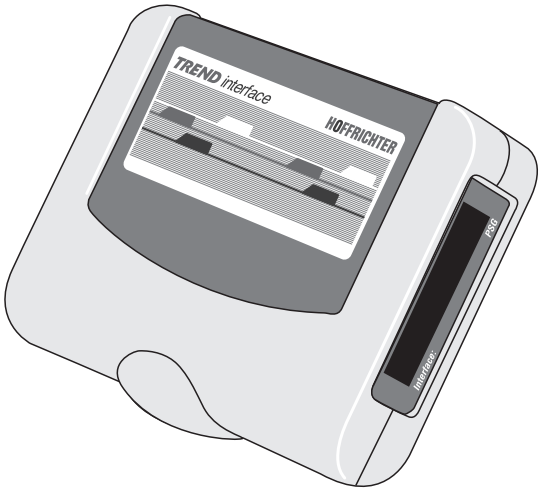
HOFFRICHTER

Quality makes the Difference



TREND interface

User's Manual

Digital-Analog Converter

SERIAL NUMBER

Every HOFFRICHTER GmbH device is supplied with a serial number for traceability purposes.

Please enter your device‘s serial number here. You will find the serial number on the rating plate on the back of the device.

Serial number: .....

Please always quote the serial number for all queries and complaints.

CONFORMITY

CE 0123

The device complies with the requirements of Directive 93/42/EEC.

CONTENTS

SYMBOLS ON THE RATING PLATE

Observe the warning and safety instructions in the user‘s manual.

CE conformity declaration

Manufacturer

Follow the user‘s manual.

Do not dispose of the device in the household waste. Please contact the relevant customer services department to find out how to dispose of the device properly.

SAFETY INFORMATION

Please read this user's manual through carefully before using your TREND interface for the first time.

Keep the manual in a safe place close to the device so that you can refer to it immediately if necessary.

- The housing of the device does not provide any protection against ingress of water.
- Never try to open the housing of TREND interface.
- Never expose the device to rain, moisture or humidity. Malfunctions, damage and electric shocks can occure as a result.
- Never place the TREND interface in the vicinity of other equipment or devices, such as defibrillators, diathermy equipment, mobile phones, microwave equipment, remote controlled toys, etc.

- If temperatures fall below - 5 °C or rise above + 50 °C, proper functioning of TREND interface may be impaired. The system must not be exposed to direct solar radiation.
- Do not use the device if there is visible damage to it. Accidents, fires and electric shocks can occure as a result.
- Make sure that no objects or fluids can penetrate into the device trough openings. This could lead to short circuits, damage, electric shocks and fires.

INTENDED USE

TREND interface is intended for conversion of digital signals from the respiration therapy devices of HOFFRICHTER GmbH into analog signals and their transfer to polysomnography systems.

Additional the communication between the respiratory therapy device and a PC with evaluation software or a remote control shall be warranted.

TREND interface is exclusively used in sleep laboratories by medical qualified personnel.

SCOPE OF DELIVERY

Included in delivery:

- TREND interface
- Adaptor RS232/PC or TRENDremote
- RS232 interface cable (connection between TREND interface and CPAP-device)
- Interface cable to the PSG-device e.g.:
  - Compumedics E-Serie
  - Embla S/N 7000
  - Alice
  - Comlab 44
  - Crystal
  - Sapphire / SleepScout

  Further on request.

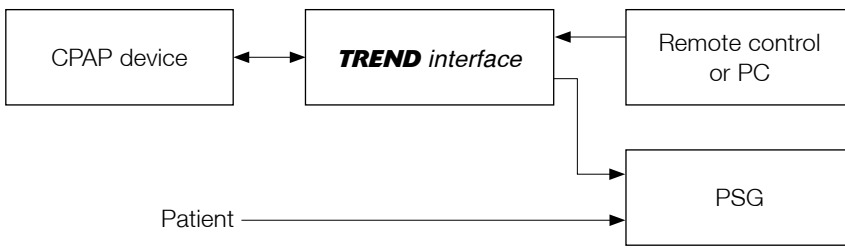
DESCRIPTION OF DEVICE

To connect the TREND interface to a PSG device an interface cable is required.

The device converts the digital signals from the respiratory therapy device into analog signals for the PSG system.
For this you first have to connect the TREND interface with the CPAP device. Use the interface cable.

Then connect the PSG device to the TREND interface.

To show the data in the software of the PSG device, some adjustments in the PSG device may be necessary.
Optional a remote control or a PC can be connected to the device. For this, use the delivered adaptor.



CONNECTIONS

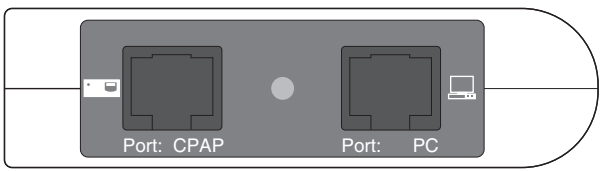
The following connectors are available on the TREND interface:

- RJ45 jack for connection with the respiratory therapy device (Port: CPAP) [1]
- SubD 15-Pin for connection with the PSG system (Interface: PSG)
- RJ45 jack for connection with a remote control / PC (Port: PC) [1]

INDICATION OF THE LED

The LED indicates the following operation conditions:

Quick flashing	▸ Initialization phase
On	▸ Device ready
Flashing	▸ Error while running



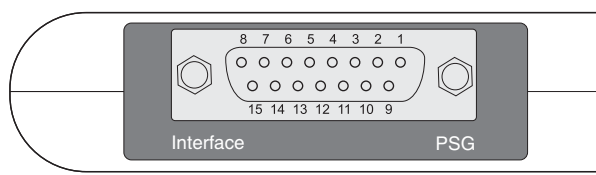
1 galvanically isolated

OUTPUT OF SUBD 15-PIN CONNECTOR

PIN	Signal
1	Ground
2	Channel 5
3	Channel 4
4	Channel 3
5	Channel 2
6	Channel 1
7	Channel 0
8	Ground
9	Ground
10	Amplification Channel 5
11	Amplification Channel 4
12	Amplification Channel 3
13	Amplification Channel 2
14	Amplification Channel 1
15	Amplification Channel 0

CHANGE OF THE VOLTAGE LEVEL

The output voltage level of the channels zero to five is 0 V to 1 V. This level can be changed to 0 to 5 V by connecting ground and the accordant amplification channel.



Signals from devices in the modes APAP and CPAP:
AutoTREND (from V 1.5xx)

Range 1 V

Channel	Name	Range (1 V)	Description
0	Mask pressure	0 V = 0 Pa 1 V = 5000 Pa	Therapy pressure in the mask
1	Breathing flow	0 V = - 2.5 l/s 1 V = 2.5 l/s	Breathing flow of the patient
2	Relative breathing volumen	0 V = 0 % 1 V = 100 %	Relative breathing volume is defined as breathing volume measured over 10 s, reductions in the signal are hypopnea or apnea
3	Snoring	0 V = inactive 1 V = active	Active, when snoring is detected
4	Airway constriction	0 V = inactive 1 V = active	Active when raised airway constriction occurs
5	Internal signal	0 - 1023	Signal for the detailed internal evaluation

Signals from devices in the modes APAP and CPAP:
AutoTREND (from V 1.5xx)

Range 5 V

Channel	Name	Range (5 V)	Description
0	Mask pressure	0 V = 0 Pa 5 V = 5000 Pa	Therapy pressure in the mask
1	Breathing flow	0 V = - 2.5 l/s 5 V = 2.5 l/s	Breathing flow of the patient
2	Relative breathing volumen	0 V = 0 % 5 V = 100 %	Relative breathing volume is defined as breathing volume measured over 10 s, reductions in the signal are hypopnea or apnea
3	Snoring	0 V = inactive 5 V = active	Active, when snoring is detected
4	Airway constriction	0 V = inactive 5 V = active	Active when raised airway constriction occurs
5	Internal signal	0 - 1023	Signal for the detailed internal evaluation

Signals from devices in the modes APAP and CPAP: AutoTREND (from V 1.700), TRENDevent, TREND II AUTO, (i)CARAT et AUTO, VECTOR et / ET AUTO, VIVA II AUTO

Range 1 V

Channel	Name	Range (1 V)	Description
0	Mask pressure	0 V = 0 Pa 1 V = 5000 Pa	Therapy pressure in the mask
1	Breathing flow	0 V = - 2,5 l/s 1 V = 2.5 l/s	Breathing flow of the patient
2	Relative breathing volumen	0 V = 0 % 1 V = 100 %	Relative breathing volume is defined as breathing volume measured over 10 s, reductions in the signal are hypopnea or apnea
3	Snoring	0 V = inactive 1 V = active	Active, when snoring is detected
4	Airway constriction	0 V = inactive 1 V = active	Active when raised airway constriction occurs
5	Status APAP	0 V to 1 V	0 V = no status active 0.06 V = Adaptation phase 0.13 V = Leakage detected 0.25 V = Hyperventilation detected 0.50 V = Mouth expiration detected

Signals from devices in the modes APAP and CPAP: AutoTREND (from V 1.700), TRENDevent, TREND II AUTO, (i)CARAT et AUTO, VECTOR et / ET AUTO, VIVA II AUTO

Range 5 V

Channel	Name	Range (5 V)	Description
0	Mask pressure	0 V = 0 Pa 5 V = 5000 Pa	Therapy pressure in the mask
1	Breathing flow	0 V = - 2.5 l/s 5 V = 2.5 l/s	Breathing flow of the patient
2	Relative breathing volumen	0 V = 0 % 5 V = 100 %	Relative breathing volume is defined as breathing volume measured over 10 s, reductions in the signal are hypopnea or apnea
3	Snoring	0 V = inactive 5 V = active	Active, when snoring is detected
4	Airway constriction	0 V = inactive 5 V = active	Active when raised airway constriction occurs
5	Status APAP	0 V to 5 V	0 V = no status active 0.30 V = Adaptation phase 0.60 V = Leakage detected 1.25 V = Hyperventilation detected 2.50 V = Mouth expiration detected

Signals from devices in the modes APAP and CPAP: TREND II AUTO, (i)CARAT et AUTO, VECTOR et / ET AUTO, VIVA II AUTO (each from V 2.120)

Range 1 V

Channel	Name	Range (1 V)	Description
0	Mask pressure	0 V = 0 Pa 1 V = 5000 Pa	Therapy pressure in the mask
1	Breathing flow	0 V = - 2,5 l/s 1 V = 2.5 l/s	Breathing flow of the patient
2	Leakage flow	0 V = 0 ml/min 1 V = 5000 ml/s	Display of leakage flow
3	Snoring	0 V = inactive 1 V = active	Active, when snoring is detected
4	Airway constriction	0 V = inactive 1 V = active	Active when raised airway constriction occurs
5	Status APAP	0 V to 1 V	0 V = no status active 0.06 V = Adaptation phase 0.13 V = Leakage detected 0.25 V = Hyperventilation detected 0.50 V = Mouth expiration detected

Signals from devices in the modes APAP and CPAP: TREND II AUTO, (i)CARAT et AUTO, VECTOR et / ET AUTO, VIVA II AUTO (each from V 2.120)

Range 5 V

Channel	Name	Range (5 V)	Description
0	Mask pressure	0 V = 0 Pa 5 V = 5000 Pa	Therapy pressure in the mask
1	Breathing flow	0 V = - 2.5 l/s 5 V = 2.5 l/s	Breathing flow of the patient
2	Leckage-Flow	0 V = 0 ml/min 5 V = 5000 ml/s	Display of leakage flow
3	Snoring	0 V = inactive 5 V = active	Active, when snoring is detected
4	Airway constriction	0 V = inactive 5 V = active	Active when raised airway constriction occurs
5	Status APAP	0 V to 5 V	0 V = no status active 0.30 V = Adaptation phase 0.60 V = Leakage detected 1.25 V = Hyperventilation detected 2.50 V = Mouth expiration detected

Signals from devices in the mode FLEXLINE:
AutoTREND (from V. 1.700), TRENDevent, TREND II AUTO, (i)CARAT et AUTO, VECTOR et / ET AUTO, VIVA II AUTO

Signals from devices in the modes FLEXLINE and CPAP:
TREND 210, TREND II CPAP, VECTOR et / ET CPAP, VIVA II CPAP

Range 1 V

Channel	Name	Range (1 V)	Description
0	Mask pressure	0 V = 0 Pa 1 V = 5000 Pa	Therapy pressure in the mask
1	Breathing flow	0 V = - 2.5 l/s 1 V = 2.5 l/s	Breathing flow of the patient
2	Leakage flow	0 V = 0 ml/min 1 V = 5000 ml/s	Display of leakage flow
3	Not used		
4	Status FLEXLINE Leakage detected	0 V = inactive 0.5 V = active	Active, when leakage is detected
5	Status FLEXLINE Basic pressure Hyperventilation detected	0 V to 1 V	0 V = no status active 0.25 V = Basic pressure 0.50 V = Hyperventilation detected

Signals from devices in the mode FLEXLINE:
AutoTREND (from V. 1.700), TRENDevent, TREND II AUTO, (i)CARAT et AUTO, VECTOR et / ET AUTO, VIVA II AUTO

Signals from devices in the modes FLEXLINE and CPAP:
TREND 210, TREND II CPAP, VECTOR et / ET CPAP, VIVA II CPAP

Range 5 V

Channel	Name	Range (5 V)	Description
0	Mask pressure	0 V = 0 Pa 5 V = 5000 Pa	Therapy pressure in the mask
1	Breathing flow	0 V = - 2.5 l/s 5 V = 2.5 l/s	Breathing flow of the patient
2	Leckage-Flow	0 V = 0 ml/min 5 V = 5000 ml/s	Display of leakage flow
3	Not used		
4	Status FLEXLINE Leakage detected	0 V = inactive 2.5 V = active	Active, when leakage is detected
5	Status FLEXLINE Basic pressure Hyperventilation detected	0 V to 5 V	0 V = no status active 1.25 V = Basic pressure 2.50 V = Hyperventilation detected

Signals from devices in all modes:
TREND II Bilevel, TREND II Bilevel ST20, VECTOR et / ET Bilevel, VECTOR et / ET Bilevel ST20, (i)CARAT et Bilevel, (i)CARAT et Bilevel ST20, PRISMA II, MELODY II

Range 1 V

Channel	Name	Range (1 V)	Description
0	Mask pressure	0 V = 0 Pa 1 V = 5000 Pa	Therapy pressure in the mask
1	Breathing flow	0 V = - 2.5 l/s 1 V = 2.5 l/s	Breathing flow of the patient
2	Leakage flow	0 V = 0 ml/min 1 V = 5000 ml/s	Display of leakage flow
3	Not used		
4	Not used		
5	Not used		

Signals from devices in all modes:
TREND II Bilevel, TREND II Bilevel ST20, VECTOR et / ET Bilevel, VECTOR et / ET Bilevel ST20, (i)CARAT et Bilevel, (i)CARAT et Bilevel ST20, PRISMA II, MELODY II

Range 5 V

Channel	Name	Range (5 V)	Description
0	Mask pressure	0 V = 0 Pa 5 V = 5000 Pa	Therapy pressure in the mask
1	Breathing flow	0 V = - 2.5 l/s 5 V = 2.5 l/s	Breathing flow of the patient
2	Leakage flow	0 V = 0 ml/min 5 V = 5000 ml/s	Display of leakage flow
3	Not used		
4	Not used		
5	Not used		

Signals from point

Range 1 V

Channel	Name	Range (1 V)	Description
0	Mask pressure	0 V = 0 Pa 1 V = 5000 Pa	Therapy pressure in the mask
1	Not used		
2	Not used		
3	Not used		
4	Not used		
5	Not used		

Signals from point

Range 5 V

Channel	Name	Range (5 V)	Description
0	Mask pressure	0 V = 0 Pa 5 V = 5000 Pa	Therapy pressure in the mask
1	Not used		
2	Not used		
3	Not used		
4	Not used		
5	Not used		

Signals from point 2

Range 1 V

Channel	Name	Range (1 V)	Description
0	Mask pressure	0 V = 0 Pa 1 V = 5000 Pa	Therapy pressure in the mask
1	Breathing flow	0 V = - 2.5 l/s 1 V = 2.5 l/s	Breathing flow of the patient
2	Leakage flow	0 V = 0 ml/min 1 V = 5 l/s	Display of leakage flow
3	Snoring	0 V = inactive 1 V = active	Active, when snoring is detected
4	Airway constriction	0 V = inactive 1 V = active	Active when raised airway constriction occurs (incl. flattening)
5	Internal signal	0 V = no status active 0.063 V = Adaptation phase 0.125 V = Leakage detected 0.25 V = Hyperventilation detected 0.50 V = Basic pressure detected	Signal for the detailed internal evaluation

Signals from point 2

Range 5 V

Channel	Name	Range (5 V)	Description
0	Mask pressure	0 V = 0 Pa 5 V = 5000 Pa	Therapy pressure in the mask
1	Breathing flow	0 V = - 2.5 l/s 5 V = 2.5 l/s	Breathing flow of the patient
2	Leakage flow	0 V = 0 ml/min 5 V = 5 l/s	Display of leakage flow
3	Snoring	0 V = inactive 5 V = active	Active, when snoring is detected
4	Airway constriction	0 V = inactive 5 V = active	Active when raised airway constriction occurs (incl. flattening)
5	Internal signal	0 V = no status active 0.313 V = Adaptation phase 0.625 V = Leakage detected 1.25 V = Hyperventilation detected 2.50 V = Basic pressure detected	Signal for the detailed internal evaluation

CLEANING AND DISINFECTION

SAFETY INFORMATION

- Do not use any volatile substances, such as solvents, to aviod damaging of the surface. Clean the device only using a soft, dry cloth.
- Do not immerse the device in water or solvent.
- Make sure that no water or other fluids can penetrate into the device trough opening or venting slots. This could lead to short circuits, damage, electric shocks and fires.

DEVICE SURFACE

Use a cloth moistened with soap water to clean the external surfaces of the device. Then wipe the device with clear water to remove residual cleaning agent.

The devices surfaces should be disinfected at regular intervals and in case of suspected contamination. We recommend Mikrozid® Liquid for disinfecting the external surfaces of the device. Disinfectants which are recognized according to the RKI Guideline can also be used. Before being put into operation, the device should be completely dry.

TECHNICAL DATA

Specifications and Performance

Dimensions (W x H x D): 115 x 84 x 25 mm
Weight: 110 g

Operating conditions

Operating temperature: 0 °C to + 40 °C
Relative humidity: 10 % to 95 %
Air pressure: 700 to 1060 hPa
Storage conditions: - 10 °C to + 50 °C
(Store in a dry, vibration free position; store device and accessories in their original packing)

Standards

The system complies with the following standards and guidelines:

- EC directive 93/42/EEC
- DIN EN ISO 14971:2000
- DIN EN ISO 14971:A1 2003
- IEC / TR 6051
- UL 1577 Component Recognition Program: 2500 V rms Isolationsspannung
- DIN EN 60747-5-2; VDE 0884-2:2003-01
- DIN EN 60950; VDE 0805:2001-12

The manufacturer reserves the right to make technical changes without notice.

DISCLAIMER

HOFFRICHTER GmbH is not liable for consequences in terms of safety, reliability and performance of the product where:

- interventions, modifi cations, extensions, calibration, repairs and maintenance are carried out by persons not authorized by us,
- other manufacturers' accessories and spare parts are used that have not been approved by us for use on the product,
- the product is used other than as described in the user's manual or
- the hygiene and cleaning instructions described in the user's manual have not been complied with.

Statutory guarantee rights remain unaffected by this.

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