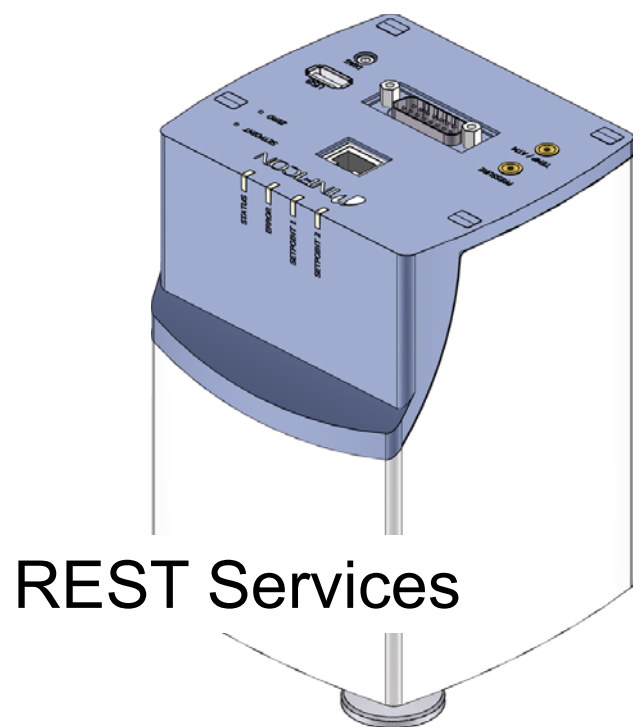


# REST Services

for Capacitance Diaphragm Gauge

Cube CDGsci



## General Information

**Caution**

Caution: data transmission errors

Any attempt to simultaneously operate the gauge via the RS232-ASCII Serial Interface or Ethernet/Wireless interface together with the diagnostic port may result in incorrect data and data transmission errors.

Therefore, it is inadmissible to simultaneously operate the gauge via the RS232-ASCII Serial Interface Ethernet/Wireless interface and the diagnostic port.

## Intended Use

This Communication Protocol contains instructions for operating INFICON Cube using the REST service protocol <sup>1)</sup>.



For safety information, specifications and operation instructions of the vacuum gauges refer to the appropriate documents (→ [1]).

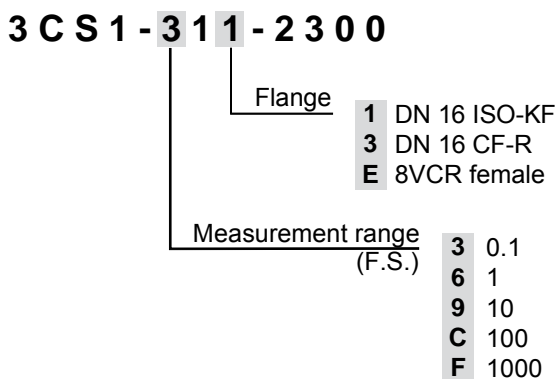
## REST service Protocol

The following description of REST service protocol is based on a dissertation of Roy Fielding from 2000 that created the protocol using only the HTTP-word "Get" (also to describe paramters).

We reserve the right to make technical changes without prior notice.

## Validity

This document applies to INFICON Cube with Ethernet / Wireless interface only. Part numbers of standard products are indicated below.



The part number (PN) can be taken from the product nameplate.



If not indicated otherwise in the legends, the illustrations in this document correspond to CDGsci gauges with the DN 16 ISO-KF vacuum connection.

We reserve the right to make technical changes without prior notice.

<sup>1)</sup> REST service stands for Representational State Transfer service and is an ASCII based data transfer protocol based on HTTP 1.1.  
Source: [http://en.wikipedia.org/wiki/Representational\\_state\\_transfer](http://en.wikipedia.org/wiki/Representational_state_transfer)

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For cross-references within this document, the symbol (→  XY) is used, for cross-references to further documents, listed under literature, the symbol (→  [Z]).

# 1 Technical Data



Further technical data →  [1].

## Ethernet interface

Ethernet connection	1×RJ45, 8-pin, socket
Cable	Shielded Ethernet cable, CAT5e quality or higher
Cable length	≤15 m
IP address	192.168.0.248 (default)
MAC address	→name plate

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## Wireless interface

WLAN adapter	USB Typ A adapter IEEE822.11g (enclosed in scope of delivery)
DHCP	DHCP capable, no server
Data rate	
IP address	192.168.0.240 (default)

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## 2 Interface Connection

Ethernet interface

For operating the temperature controlled CDGsci gauge via Ethernet, one interface cable conforming to the Ethernet standard is required.

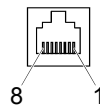
If no such cable is available, make one according to the following indications.

Cable type

Ethernet Cable or Crossover Cable (CAT5e quality) with FCC68 connector.

Procedure

**1** Pin assignment:

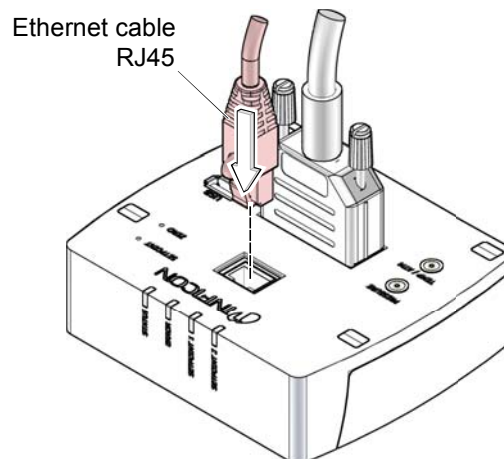


RJ45, 8-pin,  
male, soldering side

Pin	Signal	Description
1	TD+	Transmission Data +
2	TD-	Transmission Data -
3	RD+	Receive Data +
4	nu	not used
5	nu	not used
6	RD-	Receive Data -
7	nu	not used
8	nu	not used

Pin assignment of the D-Sub 15-pin sensor connector according to the respective operating manual (→ [1]).

**2** Plug the Ethernet (and sensor) cable connector into the gauge as shown.



### Wireless interface

For operating the temperature controlled CDGsci gauge via wireless interface, a WLAN USB adapter is required (enclosed in scope of delivery).

The wireless network is factory deactivated. To activate the network → [1].

### USB port



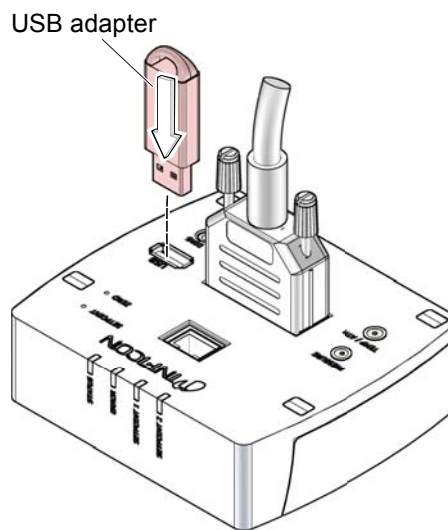
USB Type A

### USB adapter

WLAN USB adapter IEEE822.11g (enclosed in scope of delivery).

Pin assignment of the D-Sub 15-pin sensor connector according to the respective operating manual (→ [1]).

Plug the USB adapter (and sensor cable connector) into the gauge as shown.



## 3 Operation

### 3.1 Introduction

Via the Ethernet / Wireless interface, the following and further data are exchanged in the standardized REST service protocol:

- Pressure reading
- Pressure unit (Torr, mbar, Pa)
- Zero adjustment
- Status and error messages
- Status of the switching functions
- Set Trip Point for switching functions



#### Caution



Caution: data transmission errors

Any attempt to simultaneously operate the gauge via the RS232C Serial Interface and Ethernet/Wireless interface or the diagnostic port may result in incorrect data and data transmission errors.

Therefore, it is inadmissible to simultaneously operate the gauge via the RS232C Serial Interface, Ethernet/Wireless interface or the diagnostic port.

### 3.2 Send and Receive

Commands are sent via the Ethernet interface based on the HTTP – Get protocol. Thus, the commands, send and receive can be operated using a standard internet browser.

Response time

100 ms for pressure values  
500 ... 1000 ms for other information or write commands

Form of the Get-Command

Read: `http://<IPAddress>:<Port>/1/cmd/<cmd>`  
Write: `http://<IP><Address>:<Port>/1/cmd/<cmd>%20<param>`

The value is transmitted as a string back to the caller.

The input of only the command results in Cube sending the actual value of the parameter corresponding to the command (read access). The value is transmitted as a string terminated back to the caller.

The input of the command with a trailing parameter value will result in a writing attempt of the value into the corresponding parameter on the Cube. If successful, the string "o.k." is transmitted back, otherwise an error message will result.

The data type in the parameter table 4.1 indicates how the string can be interpreted. The column "Access Rights" denotes if the command is read only ("R") or has a write and read access ("RW").

Example 1

IP-Address & port of gauge in example: 192.168.0.248:8087

Used internet browser: Firefox v24.0

Command: AUN (display/set the currently set pressure unit)  
Possible parameter values: mbar, Pa, Torr

*Entry of command without parameters displays the current unit:*

`http://192.168.0.248:8087/1/cmd/AUN`

*Output in browser:*

Torr

*Entry of command with parameter sets Cube to the specified unit:*

http://192.168.0.248:8087/1/cmd/AUN%20mbar

*Output in browser:*

o.k.

*Entry of command with not recognized / allowed parameter results in an error:*

http://192.168.0.248:8087/1/cmd/AUN%20psi

*Output in browser:*

Value does not fall within the expected range.

*If unsure about the parameters, the help function will display them:*

http://192.168.0.248:8087/1/cmd/HLP%20aun

*Output in browser:*

Device unit, 0=mbar, 1=torr, 2=pa

## Example 2

Write commands that do not have a parameter list need a trailing zero ("0").

Command: ZAD (performs zero adjust at base pressure)

http://192.168.0.248:8087/1/cmd/ZAD%200

o.k.



## 4 Parameter Table

Parameter name	ASCII command	Data type	Access right	Comment
Reset	RST	unit8	W	Power On Reset [RST 0] or [q RST]
FilterSettings	FIL	unit8	RW	Filter Settings: 0 = dynamic 1 = fast 2 = slow 3 = Bypass
SP1LevelLow	S1L	real32	RW	Setpoint 1 switch on, pressure units
SP2LevelLow	S1L	real32	RW	Setpoint 2 switch on, pressure units
SP1LevelHigh	S1H	real32	RW	Setpoint 1 switch off, pressure units
SP2LevelHigh	S2H	real32	RW	Setpoint 2 switch off, pressure units
PerOfAtmSP1	S1P	uint8	RW	Setpoint 1, percentage of atmosphere (only for 1000Torr gauges). Not interchangeable with S1[L/H]. Reset S1P to 0 before using S1[L/H].
PerOfAtmSP2	S2P	uint8	RW	Setpoint 2, percentage of atmosphere (for 1000 Torr gauges only). Not interchangeable with S1[L/H]. Reset S1P to 0 before using S1[L/H].
ZeroAdjust	ZAD	uint8	W	Zero adjust gauge
ZeroAdjValue	ZAV	sint16	RW	Value after Zero Adjust, unit counts [-2 <sup>15</sup> ...2 <sup>15</sup> ]
DcOutputOffset	DOO	sint16	RW	Customer DC-Output Offset, unit counts [-2 <sup>15</sup> ...2 <sup>15</sup> ]
RemainingZero	RZE	sint16	R	Remaining Zero value, unit counts [-2 <sup>16</sup> ...2 <sup>15</sup> ]
FirmwareRevisionCPU2	SSV	string	R	Software version EtherCAT
ImageRevisionCPU2	AIM	string	R	Software version Cube
FirmwareRevisionCPU1	SWV	unit8	R	Software version CPU1
SwDateYear	SWY	string	R	Year of software version in readable format (string)
SwDateMonthDay	SWD	string	R	Month and day of software version [MMDD]
CalibDate	CDA	string	R	Calibration date (xY'MM'DD'HH'MM)
PartNo	PAN	string	R	Part number on custom label (max. 20 byte incl. null terminator)
SerialNumber	SNU	unit32	R	Serial number (unique)
RunHours	RHO	unit16	R	Running hours: 1 = 1h
ExtendedError	EXE	uint16	R	Extended Errors, coded as 16bit uint. High byte: Bit 0 PT1000 fault Bit 1 Heater block overtemperature Bit 2 Electronic overtemperature Bit 3 Zero adjust error Low byte: Bit 0 Atm. pressure out of range Bit 1 Temperature out of range Bit 4 Cal. mode wrong Bit 5 Pressure underflow Bit 6 Pressure overflow Bit 7 Zero adjust warning
SensPressRange	SPR	unit8	R	Exponent: 0 = E-3      4 = E+1 1 = E-2      5 = E+2 2 = E-1      6 = E+3 3 = E0
SensFSR	SFS	unit8	R	Mantissa: 0 = 1.0      3 = 2.5 1 = 1.1      4 = 5.0 2 = 2.0      5 = 1.4
Help	HLP	string	R	Returns all the available commands
SystemDateTime	SDT	string	RW	Set date and time. Format: DD/MM/CCYY hh:mm:ss
ComportCPU2	COA	string	RW	RS baudrate for CPU2 processor board. Selectable values are 9600, 19200, 38400, 57600
Ethernet LAN	CLA	string	R	Ethernet LAN on/off

(continued)

(concluded)

Parameter name	ASCII command	Data type	Access right	Comment
WLAN	WLA	unit8	RW	WLAN on/off
FindAccessPoints	FAP	string	R	Find Wifi access points
ConnectAccessPoint	CAP	string	RW	Connect to access point [index   password]
WLANSettings	IPW	string	R	TCP-IP address of current Wifi connection
LANSettings	IPL	string	RW	TCP-IP address. Gauge resets after successful command.
AnalogOutPLow	APL	real32	RW	Zoom: low pressure which will force an output of 0 V of the DAC
AnalogOutPHigh	APH	real32	RW	Zoom: high pressure which will force an output of 10 V of the DAC
CustomAnalogOut	CAO	unit8	RW	Zoom function for analogue out
CPU2Unit	AUN	unit8	RW	Device unit: 0 = mbar 1 = Torr 2 = Pa
Pressure	PRE	real32	R	Actual pressure
ATMValue	ATM	unit16	R	ATM value of the CPU1, unit counts [0...2 <sup>16</sup> ]
MACAddress	MAC	string	R	Mac address of the Ethernet adapter
ResetFactory	RSF	unit8	W	Factory reset device
StoreFlash	SFL	unit8	W	Write new values to EEPROM
CubeMode	DOS	uint8	R	1 = CUBE (24Bit TempOut) 2 = CUBE(24Bit AtmOut)
SecondStageFilter <sup>*)</sup>	SSF	uint8	RW	0 = moving exponential average filter 1 = Salvitzky-Golay filter 2 = LOESS filter 3 = off (default)

<sup>\*)</sup> The filter only operates on the digital data stream.

#### Data type

Abbr.	Meaning
REAL32	32 bit floating point
SINT16	16 bit signed integer
SINT32	32 bit signed integer
UINT8	8 bit unsigned integer
UINT16	16 bit unsigned integer
UINT32	32 bit unsigned integer

#### Access right

Abbr.	Meaning
R	Read only
RW	Read and write
W	Write only

## Appendix

### A: Literature



www.inficon.com  
Operating Manual  
Cube CDGsci  
tina83d1 (German)  
tina83e1 (English)  
INFICON AG, LI-9496 Balzers, Liechtenstein

Original: English tira88e1-a (2014-03)



tira88e1-a



*LI-9496 Balzers  
Liechtenstein  
Tel +423 / 388 3111  
Fax +423 / 388 3700  
reachus@inficon.com*

*www.inficon.com*