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Эл. почта: cis@nt-rt.ru || Сайт: <http://cs.nt-rt.ru/>

Operation manual



DS 300-P



Features

- Graphic display for easy user interface
- Flexible power supply: 100V...240VAC / 50...60Hz, internal rechargeable battery for up to 6 hours operation
- 2 inputs for CS flow / dew point sensors
- up to 4 additional inputs for current clamps, pressure sensors and temperature sensors
- Auto-Detection of CS flow / dew point sensors
- Complete configuration can be set through the user interface (no PC configuration required)
- USB interface for data upload to PC
- PC software CS-Soft for data analyses (optional)
- Data logger function for 1,000,000 values

Important information

The operating instructions must be read in full and carefully observed before starting up the device. The manufacturer cannot be held liable for any damage which occurs as a result of non-observance or non-compliance with this manual.

Should the device be tampered with in any manner other than a procedure which is described and specified in the manual, the warranty is cancelled and the manufacturer is exempt from liability.

The device is destined exclusively for the described application.

CS Instruments offers no guarantee for the suitability for any other purpose and is not liable for errors which may have slipped into this operating manual. They are also not liable for consequential damage resulting from the delivery, capability or use of this device.

Technical data

Casing	Size: 265 x 220 x 150 mm																
Sensor inputs	<ul style="list-style-type: none"> • 2 inputs for CS dew point and flow sensors • up to 4 additional inputs for current clamps, pressure sensors and temperature sensors. Analogue signals such as 0-20 mA, 0-10V can be connected as well. 																
Interface	USB to PC																
Keyboard	4 keys																
Power supply	100 240 VAC / 10 VA, 50-60 Hz internal rechargeable battery (6 hours battery life) Charging time: 10 hours																
Display	Graphic display, 160 x 100 pixels with back light																
Accuracy	<table> <tr> <td>Dew point:</td> <td>see sensor specifications</td> </tr> <tr> <td>Flow:</td> <td>see sensor specifications</td> </tr> <tr> <td>Pressure:</td> <td>0.5 % F.S.</td> </tr> <tr> <td>Amps:</td> <td>See sensor specification</td> </tr> <tr> <td>0-20 mA:</td> <td>0.01 mA</td> </tr> <tr> <td>0-10 V:</td> <td>0.01 V</td> </tr> <tr> <td>Pt100:</td> <td>0.5 °C</td> </tr> <tr> <td>Pt1000:</td> <td>0.5 °C</td> </tr> </table>	Dew point:	see sensor specifications	Flow:	see sensor specifications	Pressure:	0.5 % F.S.	Amps:	See sensor specification	0-20 mA:	0.01 mA	0-10 V:	0.01 V	Pt100:	0.5 °C	Pt1000:	0.5 °C
Dew point:	see sensor specifications																
Flow:	see sensor specifications																
Pressure:	0.5 % F.S.																
Amps:	See sensor specification																
0-20 mA:	0.01 mA																
0-10 V:	0.01 V																
Pt100:	0.5 °C																
Pt1000:	0.5 °C																

Measuring range	Dew point: see sensor specifications Flow: see sensor specifications Pressure: 0 ... 40 bar gauge Amps: 0 ... 1000 A Pt100: -200 ... 600 °C Pt1000: -200 ... 600 °C
Settings	Complete settings can be changed through user interface at DS 300-P
Sensor connector	Round lockable connectors, 5 pole
Operating temperature	0 ... 50 °C
Transport temperature	-20 ... 50 °C
Weight	2400 g

Probe connection and power supply



DS 300-P is equipped with an internal rechargeable battery. This battery is intended to supply the system with power during power loss or for short term measurement where a mains supply is inconvenient. The charging time takes about 10 hours, where the battery life is around 6 hours.

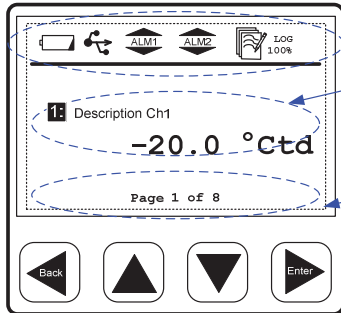
In case of plugged-in mains supply the rechargeable batteries will be charged even if the instrument is switched off. The moving bar graph LED will indicate the charging process.



Operation

Description of display icons

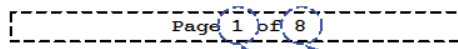
Status display, please see below for detail description of different status icon.



One page of measurement value will be shown at a time. User can use ▲ or ▼ key to scroll through all available value.

Page view indication:

This "Page view indication" shows the current display measurement value page no., and the total measurement value page count available.



Indicate there are totally 8 page measurement value available.

Indicate the measurement value display page 1 of 8.

Status icon detail description:



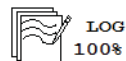
Status icon shows different status of the system.



Low battery icon: it shows when internal battery low. (Please contact service.)



USB connection icon: icon shows when DS 300 connected to PC via USB.



Logger module status icon



Logger module status:

- WAIT: Time start condition set, and wait for start logging
- LOG: Logger module is doing data logging
- STOP: Logging is stopped
- DEL: Logger is deleting protocol data
- ERR: Error occur during data logging.

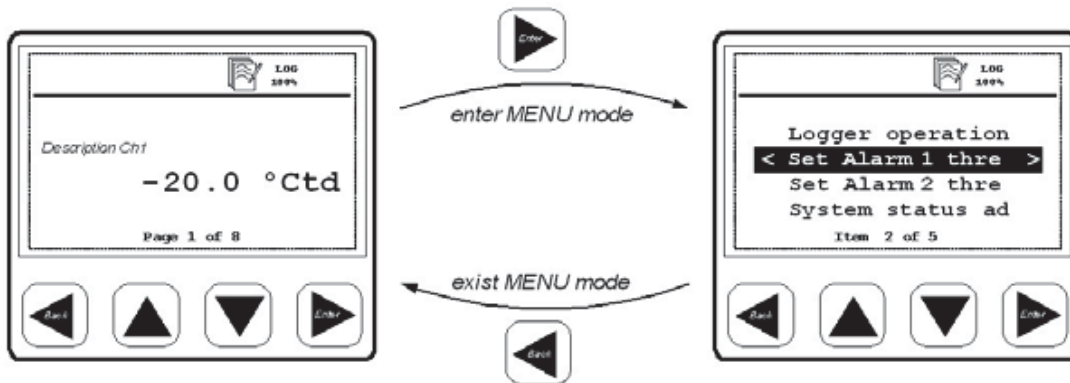
Logger module free memory in percentage, or CYCLE when logger memory in circular mode.







The number indicates the terminal number, if it's inverse this channel is set to be logged.

Basic key operation

Basic concept for MENU mode key operation



-  or  - use these keys to browse and select different items in menu, and scroll through different pages of measurement value display
 - use these keys to alter or adjust the setting option or numbering
-  - use this key to exit the current menu level
 - use it to leave all setting state, without saving the change
 - use this key to enter to submenu or next menu level of the current selected menu item
-  - use it to confirm the setting change or enable an option in all setting state

Typical menu display layout and keys description :

The current select menu item will be shown in negative color.

If there is a “<” sign, it means we can exit the current menu or go up one level from the current menu level.

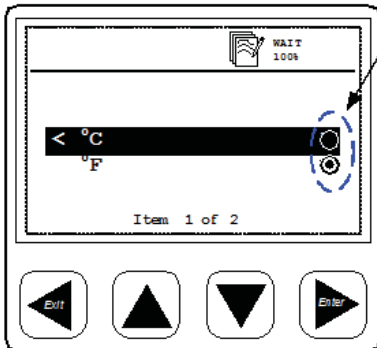
If there is a “>” sign, it means we can go into the submenu of the current select



Selectable menu item, it shows 4 items at a time. If the total items in the current menu level is more than 4 items, the menu item should scroll over.

It tells how many item exist in the current menu, and which no. of item is currently selected



Typical display layout for option selection:




The radio button for selecting the option.


- Radio button style for de-selected item
- Radio button style for selected item

Procedure to select and enable new option

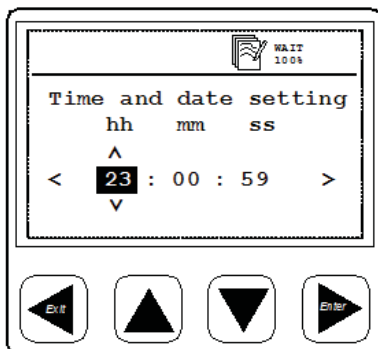
1) Use  or  key to select the desired option being enable

2) Use the  key to enable the new selected

For leaving the exist option:


1) Use the  key to go back to last menu level without

Typical display layout for altering or adjusting the number setting :



Example: Time and data setting

1) Use  and  key adjust the time

2) Use  key to move from HOUR -> MINUTE ->

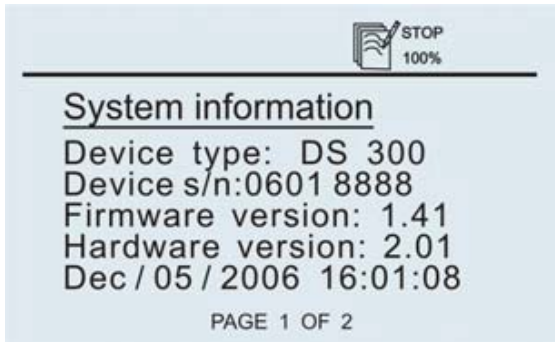
SECOND setup

3) After the SECOND setting and press the  key to finalize the setup, or press  to exit from the "Time and

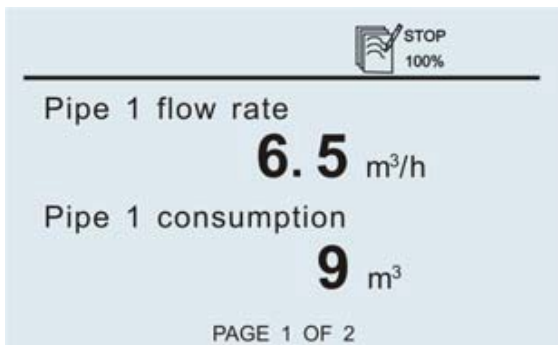
date setting" menu and without saving the new setting

Power on the device

When DS 300-P is powered on, it will display the system information like this:



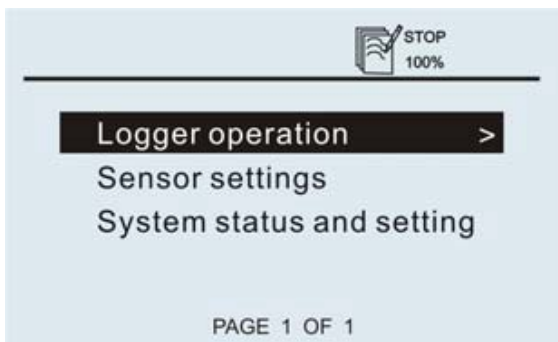
The system information is helpful for any service inquiries in order to identify the specific model and version.



If there are any sensors connected, DS 300-P will connect to them automatically and start to display real time measurement values acquired from those sensors. The measurement values may be displayed on more than one page. To see another page, just press the arrow buttons on the key board .

Operation in detail

By pressing the <Enter> key the menu can be accessed. DS 300-P has following main menus:



Logger operation

Sensor settings

System status and setting

Logger operation

DS 300-P includes a data logger that can record up to 1,000,000 measurement values. In order to configure the logger function and to activate/deactivate it, there are several functions available which are explained below:

Set logging rate and averaging option	The logging rate defines the interval data should be recorded in the memory. It will record from every activated channel a sample. The averaging option can be used to calculate an average value. I.e. DS 300-P is measuring every 1 second and if the logging rate is 10 seconds, it will calculate an average value out of the last 10 measurement values and store it as a recorded sample.
Key start/stop logging	Starts or stops the data recording. Whenever a new recording is started a new file is created in the memory.
Select logging channels	Those channels which should be recorded with the data logger must be selected first. For example, if Flow is selected to be recorded the flow value of all connected flow sensors will be recorded. Attention: sensors connectable on port 3...6 are shown as they have been selected in the sensor setting menu.
Set logger memory mode	It can be selected to stop logging when memory is full, or the "wrap around mode" can be chosen, which then will overwrite the oldest values as soon the memory is full.
Show logger memory	Informs about the current protocol: <ul style="list-style-type: none">- number of channels programmed for logging- number of values stored per channel- how many values still can be recorded- the estimated logging time- memory status. Start/stop conditions
Set time start condition	DS 300-P can be programmed to start at a certain time. Programmed time must be 10 seconds later than the system time.
View protocol	Single protocols (files) can be viewed. DS 300-P will show the available protocols with date, number of channels, number of recorded values per channel and min, max and mean values.
Delete protocol	Single protocols (files) can be deleted. DS 300-P will show the available protocols with date, number of channels and number of recorded values per channel.
Format logger	This function is used to free all memory of DS 300-P. It should be used with care , as recorded protocols will be erased permanently .

Sensor settings

The following chapter describes the settings related to the sensor itself, which can be changed on the DS 300-P menu. For that purpose select in the menu the function “**Sensor settings**”.

After the selecting “Sensor settings”, the next screen will show all detected flow/dew point sensors of terminal 1 and 2 and the selected analogue sensor of terminal 3 to 6. Changes can be done individually for each sensor, by selecting the terminal where the sensor is connected to.

The next chapters describe the available settings of the different sensors.

Flow sensor settings

For CS flows sensors following settings can be made:

- **Set tube diameter:** for flow calculation
- **Set total consumption:** counter can be set to any value
- **Set flow unit:** Selection of the desired flow unit
- **Set consumption unit:** selection of the desired consumption unit
- **Set reference pressure:** in order to calculate the standard flow
- **Set reference temperature:** in order to calculate the standard flow
- **Set gas type:** Select the gas which is measured with the flow sensor.

Note:

Reference pressure and reference temperature are not related to the actual process pressure or temperature. They are used to calculate the standard flow at standard conditions, for example: 1000 hPa, 20 °C.

Changes on the sensor settings are downloaded immediately into the sensor as soon the changes are confirmed by pressing <Enter>.

Dew point sensor settings

For CS dew point sensors following settings are available:

- **Set moisture unit:** ($^{\circ}\text{Ctd}$, g/m^3 , g/kg , ppm etc.). Attention: g/m^3 , mg/m^3 , ppm[V] and atmospheric dew point require to enter a reference pressure.
- **Set reference pressure:** required for g/m^3 , mg/m^3 , ppm[V] and atmospheric dew point calculation. The pressure has to be entered as absolute pressure (not gauge pressure!)

For the unit atmospheric dew point and ppm[V], the line pressure (absolute) has to be entered.

For the unit g/m^3 , mg/m^3 , if the calculate should be done under line pressure conditions, a reference pressure of 1013 hPa has to be entered.

If the calculation should be done for atmospheric conditions, the line pressure (absolute) has to be entered.

Analogue sensor settings

DS 300-P has up to 4 analogue input channels at terminal 3 to 6. These channels don't have an automatic sensor detection, the sensors need to be manually selected. Following settings are available:

- **Select sensor type:** Ds 300-P stores up to 15 different analogue sensors which can be selected from the list
- **Show setting:** the details of the sensor settings such as: sensor type, unit, resolution, input scaling and calibration offset can be viewed
- **One point calibration:** The instrument provides a one-point system calibration, which can eliminate accuracy failures of instrument and sensor. If an accurate reference is available (i.e. Calibration Lab), the system can be calibrated at one point to this reference. The calibration is stored inside the DS 300-P. However this calibration offset is applied to every sensor connected to this particular terminal. If the sensor type is changed, DS 300-P will delete the stored calibration offset.
- **Remove one-point calibration:** is used to delete the calibration offset

Connecting analogue sensors



Connector pinning, view to the plug at DS 300-P

Pt100 Pt1000	12V loop powered 4...20mA	1V 10V	0...20mA and 4...20mA active current
1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>	1 <input type="checkbox"/> 3-wire 2 <input type="checkbox"/> 20mA+ 3 <input type="checkbox"/> +VB 4 <input type="checkbox"/> S- 5 <input type="checkbox"/> S+

Analogue sensors such as Pt100, Pt1000 (3-wire), 0-20 mA, 4-20 mA, 0-1 V and 0-10 V types can be connected to the analogue inputs (no. 3-6) of DS 300-P4 and P6.

Please refer to the connection chart and the connector pinning above. For loop powered sensors, DS 300-P can supply current of up to 25 mA. For signal connection the optional 5 m cable 0553 0110 can be used, which comes with connector and open wire ends.

In the next step, these sensors have to be programmed in DS 300-P. Please select from the menu “Sensor Settings” - “Terminal 3:” - “Select sensor type”. Choose from the predefined types the correct one. Attention: the predefined types will measure the process signals and display them as they are in Ma or V. If a scaling to the original physical value and unit is desired, we recommend to download a small tool (DS 300-P Sensor Configuration) from our web page, which enables users to define their own sensor types (www.cs-instruments.com.hk). When using the DS 300-P sensor configuration software it's recommended as a first step to read out the current sensor settings.

Pin	1	2	3	4	5
1 st Cable color	Brown	Red	Orange	Black	Yellow
2 nd Cable color	Brown	White	Blue	Black	Grey

Remark: 5 m connection cable with open wires (P/N: 0553 0110) have 5 cores. These 5 cores match with the pins of DS 300-P plug one-to-one, which is showed above.

System status and setting

- **Setup time/date:** The internal clock can be set
- **Show system status:** For service inquiries this screen contains important information.
- **Change LCD contrast:** Contrast of display can be changed
- **System reset:** does a restart of the whole system (usually never required)

Order information

<i>P/N</i>	<i>Description</i>
0500 3101	DS 300-P2 , with 2 inputs for flow and dew point sensor from CS. With internal rechargeable battery, power cord, and USB cable.
0500 3225	DS 300-P4 , with 2 inputs for flow and dew point, 2 channels for pressure, amps and temperature. With internal rechargeable battery, power cord and USB cable.
0500 3226	DS 300-P6 , with 2 inputs for flow and dew point, 4 channels for pressure, amps and temperature. With internal rechargeable battery, power cord and USB cable.
0695 0083	Volume flow sensor VA 400-S , standard version for DS 300-P, including 5 m cable
0695 0122	Volume flow sensor VA 400-M , max version for DS 300-P, including 5 m cable
0699 0419	FA 410 , dew point sensor, -80 .. +20 °Ctd, for DS 300-P, including measuring chamber and 5 m cable
0694 1886	Pressure sensor, 0 - 16 bar, for DS 300-P, 5 m cable
0694 0356	Pressure sensor, 0 - 40 bar, for DS 300-P, 5 m cable
0554 0500	Clamp-On amp meter, 0 - 500 A, for DS 300-P, 5 m cable
0554 0504	Clamp-On amp meter, 0 - 1000 A, for DS 300-P, 5 m cable
0604 0100	Pt100 temperature sensor, -50 ... +150 °C, 5 m cable
0554 7010	CS-Soft for data transfer from DS 300-P and analyzes
0599 2010	CAA, Compressed Air Analyzer software
0553 0103	Extension cable DS 300-P, ODU connection male/female, 5 m
0553 0110	5 m connection cable with open wires
0554 6005	Casing for probes DS 300 portable

Scope of delivery

- DS 300-P x
- USB cable
- Operation manual
- Sensors according to the order
- Accessories according to the order
- Delivery note

Warranty

CS provides a warranty for this product of 12 months covering the material and workmanship under the stated operating conditions from the date of delivery.

Please report any findings immediately and within the warranty time guaranteed by us.

Excluded from this warranty is damage caused by improper use and non-adherence to the instruction manual.

The warranty is also cancelled once the measuring instrument has been opened provided this is not described in the instruction manual for maintenance purposes. This is also the case if the serial number has been changed, damaged or removed.

If in addition to the warranty service necessary repairs, adjustments or similar are carried out, the warranty services are free of charge but there is a charge for other services such as transport and packing costs. Other claims, especially those for damage occurring outside the instrument are not included unless responsibility is legally binding.

EC Declaration of Conformity

for

DIRECTIVE 2002/96/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27. January 2003 on waste electrical and electronic equipment (WEEE)

and

DIRECTIVE 2002/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27. January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)

for the following instruments of CS Instruments GmbH:

Pressure dew point meters: FA 400 and accessories

Flow and consumption meters: VA 400/VA 410/DS 300-P

and accessories

CS Instruments GmbH as the manufacturer herewith declares that the above instruments and accessories belong to the category 9 (WEEE 2002/96/EC). Therefore the above instruments are not affected by the directive RoHS 2002/95/EC and by the material restriction.

In accordance with directive WEEE 2002/96/EC the measuring instruments specified above will be taken back from CS Instruments GmbH for disposal.

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EC Declaration of Conformity

According to the guideline of the Board for Approximation

Of Laws of the member states on the

Electromagnetic compatibility (89/336/EWG)

Pressure dew point meters

FA 400, FA 410, FA 415,

FA 416, FA 300-1, FA 300-2,

FA 300-2 Ex, FA 200-2

Flow and consumption meters

VA 300, VA 400, VA 410,

DS 300-P

CS Instruments GmbH as the manufacturer herewith declares that the above mentioned pressure dew point, flow and consumption meters correspond with the requirements of the following guideline: