

FA 300

Stationary humidity measuring instrument for **measuring pressure dew-point and atmospheric dew-point** in different applications:

- Compressed air plants
(refrigerating/adsorption dryers)
- Granulate dryers
- Medical gases
- Non-corrosive gases, e.g. nitrogen
- Etc.





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INTRODUCTION

Dear CS-customer,

You have made the right decision by choosing a measuring instrument from CS-Instruments. Thousands of customers buy our high standard products every year. There are a few good reasons for doing so:

- Cost-performance ratio. Reliable quality at a fair price.
- We have the ideal solutions for your measuring tasks based on our expert experience gained over 20 years.
- Our high quality standard.
- Of course, our instruments carry the CE symbol required by the EU.
- Calibration certificates, trainings, consultation and calibration on location.
- Our after-sales service, we do not leave you out in the cold.

Our service guarantees fast help.



Measuring instrument conforms with **DIN EN 61326**



Please read prior to operation

Warning: Do not exceed pressure range of > 50 bar with standard versions.
With special versions up to 350 bar.

Observe measuring ranges of sensor!
The probes are damaged if overheated.

Observe max. storage and transport temperature as well as max. operating temperature.
(e. g. protect measuring instrument from direct sunlight).

Warranty claims no longer apply if the instrument is opened,
in the case of inexpert handling or use of force.

Adjustments or calibrations should be carried out by qualified measurement
and control engineering staff only.

Important: Before installation briefly bleed the compressed air in order to remove
condensate and particles. Prevents soiling of FA 300.
Standing air leads to long measuring times.

DESCRIPTION

Applications with compressed air always have one problem: humidity and condensate. The high quality standards in the industry require a continuous humidity monitoring, which is reliable and long-term stable.

The **FA 300-1** with its measuring range from -10...+50°C td is the ideal measuring system for monitoring **refrigerating dryers**.

The **FA 300-2** ideally suits monitoring **adsorption and membrane dryers** with its measuring range from -80...+20°C td. Via two limit contacts a pre- and main alarm is triggered. The control status is displayed via LED.

The **version with display** also has two switching contacts. The humidity sensors, which offer a high level of stability over long periods, and the internal automatic calibration provide reliable measuring results.

Programming via service software:

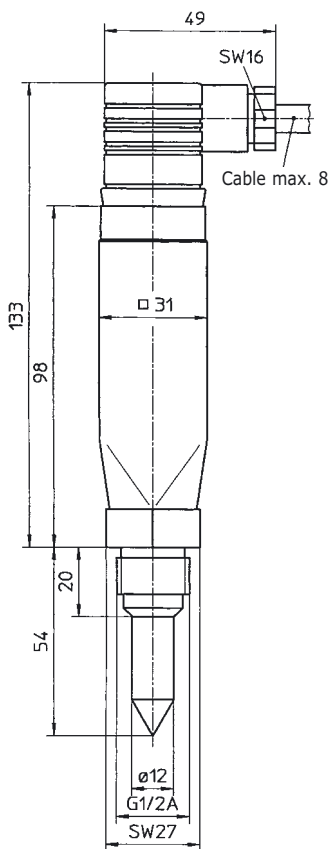
- Adjustable alarm values, scaleable analogue output
- Switching between °C_{td}, %RH, g/m³ etc.
- Calibration and adjustment including issuing of certificate
- Read-out of service data

When installing the FA 300 in compressed air plants the pressure dew point (dewpoint under pressure) is directly measured up to 50 or 350 bar. When installing under atmospheric conditions (ambient pressure) or in the bleeding zone (expanded air) of compressed air plants, the atmospheric dewpoint is measured. Example see page 6 and page 8.



Dimensions in mm

Basic instrument FA 300-11/21

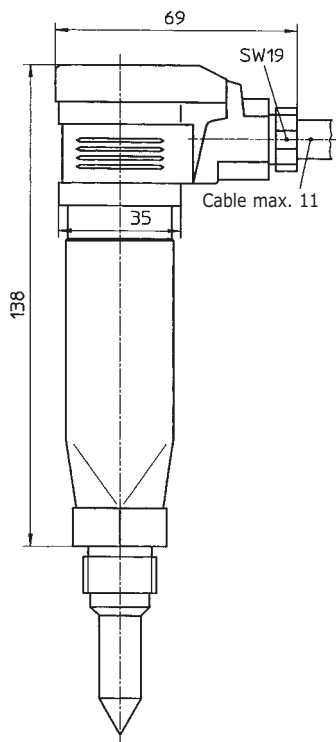


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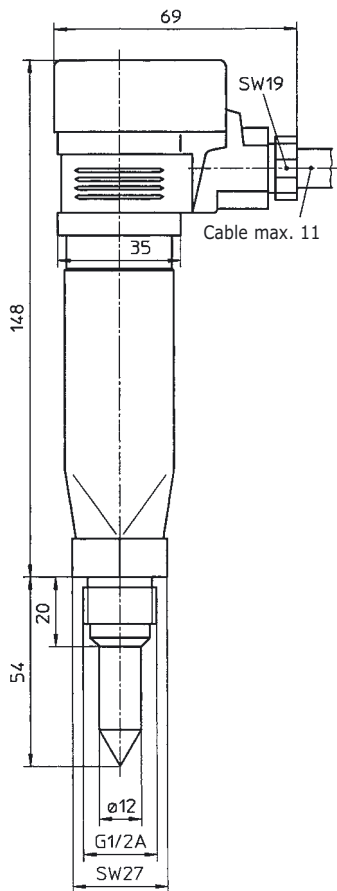


Dimensions in mm

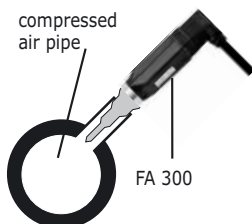
FA 300-12/22 with Limit contact



FA 300-13/23 with display

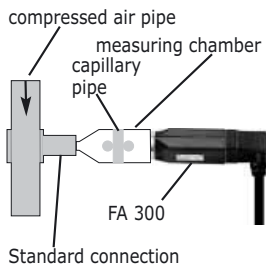


Please note: For safety we recommend the installation of a second measuring instrument with the option to monitor with a switch contact for especially critical and expensive productions.



Directly in the compressed air system

Screw in probe with G 1/2 " thread pressure-tight in the centre or in the compressed air pipe where the measurement is to take place. Ensure that the measurement is carried out close to the compressed air flow. U-bend pipes or non-flowing compressed air result in very slow reaction times for the moisture reading. Installation is recommended following drying of the compressed air and all bypass pipes or for critical compressed air users.



Indirectly in the compressed air system

Screw in probe with the G 1/2 " thread in the measuring chamber. Connect measuring chamber with the compressed air pipe using a ball valve and possibly a diffusion-tight connection pipe (max. 5m). In the case of compressed air containing oil and dirt particles, a 40µm pre-filter should be installed in front of the measuring chamber. Compressed air flows continuously (at 7 bar, approx. 1 l/min. expanded) in the capillary pipe of the measuring chamber. The reaction times for the humidity reading are shorter than when directly mounted.

Advantage: Easy mounting and dismantling of the probe, fast adaptation time.

Measurable gases:

In general humidity can be measured in all non-corrosive active gases. For corrosive gases please query with CS-Instruments

To enable accurate measurements in the low dew point range (-30 to -80 °C_{td}), the measuring temperature of the gas should, if possible, be that of room temperature (20 to 35 °C). With resin driers, for example, or other applications, the temperature of the measuring gas is often higher, e.g. 80 to 120 °C.

In this case we recommend installing a "cooling tunnel" of impermeable material in front of the screw-on measuring chamber.

A Teflon pipe or a copper pipe would be ideally suitable for this purpose, as the hot gas is cooled to ambient temperature over the length of the pipe, approx. 2 to 5 m.

Please do not use ordinary plastic tubes!

The dew point temperature in °C_{td} does not change when cooled as it is an absolute humidity value, which, like other measured variables e.g. g/m³, is independent of temperature.

Installation recommendation

It is possible to mount the pressure dew-point meters directly in the airflow.

We generally, however, recommend the use of a screw-on measuring chamber.



◀ Screw-on

measuring chamber

Advantage: quick measurement, no time-consuming installation

The right measuring chamber for each application:



Standard measuring chamber for compressed air up to 16 bar
Order no. 0699.3390



Measuring chamber for atmospheric pressure dew point
Order no. 0699.3690



Measuring chamber for resin driers up to 250 mbar
Order no. 0699.3490



Measuring chamber for air tanks up to 350 bar*
Order no. 0699.3790



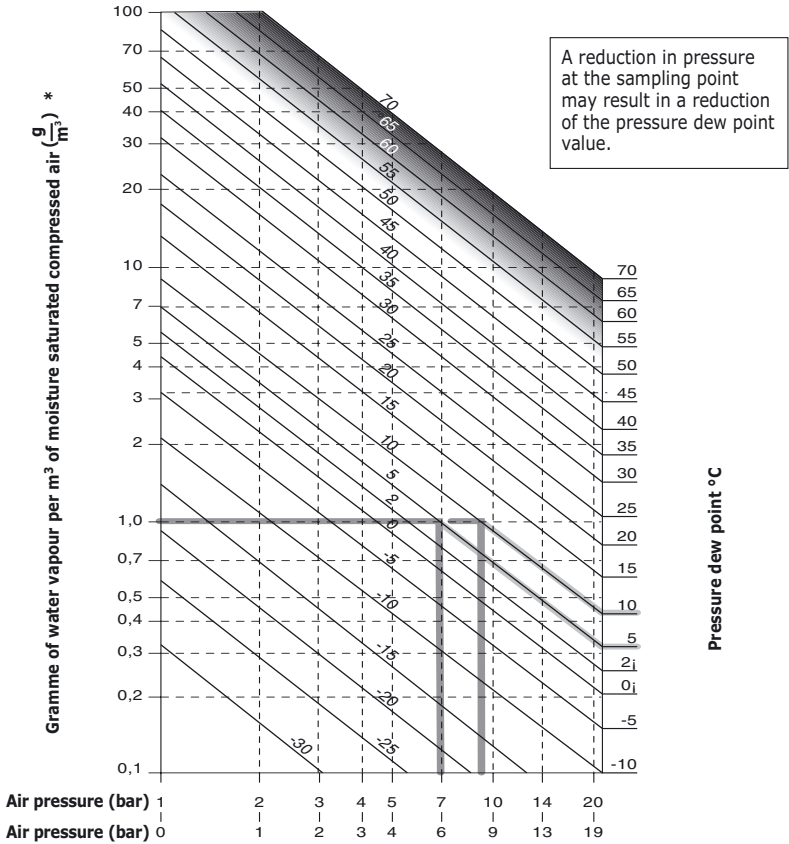
High pressure measuring chamber up to 350 bar*
Order no. 0699.3590

* higher than 50 bar
Please order special version FA 300
Order no. 0699.4003



DEW POINT DIAGRAM FOR COMPRESSED AIR

The diagram provides information on the change in pressure dew point when there is a drop in pressure. Example: a drop in pressure from 8 bar to 6 bar working positive pressure is shown. In this case the pressure dew point drops from 10 °C to 5 °C.



* with reference to 0 bar, 20°C



Measuring range:	pressure dewpoint in °C _{td}
FA 300-1:	-10 to +50 °C _{td} $\hat{=}$ 4 to 20 mA
FA 300-2:	-80 to +20 °C _{td} $\hat{=}$ 4 to 20 mA

Common data FA 300-1 and F 300-2

Pressure range:	-1 to +50 bar standard
Power supply:	24 VDC (10 to 30 V DC)
Accuracy:	± 0.5 °C _{td} (-10 to +50 °C _{td}) typical ± 2 °C _{td} at -40 °C _{td}
Output:	4 to 20 mA in 2-wire technology
Protection class:	IP65
CE conformity to:	DIN EN 61326
Operating temperature:	-20 to +70 °C
Storage temperature:	-40 to +80 °C
Load for analogue output:	≤ 500 Ohm
Screw in thread:	G 1/2" stainless steel
Material of housing:	polycarbonate
Sensor protection:	sinter filter 50 mm stainless steel

Display, Option switching contacts

2 floating switching contacts
(60 V/1A max. 30 W)

Exceeding alarm values (pre-alarm / main alarm)

Default settings:

FA 300-12/13: Pre-alarm +8 °C_{td}
Main alarm +12 °C_{td}

FA 300-22/23: Pre-alarm -40 °C_{td}
Main alarm -35 °C_{td}

LED display:

green: measured value ok

yellow: pre-alarm exceeded

red: main alarm exceeded

Different alarm value settings on request.

On request

- versions up to 350 bar
- outputs 4 to 20 mA in g/m³, g/kg, %RH
- digital output
- customer specific setting of pre- and main alarm
- 0 to 20 mA output in 3-wire technology

The FA 300 complies with the EMC standard according to the industrial standard 61326. We recommend the use of a shielded connection cable in particular with long signal transmissions and "harsh industrial conditions". When using a measuring chamber, earth one side of the shield in the control cabinet. For direct installation without measuring chamber, connect the shielding as short as possible to clamp 4 (earth) in connection plug on FA 200.

Instrument family FA 300-1 for refrigerating dryers

(-10 to 50°C pressure dewpoint)

FA 300-11

Basic instrument

4 to 20 mA analogue output

Order no. 0699.3011

(See Set 1)


FA 300-12

2 alarm contacts with alarm LED

 alarm values $+8^{\circ}\text{C}_{\text{td}}$, $+12^{\circ}\text{C}_{\text{td}}$

4 to 20 mA analogue output

Order no. 0699.3012

(See Set 2)


FA 300-13

Display and 2 alarm contacts

 alarm value $+8^{\circ}\text{C}_{\text{td}}$, $+12^{\circ}\text{C}_{\text{td}}$

4 to 20 mA analogue output

Order no. 0699.3013

(See Set 3)





Instrument family FA 300-2 for adsorption dryers

(-80 to 20°C pressure dewpoint)

FA 300-21



Basic instrument

4 to 20 mA analogue output

Order no. 0699.3021

(See Set 4)



FA 300-22



2 alarm contacts with alarm LED

alarm values $-40^{\circ}\text{C}_{tdr}$, -35°C_{td}

4 to 20 mA analogue output

Order no. 0699.3022

(See Set 5)



FA 300-23



Display and 2 alarm contacts

alarm value $-40^{\circ}\text{C}_{tdr}$, -35°C_{td}

4 to 20 mA analogue output

Order no. 0699.3023

(See Set 6)

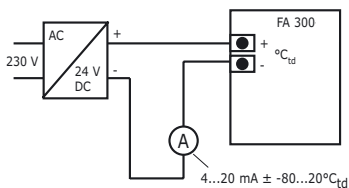


The versions of FA 300 with alarm contact and display have a 9-pin wire and a cable length of 5 m as a standard.

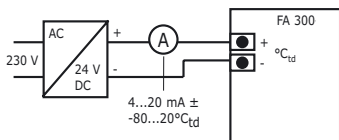
If cable extension is required, please order a separate plug. Order no. 0699.3501.

Current measurement

Option 1:



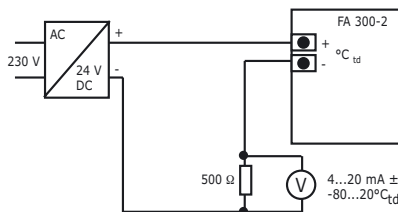
Option 2:



Voltage measurement

Long signal paths can be a problem when transmitting voltage signals (cable resistance, interference, etc.) It is advisable to use current signals for safe transmission (4...20 mA). Shunt resistances between 50 Ω or 500 Ω (50 Ω : 0.2 to 1 V, 500 Ω : 2 to 10 V) are connected in parallel to the multimeter, controller, etc. when measuring voltage (0.2...1 V, 2...10 V).

Advantage: - Reliable signal due to power transmission
- Recognises disconnected cable
0,2 V or 2 V corresponds to $-80^{\circ}\text{C}_{\text{td}}$



CALIBRATING/ADJUSTING

Via PC

The measuring instruments can be calibrated on location via a PC and a calibration software, if accurate reference values are available. Check with CS Instruments.

From the manufacturer

According to DIN ISO certification of the measuring instruments, we recommend regular calibration, and if necessary, adjustment of instrument by the manufacturer. The calibration cycles should fit your internal scheme. We recommend a yearly cycle. If requested, we can carry out calibration on your premises.

Connection: Basic instruments FA 300-11/21

Basic instrument

4 to 20 mA analogue output
(See page 16)



Opening the plug:
for opening the plug for connection
light levering with a flat screw driver.

Connection:

1. internal use
 2. - Vb (earth 0 V)
 3. + Vb (supply 24 V DC, 10...30 V DC)
 4. \perp instrument earth
- max. cable cross section: 1,5 mm²
cable diameter: PG9

Connection: FA 300-12/22
FA 300-12

2 alarm contacts with alarm LED

 alarm values $+8^{\circ}\text{C}_{\text{td}}$, $+12^{\circ}\text{C}_{\text{td}}$

4 to 20 mA analogue output

Order no. 0699.3012
FA 300-22

2 alarm contacts with alarm LED

 alarm values $-40^{\circ}\text{C}_{\text{td}}$, $-35^{\circ}\text{C}_{\text{td}}$

4 to 20 mA analogue output

Order no. 0699.3022

