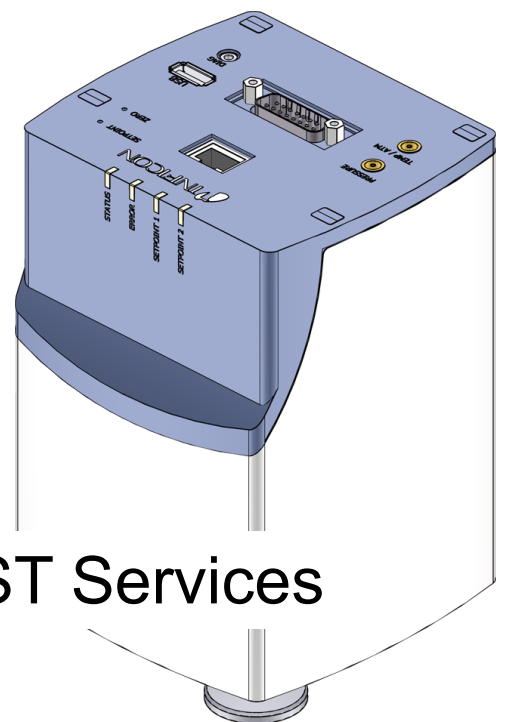


REST Services

for Capacitance Diaphragm Gauge

Cube CDGsci



REST Services

General Information

When a cable is attached to the diagnostic port all other inter-faces except the analogue outputs are automatically deactivated.

Intended Use

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



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 parameters).

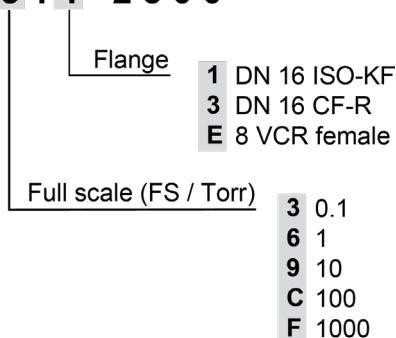
We reserve the right to make technical changes without prior notice.

Validity

This document applies to INFICON Cube in operation via Ethernet or Wi-Fi interface only.

Part numbers of standard products are indicated below. The gauge will be shipped with pressure unit in Torr by default.

3 C S 1 - 3 1 1 - 2 3 0 0



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.

¹⁾ 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

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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

Wireless interface

WLAN adapter	USB Type A adapter IEEE802.11g/n (enclosed in scope of delivery)
DHCP	DHCP capable, no server
Data rate	up to 300 Mbit/s
IP address	192.168.0.240 (default)

2 Interface Connection

Ethernet interface

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

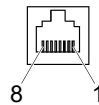
If no such cable is available, make one according to the following indications.

Cable type

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

Procedure

- 1** Pin assignment:

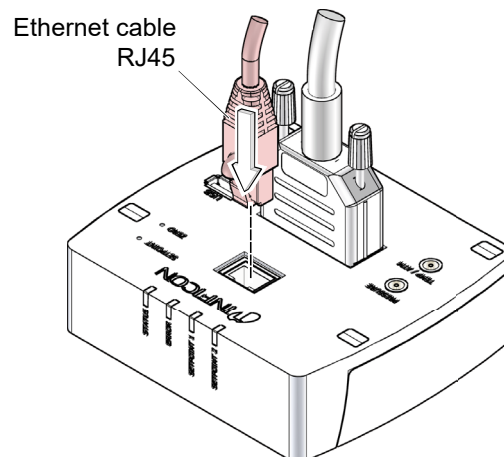


RJ45, 8-pin,
male, soldering side

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



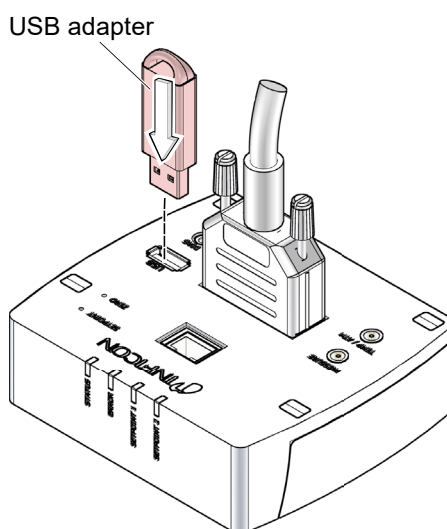
USB Type A

USB adapter

WLAN USB adapter IEEE802.11g/n (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
- Error messages
- Setting of the switching point
- Set Trip Point for switching functions

When a cable is attached to the diagnostic port all other interfaces except the analogue outputs are automatically deactivated.

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 common 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>:1/cmd/<cmd>`
Write: `http://<IPAddress>://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 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 read and write access ("RW").

Example 1

IP-Address & port of gauge in example: 192.168.0.248
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://192.168.0.248/1/cmd/AUN`

output in browser:
Torr

Entry of command with parameter sets Cube to the specified unit:
`http://192.168.0.248/1/cmd/AUN%20mbar`

output in browser:
o.k.

Entry of command with not recognized / allowed parameter results in an error:
`http://192.168.0.248/1/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://192.168.0.248/1/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://192.168.0.248/1/cmd/ZAD%200`
o.k.

4 Parameter Table

Parameter name	ASCII command	Data type	Access right	Comment
Reset	RST	uint8	W	Power on reset [RST 0] or [q RST]. Power cycles the gauge.
FilterSettings	FIL	uint8 or string	RW	Adaptive filter settings. Parameters: 0=dynamic, 1=fast, 2=slow, 3=bypass Input can be e.g. "0" or "dynamic". Transmitted back is always string, e.g. "fast".
SP1LevelLow	S1L	real32	RW	Setpoint 1 switch on, pressure units
SP2LevelLow	S2L	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).
PerOfAtmSP2	S2P	uint8	RW	Setpoint 2, percentage of atmosphere (for 1000 Torr gauges only).
ZeroAdjust	ZAD	uint8	W	Execute zero adjust function. [ZAD 0]
ZeroAdjValue	ZAV	real32	RW	Offset compensation value after zero adjust [Volt]
DcOutputOffset	DOO	real32	RW	Generates a customer DC-output offset in Volts. Scale 0...10 V
RemainingZero	RZE	sint16	R	Remaining zero value after a zero adjust. Scale in counts
FirmwareRevisionCPU2	SSV	string	R	Software version Cube application program
ImageRevisionCPU2	AIM	string	R	Image version of the Linux operating system
FirmwareRevisionCPU1	SWV	uint8	R	Software version CPU1
SwDateYear	SWY	string	R	Year of low level firmware version [YYYY].
SwDateMonthDay	SWD	string	R	Month and day of low level firmware version [MMDD].
CalibDate	CDA	string	R	Cube calibration date [DD.MM.YYYY hh:mm]
PartNo	PAN	string	R	Part number on customer label
SerialNumber	SNU	uint32	R	Unique Cube serial number
RunHours	RHO	uint16	R	Run hours [hours]
ExtendedError	EXE	uint16	R	List of extended error 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	uint8	R	Full scale of Cube (Exponent): 0=E-3, 1=E-2, 2=E-1, 3=E0, 4=E+1, 5=E+2, 6=E+3
SensFSR	SFS	uint8	R	Full scale of Cube (Mantissa): 0=1.0, 1=1.1, 2=2.0, 3=2.5, 4=5.0, 5=1.4
Help	HLP	string	R	Returns all the available commands
SystemDateTime	SDT	string	RW	Date and time of Cube via [DD/MM/YYYY hh:mm:ss]
ComportCPU2	COA	string	RW	Selector for RS232 Baudrate (RS232 ASCII), [9600, 19200, 38400, 57600]
Ethernet LAN	CLA	string	R	Switch LAN [on/off]

(continued)

(concluded)				
Parameter name	ASCII command	Data type	Access right	Comment
WLAN	WLA	uint8	RW	Switch WLAN [on/off]
FindAccessPoints	FAP	string	R	Find a Wifi access point
ConnectAccessPoint	CAP	string	RW	Connect to an access point with index and password [2 password]
WLANSettings	IPW	string	R	TCP-IP address of Wifi connection. Change with IPW [IP-address][Subnetmask].
LANSettings	IPL	string	RW	TCP-IP address of current Ethernet connection. Change with IPL [IP-address][Subnetmask]. Gauge resets after successful command.
AnalogOutPLow	APL	real32	RW	Lower limit for analog zoom function (equals output of 0V), pressure units
AnalogOutPHigh	APH	real32	RW	Higher limit for analog zoom function (equals output of 10V), pressure units
CustomAnalogOut	CAO	uint8	RW	Switch analog zoom function [on/off]
CPU2Unit	AUN	uint8	RW	Cube pressure unit, 0=mbar, 1=torr, 2=pa
Pressure	PRE	real32	R	Current reading of vacuum sensor
ATMValue	ATM	uint16	R	Current reading atmospheric pressure sensor [mbar]
MACAddress	MAC	string	R	Mac address of the Ethernet adapter
SecondStageFilter ^{*)}	SSF	uint8	RW	Extended noise filter. [0=Moving Exponential Average, 1=SGS (Salvitzky-Golay Smoothing 4th order), 2=Loess Filter, 3=None
ResetFactory	RSF	uint8	W	Factory reset device
StoreFlash	SFL	uint8	W	Write new values to EEPROM
CubeMode	DOS	uint8	RW	Change digital 24bit output signal. 1= SL TempOut, 2= SL AtmOut

^{*)} The filter only operates on the digital data stream.

Data type

Abbr.	Meaning
STRING	Array of ASCII characters
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



tra88e1-b



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