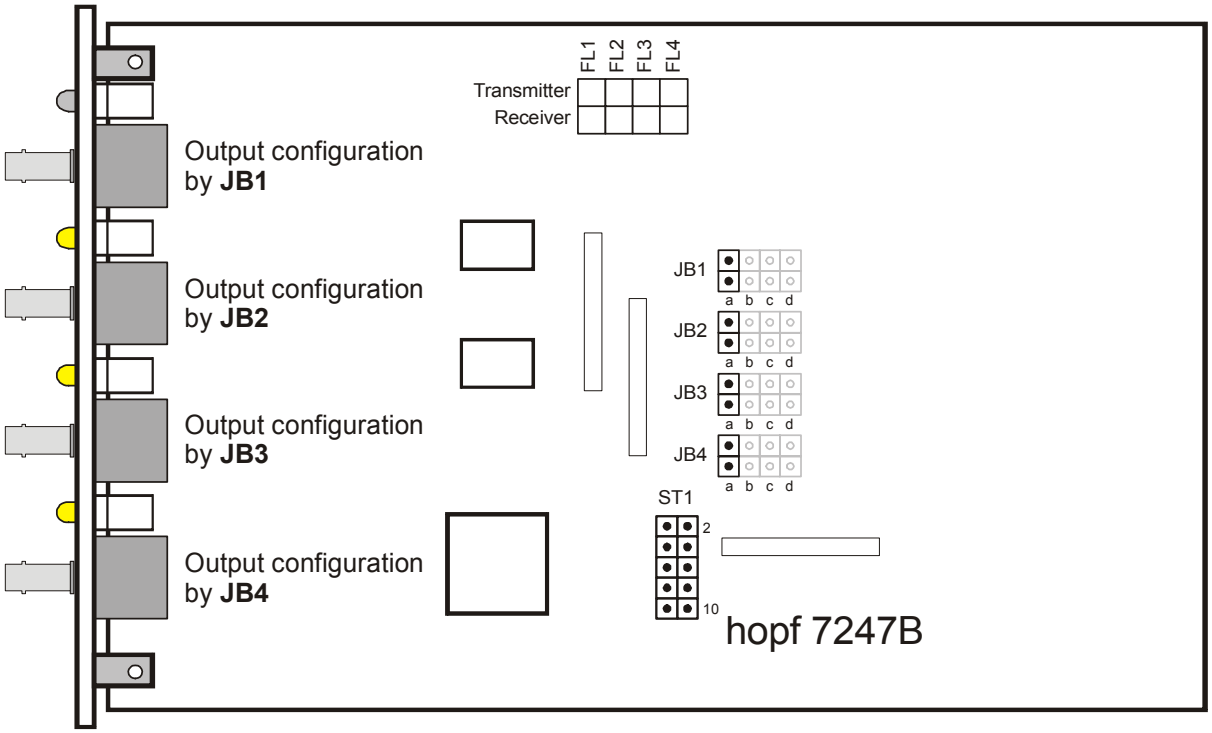
The signal outputs are configured as **not inverted** (JBx not connected) as standard.

Output signal not inverted:



Output signal inverted:





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4 Technical Data

4.1 FO-StarCoupler - General

General Data	
Installation position	On horizontal 35mm DIN rail per DIN EN 50 022
Protection Type of the housing	IP40
Protection Class	I, with PE connection
MTBF	> 300 000 h
Type of housing	Aluminium, closed
Dimensions (W x H x D) + DIN rail	100 x 105 x 198 mm
Weight	approx. 1.05 kg

Climatic Data		
Environmental temperature	Operation	0° C ... +55° C
	Storage	-20° C ... +75° C
Humidity		Up to 90% at +25° C, no condensation

CE compliant to EMC Directive 89/336/EEC and Low Voltage Directive 73/23/EEC	
Safety - Low Voltage Directive	DIN EN 60950-1:2001 + A11 + Corrigendum
EN 61000-6-4:	
EMC (Electro-Magnetic Compatibility) Stability	EN 610000-4-2 /-3/-4/-5/-6/-11
EN 61000-6-2:	EN 61000 -3 -2 /-3
Interference Voltage EN 55022	EN 55022 Class B
Interference Voltage EN 55022	EN 55022 Class B

4.2 Power Supply

Internal Power Supply (with wide input range)	***hopf*** type: **AC-M05-D** (Long)
Nominal input voltage	100 - 240V AC / 47 - 440Hz Connection via plug-in 3-pole screw terminal with housing
Power consumption	max. 6 VA

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4.3 FO-Components of the FO-StarCoupler

Technical Data of the Optical Input:	**λ = 820 nm**, plug type: **ST** (bayonet)
Min. optical reception	P_{in} [dBm] = -18.3 dBm (± 0.2 dBm) ⇨ P_{in} [µW] = 14.8 µW (± 0.7 µW)
Max. optical reception (overload)	P_{in} [dBm] = -10 dBm (± 0.2 dBm) ⇨ P_{in} [µW] = 100 µW (± 0.7 µW)
Max. reception frequency	<= 10 MHz
Types of multi-mode fiber optic cable supported	50/125 µm, 62.5/125 µm, 100/140 µm or 200 µm HCS ® fiber

Technical Data of the Optical Outputs:	**λ = 820 nm**, plug type: **ST** (bayonet)
Optical output P_{out} [dBm] to multi-mode fiber glass cable: **Length = 1 m, 50/125 µm**	P_{out} [dBm] = -15 dBm (± 0.2 dBm) ⇨ P_{out} [µW] = 32 µW (± 0.7 µW)
Optical output P_{out} [dBm] to multi-mode fiber glass cable: **Length = 2.5 m, 62.5/125 µm**	P_{out} [dBm] = -11 dBm (± 0.2 dBm) ⇨ P_{out} [µW] = 80 µW (± 0.7 µW)
Optical output P_{out} [dBm] to multi-mode fiber glass cable: **Length = 2000 m, 62.5/125 µm**	P_{out} [dBm] = -18 dBm (± 0.2 dBm) ⇨ P_{out} [µW] = 16 µW (± 0.7 µW)
Max. transmission frequency	<= 10 MHz
Types of multi-mode fiber optic cable supported	50/125 µm, 62.5/125 µm, 100/140 µm or 200 µm HCS ® fiber

The max. permissible length of the 62.5/125 µm multi-mode fiber glass cable between two FO-components is 2000 m (valid for ***hopf*** equipment). Attention is to be paid to the optical output and reception when using other types of fiber glass.

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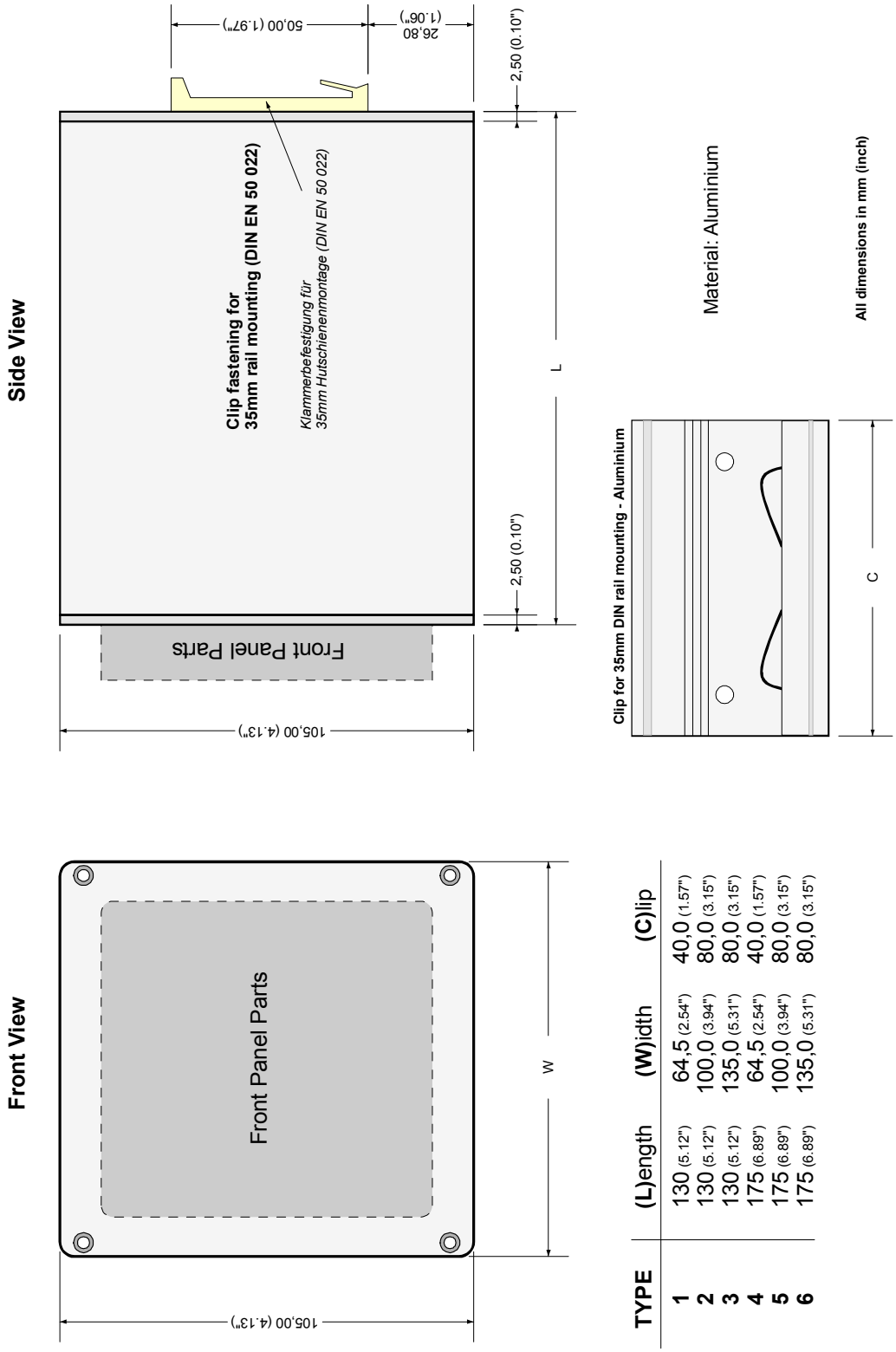
4.4 Dimensions – Rail Mounting Housing



TYPE	(L)ength	(W)idth	(C)lip
1	130 (5.12")	64,5 (2.54")	40,0 (1.57")
2	130 (5.12")	100,0 (3.94")	80,0 (3.15")
3	130 (5.12")	135,0 (5.31")	80,0 (3.15")
4	175 (6.89")	64,5 (2.54")	40,0 (1.57")
5	175 (6.89")	100,0 (3.94")	80,0 (3.15")
6	175 (6.89")	135,0 (5.31")	80,0 (3.15")

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