



Server TCP/IP Communication Protocol.

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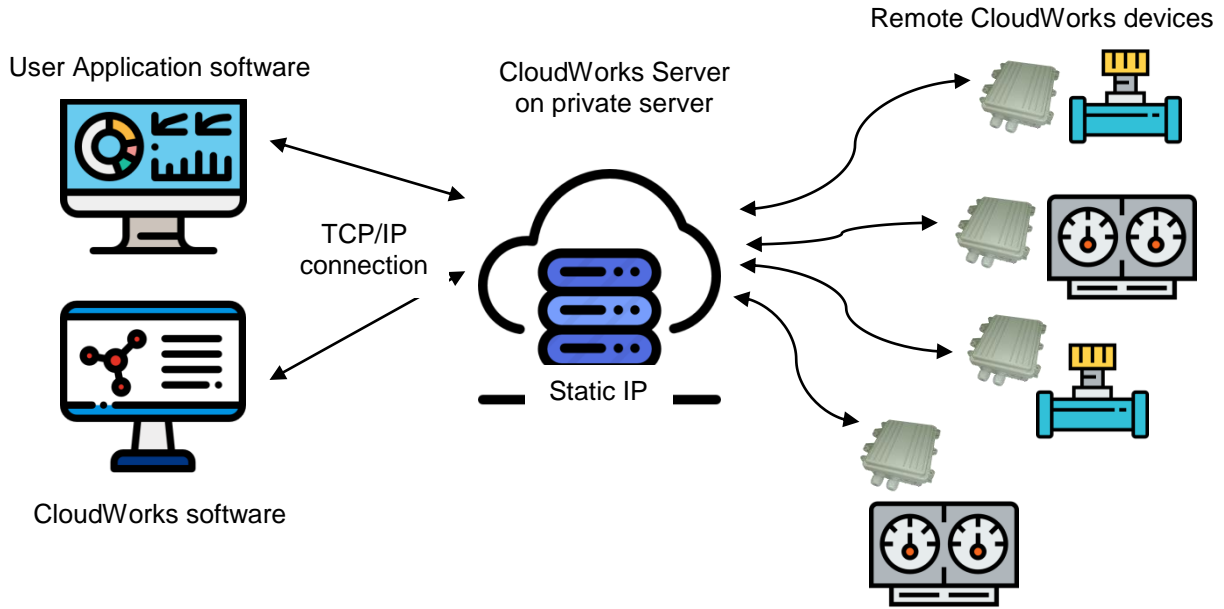
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1 CLOUDWORKS SERVER PROTOCOL

1.1 Basic system architecture

The CloudWorks system is designed to communicate through a static IP server running the **CloudWorks Server** software. This architecture allows the remote devices to operate on networks that only provide dynamic IP's such as most mobile operators. In order for them to communicate correctly to the user software, they need to connect via a server with a fixed IP. This can be on a private network or simply on an internet exposed server. Fully private networks can be established using VPN's etc.



This document serves to describe the CloudWorks Server TCP/IP protocols used to communicate with the CloudWorks/User Application software which in turn manages and controls the remote CloudWorks devices (e.g Cumulus loggers etc). Please note that all communications to the remote devices is done via the **CloudWorks Server** software. This software running on the server maintains a register of IP addresses of the remote devices as well as operating a heartbeat system and maintaining clocks amongst other functions.

The CloudWorks/User Application software will connect to CloudWorks Server using a TCP/IP connection on Port 13000 (settable in CloudWorks Server). Once this connection has been established, a flow of data can commence between the CloudWorks/User Application software and the remote CloudWorks devices.

Multiple commands can be sent simultaneously to the server and will be serviced once the appropriate resources become available. Please note that commands are sent to each remote device in parallel and return results can appear in any sequence. In order to match commands to responses correctly, a command indexing system has been applied - explained in more detail later.

1.2 Establishing a connection

Connections to the CloudWorks Server software can be achieved by opening a standard TCP/IP connection to the server address on Port number 13000. This is the default port number but can be adjusted in the settings of CloudWorks Server should it clash with existing systems.

Before any commands to the remote devices are serviced, the user will need to '[LOG ON]' to the system with a Vendor Code and secure password. The Vendor Code and password are issued by the system administrator and prevent unauthorised access to the system.

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Should this connection remain idle for more than 20 seconds, a '[HELLO]' message will be sent from the server to test if the connection is still active. TCP Protocols do not have a mechanism to directly detect if a connection has been broken and these packets can generally be ignored. Many simultaneous connections to the CloudWorks Server channel are supported.

Remote devices are addressed via a unique DEVICE CODE consisting of 10 digits.

1.3 Protocol Format

Commands to the server follow a strict format and consist of 5 items:

1. Index
2. Device Code
3. Command
4. Parameters
5. <CRLF> - Carriage Return and Line Feed

They form a packet of the following structure:

{index:device code}[command][parameter=...][parameter=...]<CRLF>

A parameter consists of a [parameter_tag=paramater_value]. An example of a command to set the description of a device would be as follows:

{1245:1412010001}[SET DESCRIPTION][DESCRIPTION=Main feed meter]<CRLF>

This command would set the description on device with Device Code of 1412010001 to the value of 'Main feed meter'. The packet index of this command would be 1245.

There is no need for command checksums etc since this a built in function of the TCP protocols. There should always be a response to every command that is sent. This response would have the following structure:

{index:device code} response <CRLF>

So the Index and Device Code values will be the same as the outgoing command. For this purpose, the response can be matched to the outgoing command.

Reponses can either be:

- {index:device code}[OK]<CRLF> for non parameter return responses
- {index:device code}[parameter=...][parameter=...]<CRLF> for responses with return parameters
- {index:device code}[ERROR]<CRLF> for commands that are incorrect or failed to execute

So a response to the above [SET DESCRIPTION] would return as {1245:1412010001}[OK]<CRLF>

Parameters can appear in any order and are extracted by means of their parameter_tag.

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An example of an extraction function in VB.net would be:

```
Public Function Extract_Data(ByVal Packet As String, ByVal Parameter_Tag As String) As String

    Parameter_Tag = "[" + Parameter_Tag + "="

    If InStr(Packet.ToUpper, Parameter_Tag.ToUpper) = 0 Then
        Return "ERROR"
    End If

    Dim Build_Packet As String = ""
    Dim Bracket_Counter As Integer = 1

    Packet = Mid(Packet, InStr(Packet.ToUpper, Parameter_Tag.ToUpper) + Parameter_Tag.Length)

    For I As Integer = 1 To Packet.Length
        If Mid(Packet, I, 1) = "[" Then
            Bracket_Counter += 1
        ElseIf Mid(Packet, I, 1) = "]" Then
            Bracket_Counter -= 1
            If Bracket_Counter = 0 Then
                Exit For
            End If
        End If
        Build_Packet += Mid(Packet, I, 1)
    Next
    Return Build_Packet

End Function
```

Multiple commands can be sent as one packet and are simply separated by the <CRLF> characters in the CloudWorks Server software. These are then processed simultaneously and each response is returned individually. Because of the standard network operation, it is possible that more than one response could appear as a single return packet so receive algorithms must allow for the separation of these responses using the <CRLF> characters.

An example of a multiple command would be:

```
{1245:1412010001}[SET DESCRIPTION][DESCRIPTION=Main feed]<CRLF>{1246:1412010055}[GET APN NAME]<CRLF>
```

Responses

```
{1246:1412010055}[NAME=gprs.swisscom.ch]<CRLF>
{1245:1412010001}[OK]<CRLF>
```

Note that the [GET APN NAME] command's response appeared before the [SET DESCRIPTION] command's response. These responses here can be matched to their commands by using the INDEX value. INDEX values are as per the assigned value on the outgoing command and can alphabetic or numerical. Please avoid using any of the control characters of '{' ':' '}' '[' ']' or <CRLF>. They would just serve to confuse the CloudWorks Server software and return responses.

Responses to commands should all return in a very short period of time (milliseconds). However, since communications is carried over a mobile network, there could be delays of up to 15 seconds. It would be safe to say that if no response has been received for 15 seconds, the Application software should move on and attempt further commands.

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Should the command be unknown, a response of [UNKNOWN COMMAND] will be received.

Commands available on **CloudWorks Server** have been categorised in 6 groups:

1. Server Commands
2. General Setup Commands
3. System Status Commands
4. Communications Commands
5. Datalog and Wakeup Commands
6. Input/Output Function Commands

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1.4 Server Commands

Before any communicates can take place with the server, the application software will need to log on to the server. The log on details used are the Vendor Code and associated password. To address the server use a Device Code equal to 'SERVER'.

For example: {1234:SERVER}[PING]<CRLF>

1.4.1 Log On Command

Performs a server log on. This must be completed successfully before the server will start servicing any other requests on this connection.

Command	Parameter	Notes
[LOG ON]	VENDOR CODE PASSWORD	Vendor code assigned to the system Password assigned to that code. This password can be obtained from your system administrator.

Response	Parameter	Notes
[VERSION=x.x.x.x]	VERSION	CloudWorks Server version number.

1.4.2 Ping Server Command

Returns a response from the server to check that it is present.

Command	Parameter	Notes
[PING]		

Response	Parameter	Notes
[OK]		Will return a reply of OK if present.

1.4.3 Get Version Command

Returns the CloudWorks Server version number.

Command	Parameter	Notes
[GET VERSION]		

Response	Parameter	Notes
[VERSION=x.x.x.x]	VERSION	CloudWorks Server version number.

1.4.4 Get Register Command

In order for the server to keep track of the various dynamic IP's and communications statuses of the remote devices, it keeps a register containing this information. This command returns the current device register and associated data. This command will return multiple lines separated by a comma. Optionally one can request the entire register or only the changes to the register since the last read. The final entry will be an [OK].

Command	Parameter	Notes
[GET REGISTER]	CHANGE	TRUE/FALSE. If set TRUE, then only entries that have changed since the last [GET REGISTER] command will be sent. This will reduce the data traffic between the server and application software.

Response	Parameter	Notes
[STATUS=x]	STATUS	Device comms status. Offline/Online/Sleep
[VENDOR CODE=x]	VENDOR CODE	Vendor Code for device. Normally only the devices with the same Vendor Code to which you have logged on to the server will be present here.
[SITE CODE=x]	SITE CODE	Site Code for device. Not widely used.
[DEVICE CODE=x]	DEVICE CODE	Device Code for device. Consists of a 10 digit code programmed at manufacture. This is ultimately the address for this device.
[APP CODE=x]	APP CODE	Application Code for device. See User manual.
[TYPE=x]	TYPE	Device Type e.g. CDS538, CDS541 etc.
[IP=x.x.x.x]	IP	Remote IP address for device.
[PORT=x]	PORT	Remote port number for device.
[POWER=x]	POWER	Current Power status. Mains/Battery
[POWER MODE=x]	MODE	Power operation mode. Mains/Dual/Battery
[VERSION=x]	VERSION	Firmware version number on the device.
[LATENCY=x]	LATENCY	Communications latency to device in milliseconds. This reading is the latency on the GSM network.
[SEEN=x]	SEEN	Date and time the device was last seen. Format is as follows: dd/MM/yyyy HH:mm:ss
[OK]		Final line is terminated with an [OK]



1.4.5 Get Device Status Command

As per the above register command, this one returns the current device register and associated data for only specified devices. Multiple devices can be addressed in this command. The final entry will be an [OK]. Should none of the devices be present in the register, only the [OK] entry will be returned.

Command	Parameter	Notes
[GET DEVICE STATUS]	DEVICES	A list of requested devices separated by a comma.

Response	Parameter	Notes
[STATUS=x]	STATUS	Device comms status. Offline/Online/Sleep
[VENDOR CODE=x]	VENDOR CODE	Vendor Code for device. Normally only the devices with the same Vendor Code to which you have logged on to the server will be present here.
[SITE CODE=x]	SITE CODE	Site Code for device. Not widely used.
[DEVICE CODE=x]	DEVICE CODE	Device Code for device. Consists of a 10 digit code programmed at manufacture. This is ultimately the address for this device.
[APP CODE=x]	APP CODE	Application Code for device. See User manual.
[TYPE=x]	TYPE	Device Type e.g. CDS538, CDS541 etc.
[IP=x.x.x.x]	IP	Remote IP address for device.
[PORT=x]	PORT	Remote port number for device.
[POWER=x]	POWER	Current Power status. Mains/Battery
[POWER MODE=x]	MODE	Power operation mode. Mains/Dual/Battery
[VERSION=x]	VERSION	Firmware version number on the device.
[LATENCY=x]	LATENCY	Communications latency to device in milliseconds. This reading is the latency on the GSM network.
[SEEN=x]	SEEN	Date and time the device was last seen. Format is as follows: dd/MM/yyyy HH:mm:ss
[OK]		Final line is terminated with an [OK]

1.4.6 Get Comms Analysis Command

The server keeps a 24 hour log of the communications status for each device in the register given in 10 minute intervals. This operates on a rolling window technique and will only give you the last 24 hours. The final entry sent will be an [OK]. This log can be used to determine the GSM stability during different periods of the day.

Command	Parameter	Notes
[GET COMMS ANALYSIS]	DEVICE CODE	Device Code of selected device.

Response	Parameter	Notes
[HI_LATENCY=x]	HI_LATENCY	Highest latency time in milliseconds.
[LO_LATENCY=x]	LO_LATENCY	Lowest latency time in milliseconds.
[TOT_LATENCIES=x]	TOT_LATENCIES	Sum of all the latencies in milliseconds.
[TOT_SAMPLES=x]	TOT_SAMPLES	Number of latency samples.
[TOT_PACKETS=x]	TOT_PACKETS	Total data packets sent.
[DROP_PACKETS=x]	DROP_PACKETS	Total data packets with no response.
[OK]		Final line is terminated with an [OK].



1.5 General Setup Commands

1.5.1 Get Device Code Command

Read back the Device Code from the device. Not extremely useful when connected over as GSM network since you require this code to address the device in the first place. Functional through the Bluetooth interface.

Command	Parameter	Notes
[GET DEVICE CODE]		

Response	Parameter	Notes
[CODE=x]		Returns the 10 digit Device Code

1.5.2 Get Site Code Command

Read back the Site Code from the device. The Site Code parameter is not used by the CloudWorks system but can be useful for User Applications.

Command	Parameter	Notes
[GET SITE CODE]		

Response	Parameter	Notes
[CODE=x]		

1.5.3 Set Site Code Command

Set the Site Code for a device.

Command	Parameter	Notes
[SET SITE CODE]	CODE	Alphanumeric value (Max 10 characters)

Response	Parameter	Notes
[OK]		

1.5.4 Get Vendor Code Command

Read back the Vendor Code from the device.

Command	Parameter	Notes
[GET VENDOR CODE]		

Response	Parameter	Notes
[CODE=x]		

1.5.5 Set Vendor Code Command

Set the Vendor Code for a device.

Command	Parameter	Notes
[SET VENDOR CODE]	CODE	Alphanumeric (Max 10 characters)

Response	Parameter	Notes
[OK]		



1.5.6 Get Application Code Command

Read back the Application Code from a device. Application codes are used to describe the application function to which a device has been applied. This is a numeric value.

Command	Parameter	Notes
[GET APPLICATION CODE]		

Response	Parameter	Notes
[CODE=x]		

1.5.7 Set Application Code Command

Set the Application Code for a device.

Command	Parameter	Notes
[SET APPLICATION CODE]	CODE	Numeric number (0-999999999)

Response	Parameter	Notes
[OK]		

1.5.8 Get Description Command

Read back the Description assigned to a device. Descriptions are used to describe the device or its location.

Command	Parameter	Notes
[GET DESCRIPTION]		

Response	Parameter	Notes
[DESCRIPTION=x]		

1.5.9 Set Description Command

Set the Description for the device.

Command	Parameter	Notes
[SET DESCRIPTION]	DESCRIPTION	Alphanumeric (Max 50 characters)

Response	Parameter	Notes
[OK]		

1.5.10 Get Serial Number Command

Read back the Serial Number from a device. This parameter can be utilised by the end user for serial number allocations.

Command	Parameter	Notes
[GET SERIAL NUMBER]		

Response	Parameter	Notes
[NUMBER=x]		

1.5.11 Set Serial Number Command

Set the Serial Number for a device.

Command	Parameter	Notes
[SET SERIAL NUMBER]	NUMBER	Alphanumeric (Max 10 characters)

Response	Parameter	Notes
[OK]		



1.5.12 Get Configuration Data Command

Read back the Configuration Data. Each device has a user allocated space of 255 characters for user application use. This space can be used for storing any data needed specifically for this device.

Command	Parameter	Notes
[GET CONFIGURATION DATA]		

Response	Parameter	Notes
[DATA=x]		

1.5.13 Set Configuration Data Command

Set the Configuration Data for the device.

Command	Parameter	Notes
[SET CONFIGURATION DATA]	DATA	Alphanumeric (Max 255 characters)

Response	Parameter	Notes
[OK]		

1.5.14 Get Clock Command

Read back the current clock setting from this device. Please note, the CloudWorks Server will automatically maintain all the clock on the remote devices to UTC time.

Command	Parameter	Notes
[GET CLOCK]		

Response	Parameter	Notes
[TIME=x]		24 hour clock format = dd/MM/yyyy HH:mm:ss

1.5.15 Set Clock Command

Set the Current Clock for this device. Please note, the CloudWorks Server will automatically maintain all the clock on the remote devices to UTC time.

Command	Parameter	Notes
[SET CLOCK]	TIME	24 hour clock format = dd/MM/yyyy HH:mm:ss

Response	Parameter	Notes
[OK]		

1.5.16 Get Power Mode Command

Read back the Power Mode setting for this device. Remote devices operate in 3 different power modes. Mains/Battery/Dual. In the Dual mode, while the mains is present, the device will maintain a connection to the server and remain online at all times. However, when the power voltage drops below the Power Threshold, the device will go into battery mode and go to sleep, operating like a battery device until the mains is restored.

Command	Parameter	Notes
[GET POWER MODE]		

Response	Parameter	Notes
[MODE=x]		

1.5.17 Set Power Mode Command

Authorises the dispenser to allow the dispensing to continue

Command	Parameter	Notes
[SET POWER MODE]	MODE	Set as MAINS/BATTERY/DUAL

Response	Parameter	Notes
[OK]		

1.5.18 Get Power Threshold Command

Read back the Power Threshold. This settings the power voltage point at which the dual mode will switch between battery and mains mode.

Command	Parameter	Notes
[GET POWER THRESHOLD]		

Response	Parameter	Notes
[VOLTAGE=x]		

1.5.19 Set Power Threshold Command

Set the Power Threshold voltage on a device. Remote devices operate in 3 different power modes. Mains/Battery/Dual. In the Dual mode, while the mains is present, the device will maintain a connection to the server and remain online at all times. However, when the power voltage drops below the Power Threshold, the device will go into battery mode and go to sleep, operating like a battery device until the mains is restored.

Command	Parameter	Notes
[SET POWER THRESHOLD]	VOLTAGE	Threshold voltage (4.5 to 5.0 volts) Normal setting would be 4.65V

Response	Parameter	Notes
[OK]		

1.5.20 Get GPS Power Command

Read back the GPS Power status.

Command	Parameter	Notes
[GET GPS POWER]		

Response	Parameter	Notes
[STATE=x]		

1.5.21 Set GPS Power Command

Set the GPS Power state. GPS power can be switched on when the device is operating in Mains mode. If this is switched on while a battery device is awake, the power will drop away again when the device goes to sleep.

Command	Parameter	Notes
[SET GPS POWER]	STATE	ON/OFF

Response	Parameter	Notes
[OK]		



1.5.22 Get Bluetooth Power Command

Read back the Bluetooth Power status.

Command	Parameter	Notes
[GET BLUETOOTH POWER]		

Response	Parameter	Notes
[STATE=x]		PERMANENT/PUSHBUTTON

1.5.23 Set Bluetooth Power Command

Set the Bluetooth Power state. The Bluetooth interface can operate in one of two modes. Permanently on, or operated by a short press of the pushbutton. In Pushbutton mode, a Bluetooth connection that is idle for more than 60 seconds will automatically result in the Bluetooth being switch off.

Command	Parameter	Notes
[SET BLUETOOTH POWER]	MODE	PERMANENT/PUSHBUTTON

Response	Parameter	Notes
[OK]		

1.5.24 Get Generator Mode Command

Read back the Generator Mode from the device. The onboard 24V generator can be used in one of 4 modes:

1. Off - Generator is permanently off.
2. On - Generator is permanently on.
3. Loop -Generator is normally off, but will briefly power up before reading the 4-20mA current loop, after which it switches off again.
4. Modbus - Generator is normally off, but will briefly power up before sending a command packet out of the Modbus port and receive a reply, after which it will switch off again.

The period for which it will be on in the Loop and Modbus modes before accessing the current loop or Modbus is defined in the **Generator Delay** parameter.

Command	Parameter	Notes
[GET GENERATOR MODE]		

Response	Parameter	Notes
[MODE=x]		OFF/ON/LOOP/MODBUS

1.5.25 Set Generator Mode Command

Set the Generator Mode on the device.

Command	Parameter	Notes
[SET GENERATOR MODE]	MODE	OFF/ON/LOOP/MODBUS

Response	Parameter	Notes
[OK]		



1.5.26 Get Generator Delay Command

Read back the Generator Delay time from the device.

Command	Parameter	Notes
[GET GENERATOR DELAY]		

Response	Parameter	Notes
[TIME=x]		Time in seconds

1.5.27 Set Generator Delay Command

Set the Generator Delay time. The period for which the generator will be on in the Loop and Modbus modes before accessing the current loop or Modbus.

Command	Parameter	Notes
[SET GENERATOR DELAY]	TIME	Time in seconds

Response	Parameter	Notes
[OK]		

1.6 System Status Commands

1.6.1 Get Status Command

Read the current device general Status packet.

Command	Parameter	Notes
[GET STATUS]		

Response	Parameter	Notes
[VENDOR CODE=x]	VENDOR CODE	Vendor Code.
[SITE CODE=x]	SITE CODE	Site Code.
[DEVICE CODE=x]	DEVICE CODE	Device Code.
[APPLICATION CODE=x]	APPLICATION CODE	Application Code.
[VERSION=x]	VERSION	Firmware version on the device.
[APN=x]	APN	APN to which the device has connected.
[LOCAL IP=x]	LOCAL IP	Remote IP address for device.
[PORT=x]	PORT	Remote port number for device.
[HEARTRATE=x]	HEARTRATE	Heartbeat rate interval in seconds.
[SIGNAL=x]	SIGNAL	GSM Signal strength in %.
[CLOCK=x]	CLOCK	Current clock date and time - should be UTC.
[RECORDS=x]	RECORDS	Number of records in the datalog.
[POWER=x]	SEEN	Current power status. Mains/Battery.

1.6.2 Get IO Status Command

Returns the current Input/Output Status of the device.

Command	Parameter	Notes
[GET IO STATUS]		

Response	Parameter	Notes
[PULSE1 COUNTER=x]	PULSE1 COUNTER	Counter Value for Pulse Input 1.
[PULSE1 WEIGHT=x]	PULSE1 WEIGHT	Pulse Weight for Pulse Input 1.
[PULSE1 UNITS=x]	PULSE1 UNITS	Units for Pulse Input 1.
[PULSE2 COUNTER=x]	PULSE2 COUNTER	Counter Value for Pulse Input 2.
[PULSE2 WEIGHT=x]	PULSE2 WEIGHT	Pulse Weight for Pulse Input 2.
[PULSE2 UNITS=x]	PULSE2 UNITS	Units for Pulse Input 1.
[LOOP CURRENT=x]	LOOP CURRENT	4-20mA Loop current in milliamps.
[LOOP LOW LEVEL=x]	LOOP LOW LEVEL	Equivalent 4mA value for loop.
[LOOP HIGH LEVEL=x]	LOOP HIGH LEVEL	Equivalent 20mA value for loop.
[LOOP UNITS=x]	LOOP UNITS	Units for the 4-20mA current loop. e.g. kPa
[INPUT=x]	INPUT	Digital Input status. ON/OFF
[OUTPUT=x]	OUTPUT	Digital Output status. ON/OFF
[VOLTAGE=x]	VOLTAGE	Current power/battery voltage.

1.6.3 Get GPS Position Command

Read the GPS Co-ordinates of a device. Please note, the GPS must be powered for a fix to be obtained.

Command	Parameter	Notes
[GET GPS POSITION]		

Response	Parameter	Notes
[FIX=x]	FIX	Fix status. OK/FAIL. Only use reading if fix is OK.
[LATITUDE=x]	LATITUDE	Current Latitude.
[LONGITUDE=x]	LONGITUDE	Current Longitude.
[ALTITUDE=x]	ALTITUDE	Current Altitude.
[SAT COUNT=x]	SAT COUNT	Number of satellites found. Determines the quality of the fix.

1.6.4 Get GPS Data Command

Returns the a portion of the GPS NMEA data stream directly from the GPS. This can be used to extract other GPS information such as speed, bearing etc.

Command	Parameter	Notes
[GET GPS DATA]	HEADER	NMEA data header. e.g. GGA

Response	Parameter	Notes
[DATA=x]		NMEA Packet

1.6.5 Get Firmware Version Command

Returns the Firmware version number of the device.

Command	Parameter	Notes
[GET FIRMWARE VERSION]		

Response	Parameter	Notes
[VERSION=x.x]	VERSION	Device firmware version number

1.6.6 Get Voltage Command

Gets the power voltage. In Battery Mode, this would be the battery voltage, while in Mains mode, it will be the power supply voltage.

Command	Parameter	Notes
[GET VOLTAGE]		

Response	Parameter	Notes
[VOLTAGE=x]		Power voltage in volts

1.6.7 Reset Command

Resets a remote device.

Command	Parameter	Notes
[RESET]		

Response	Parameter	Notes
No response		



1.6.8 Get Reset Counter Command

Returns the number of times a device has reset since the last time the counter was cleared.

Command	Notes
[GET RESET COUNTER]	

Response	Parameter	Notes
[COUNT=x]		Reset count (rolls over to zero after 255).

1.6.9 Clear Reset Counter Command

Clears the Reset Counter.

Command	Notes
[CLEAR RESET COUNTER]	

Response	Parameter	Notes
[OK]		



1.7 Communications Commands

1.7.1 Ping Command

Returns a response from the device to check that it is present and connected.

Command	Parameter	Notes
[PING]		

Response	Parameter	Notes
[OK]		Will return a reply of OK if present

1.7.2 Wakeup Command

Wakes up and forces a device to connect to the server when it is sleeping or in command mode. This command is really only useful when accessed through the Bluetooth interface. Sending a Wakeup command to an online device will simply result in it restarting the GSM connection and reconnecting to the server.

Command	Parameter	Notes
[WAKEUP]		

Response	Parameter	Notes
No response		

1.7.3 Sleep Command

Places a battery logger into the Sleep mode.

Command	Parameter	Notes
[SLEEP]		

Response	Parameter	Notes
No response		

1.7.4 Hangup Command

Forces a device to Hangup its' current connection to the server and reconnect. This command is useful when you have made changes to the connections parameters (e.g. moved servers) and it needs to reconnect using the new parameters.

Command	Parameter	Notes
[HANGUP]		

Response	Parameter	Notes
No response		

1.7.5 Get Server Name Command

Reads the Server Name from the device. The Server Name can be in to form of a DNS name e.g. cloudworks.systems or an IP address.

Command	Parameter	Notes
[GET SERVER NAME]		

Response	Parameter	Notes
[NAME=x]		



1.7.6 Set Server Name Command

Sets the Server Name to which the device must connect. The Server Name can be in to form of a DNS name e.g. cloudworks.systems or an IP address.

Command	Parameter	Notes
[SET SERVER NAME]	NAME	DNS name or IP address (Max 40 characters)

Response	Parameter	Notes
[OK]		

1.7.7 Get Server Port Command

Gets the Server Port to which the device must connect.

Command	Parameter	Notes
[GET SERVER PORT]		

Response	Parameter	Notes
[PORT=x]		Port number (0-65535). Normally 13000

1.7.8 Set Server Port Command

Sets the Server Port to which the device must connect.

Command	Parameter	Notes
[SET SERVER PORT]	PORT	Numeric Server Port number (0-65535). Normally 13000

Response	Parameter	Notes
[OK]		

1.7.9 Get APN Name Command

Gets the GSM APN Name to which the device needs to connect.

Command	Parameter	Notes
[GET APN NAME]		

Response	Parameter	Notes
[NAME=x]		

1.7.10 Set APN Name Command

Set the GSM APN Name to which the device needs to connect.

Command	Parameter	Notes
[SET APN NAME]	NAME	APN Name (Max 40 characters).

Response	Parameter	Notes
[OK]		



1.7.11 Get APN Username Command

Gets the APN Username for the GSM connection.

Command	Parameter	Notes
[GET APN USERNAME]		

Response	Parameter	Notes
[USERNAME=x]		

1.7.12 Set APN Username Command

Sets the APN Username for the GSM connection.

Command	Parameter	Notes
[SET APN USERNAME]	USERNAME	Alphanumeric (Max 40 characters).

Response	Parameter	Notes
[OK]		

1.7.13 Get APN Password Command

Gets the APN Password for the GSM Connection.

Command	Parameter	Notes
[GET APN PASSWORD]		

Response	Parameter	Notes
[PASSWORD=x]		

1.7.14 Set APN Password Command

Sets the APN Password for GSM Connection.

Command	Parameter	Notes
[SET APN PASSWORD]	PASSWORD	

Response	Parameter	Notes
[OK]		

1.7.15 Get Pincode Command

Gets the stored Pincode for the simcard on this device. This would be the pincode sent should a simcard request a pincode at start up of the GSM connection.

Command	Parameter	Notes
[GET PINCODE]		

Response	Parameter	Notes
[PINCODE=x]		

1.7.16 Set Pincode Command

Sets the Pincode for the simcard on the device. This would be the pincode sent should a simcard request a pincode at start up of the GSM connection.

Command	Parameter	Notes
[SET PINCODE]	PINCODE	Alphanumeric (Max 20 characters)

Response	Parameter	Notes
[OK]		

1.7.17 Get Roaming Command

Gets the Roaming status from the device. When the roaming is switched on, the GSM module will allow connections on networks outside of the home network set on the simcard.

Command	Parameter	Notes
[GET ROAMING]		

Response	Parameter	Notes
[STATE=x]		

1.7.18 Set Roaming Command

Sets the Roaming State on the device. When the roaming is switched on, the GSM module will allow connections on networks outside of the home network set on the simcard.

Command	Parameter	Notes
[SET ROAMING]	STATE	Roaming ON/OFF

Response	Parameter	Notes
[OK]		

1.7.19 Get Primary DNS Command

Gets the Primary DNS used for lookups. Most GSM networks default automatically to their own networks so this parameter can be left blank.

Command	Parameter	Notes
[GET PRIMARY DNS]		

Response	Parameter	Notes
[IP=x.x.x.x]		

1.7.20 Set Primary DNS Command

Sets the Primary DNS lookup address. Most GSM networks default automatically to their own networks so this parameter can be left blank.

Command	Parameter	Notes
[SET PRIMARY DNS]	IP	IP address of DNS server

Response	Parameter	Notes
[OK]		

1.7.21 Get Secondary DNS Command

Gets the Secondary DNS used for lookups. Most GSM networks default automatically to their own networks so this parameter can be left blank.

Command	Parameter	Notes
[GET SECONDARY DNS]		

Response	Parameter	Notes
[IP=x.x.x.x]		

1.7.22 Set Secondary DNS Command

Sets the Secondary DNS lookup address. Most GSM networks default automatically to their own networks so this parameter can be left blank.

Command	Parameter	Notes
[SET SECONDARY DNS]	IP	IP address of DNS server

Response	Parameter	Notes
[OK]		

1.7.23 Get SMS Service Centre Command

Gets the SMS Service Centre number used by the GSM service provider. This parameter is normally automatically set by the provider and can be left blank.

Command	Parameter	Notes
[GET SMS SERVICE CENTRE]		

Response	Parameter	Notes
[TEL NUMBER=x]		

1.7.24 Set SMS Service Centre Command

Sets the SMS Service Centre number used by the GSM service provider. This parameter is normally automatically set by the provider and can be left blank.

Command	Parameter	Notes
[SET SMS SERVICE CENTRE]	TEL NUMBER	Numeric (Max 20 characters)

Response	Parameter	Notes
[OK]		

1.7.25 Get Heartbeat Time Command

Gets the Heartbeat Time from the device. In order to maintain stable communications on a GSM network, the server will periodically PING the remote device to ensure that the data is flowing correctly. The frequency of these pings are determined by this parameter. Should a device not receive a ping for double this time (i.e. miss 2 pings) it will automatically disconnect and re-establish a connection to the server.

Command	Parameter	Notes
[GET HEARTBEAT TIME]		

Response	Parameter	Notes
[TIME=x]		Time in seconds



1.7.26 Set Heartbeat Time Command

Sets the Heartbeat Time for the device. In order to maintain stable communications on a GSM network, the server will periodically PING the remote device to ensure that the data is flowing correctly. The frequency of these pings is determined by this parameter. Should a device not receive a ping for double this time (i.e. miss 2 pings) it will automatically disconnect and re-establish a connection to the server.

Command	Parameter	Notes
[SET HEARTBEAT TIME]	TIME	Time in seconds. Ideally 10 seconds.

Response	Parameter	Notes
[OK]		

1.7.27 Get Max Startup Time Command

Gets the Max Startup Time from the device. Should a device take longer than the Max Startup Time to establish a connection to the server, it will abort and in Mains Mode try again. Failure to connect within the given time in battery mode will result in the device disconnecting and going back to sleep.

Command	Parameter	Notes
[GET MAX STARTUP TIME]		

Response	Parameter	Notes
[TIME=x]		Time in seconds

1.7.28 Set Max Startup Time Command

Sets the Max Startup Time for the device. Should a device take longer than the Max Startup Time to establish a connection to the server, it will abort and in Mains Mode try again. Failure to connect within the given time in battery mode will result in the device disconnecting and going back to sleep.

Command	Parameter	Notes
[SET MAX STARTUP TIME]	TIME	Time in seconds. (0-255)

Response	Parameter	Notes
[OK]		

1.7.29 Get Comms Timeout Command

Gets the Comms Timeout Time from the device. Once a device has connected to the server, there should be a continuous flow of data. This is normally maintained by the heartbeat system. Should the data flow stall for more than the Comms Timeout value in seconds, the device will drop the connection and reconnect to the server. Devices in battery mode will disconnect and going back to sleep.

Command	Parameter	Notes
[GET COMMS TIMEOUT]		

Response	Parameter	Notes
[TIME=x]		Time in seconds

1.7.30 Set Comms Timeout Command

Sets the Comms Timeout Time on the device. Once a device has connected to the server, there should be a continuous flow of data. This is normally maintained by the heartbeat system. Should the data flow stall for more than the Comms Timeout value in seconds, the device will drop the connection and reconnect to the server. Devices in battery mode will disconnect and go back to sleep.

Command	Parameter	Notes
[SET COMMS TIMEOUT]	TIME	Time in seconds (0-255)

Response	Parameter	Notes
[OK]		

1.7.31 Get Modem Diagnostics Command

Gets the Modem Diagnostics state from the device. Devices with the modem diagnostics on will stream all the commands sent to the GSM module to the Bluetooth port as well. This assists in the analysis of the GSM communications.

Command	Parameter	Notes
[GET MODEM DIAGNOSTICS]		

Response	Parameter	Notes
[STATE=x]		

1.7.32 Set Modem Diagnostics Command

Sets the Modem Diagnostics state on the device. Devices with the modem diagnostics on will stream all the commands sent to the GSM module to the Bluetooth port as well. This assists in the analysis of the GSM communications.

Command	Parameter	Notes
[SET MODEM DIAGNOSTICS]	STATE	ON/OFF

Response	Parameter	Notes
[OK]		

1.7.33 Send Test SMS Command

Sends a Test SMS from the device. This function is useful to test the SMS system as well as determining the telephone number assigned to the simcard.

Command	Parameter	Notes
[SEND TEST SMS]	TEL NUMBER	Telephone number of the receiver of the SMS. (Max 20 digits)

Response	Parameter	Notes
[OK]		

1.7.34 Send Modem Command

Sends an AT Modem Command directly to the GSM module.

Command	Parameter	Notes
[SEND MODEM COMMAND]	COMMAND	Modem AT command

Response	Parameter	Notes
[REPLY=x]		Reply to command

1.8 Datalog and Wakeup Commands

Datalog timings are calculated forward from midnight of the day on which they are set. What this means is that if the datalog period is set to 5 minutes for instance, the next log time will be calculated as 5 minute intervals starting from midnight. This means that each entry would appear on the 5 minute interval of an hour.

Wakeup timings are calculated forward from the moment a device goes back to sleep and not from the midnight point.

1.8.1 Get Wakeup Period Command

Gets the Wakeup Period from the device.

Command	Parameter	Notes
[GET WAKEUP PERIOD]		

Response	Parameter	Notes
[TIME=x]		Time in minutes

1.8.2 Set Wakeup Period Command

Sets the Wakeup Period on the device.

Command	Parameter	Notes
[SET WAKEUP PERIOD]	TIME	Time in minutes (0-10080)

Response	Parameter	Notes
[OK]		

1.8.3 Get Next Wakeup Command

Gets the Next Wakeup date and time set for this device.

Command	Parameter	Notes
[GET NEXT WAKEUP]		

Response	Parameter	Notes
[TIME=x]		Time in format dd/MM/yyyy HH:mm:ss

1.8.4 Get Datalog Period Command

Gets the Datalog Period from the device.

Command	Parameter	Notes
[GET DATALOG PERIOD]		

Response	Parameter	Notes
[TIME=x]		Time in minutes



1.8.5 Set Datalog Period Command

Sets the Datalog Period on the device.

Command	Parameter	Notes
[SET DATALOG PERIOD]	TIME	Time in minutes (0-10080)

Response	Parameter	Notes
[OK]		

1.8.6 Get Next Datalog Command

Gets the Next Datalog date and time set for this device.

Command	Parameter	Notes
[GET NEXT DATALOG]		

Response	Parameter	Notes
[TIME=x]		Time in format dd/MM/yyyy HH:mm:ss

1.8.7 Get Datalog Types Command

Gets the Datalog Types from the device. Each device can record up to 5 datalog record types at each trigger. These types vary according to the device type and application.

Command	Parameter	Notes
[GET DATALOG TYPES]		

Response	Parameter	Notes
[TYPE1=x]		Numeric Type (0-255)
[TYPE2=x]		Numeric Type (0-255)
[TYPE3=x]		Numeric Type (0-255)
[TYPE4=x]		Numeric Type (0-255)
[TYPE5=x]		Numeric Type (0-255)

1.8.8 Set Datalog Types Command

Gets the Datalog Types from the device. Each device can record up to 5 datalog record types at each trigger. These types vary according to the device type and application.

Command	Parameter	Notes
[SET DATALOG TYPES]	TYPE1	Numeric Type (0-255)
	TYPE2	Numeric Type (0-255)
	TYPE3	Numeric Type (0-255)
	TYPE4	Numeric Type (0-255)
	TYPE5	Numeric Type (0-255)

Response	Parameter	Notes
[OK]		



1.8.9 Get Datalog Size Command

Gets the number of records in the datalog.

Command	Parameter	Notes
[GET DATALOG SIZE]		

Response	Parameter	Notes
[SIZE=x]	SIZE	Number of records in the datalog.
[MAXIMUM=x]	MAXIMUM	Maximum number of records the datalog can store.

1.8.10 Get Datalog Record Command

Gets a specific record from the datalog. Data for each record type differs and is interpreted according to the record type.

Command	Parameter	Notes
[GET DATALOG RECORD]	RECORD	Record number to return.

Response	Parameter	Notes
[RECORD=x]	RECORD	Record number.
[TYPE=x]	TYPE	Record Type.
[DATE=x]	DATE	Time of reading (dd/MM/yyyy HH:mm:ss).
[DATA=x]	DATA	Data within the record.
Or		
[ERROR]		Error response if the record does not exist

1.8.11 Get Datalog Records Command

Gets a range records from the datalog. Data for each record type differs and is interpreted according to the record type. The final entry will be an [OK]. Should the range selected not be present in the datalog, only the [OK] entry will be returned.

Command	Parameter	Notes
[GET DATALOG RECORDS]	START LIMIT	Start of range of records Number of records from that point onwards. The max number that can be downloaded in each block is 255.

Response	Parameter	Notes
[RECORD=x]		Record number.
[TYPE=x]		Record Type.
[DATE=x]		Time of reading (dd/MM/yyyy HH:mm:ss).
[DATA=x]		Data within the record.
[OK]		



1.8.12 Reset Datalog Command

Unconditionally clears and resets the datalog. This command should be avoided under normal circumstances.

Command	Parameter	Notes
[RESET DATALOG]		

Response	Parameter	Notes
[OK]		

1.8.13 Clear Datalog Command

Returns the Firmware version number of the device

Command	Parameter	Notes
[CLEAR DATALOG]	TOTAL	

Response	Parameter	Notes
[OK]		

1.9 Input/Output Function Commands

1.9.1 Get Loop Current Command

Gets the Loop Current reading.

Command	Parameter	Notes
[GET LOOP CURRENT]		

Response	Parameter	Notes
[CURRENT=x]	CURRENT	Loop current in milliamps

1.9.2 Get ADC Readings Command

Gets the 2 Raw ADC Readings.

Command	Parameter	Notes
[GET ADC READINGS]		

Response	Parameter	Notes
[CHAN0=x]	CHAN0	ADC reading for the current loop
[CHAN1=x]	CHAN1	ADC reading for the power voltage

1.9.3 Set Loop Offset Command

Sets the current loop reading as the Offset value. This command is executed when there is a 4mA current applied to the 4-20mA interface.

Command	Parameter	Notes
[SET LOOP OFFSET]		

Response	Parameter	Notes
[OK]		

1.9.4 Set Loop Ratio Command

Uses the current loop reading to calculate the Ratio parameter. This command is executed when there is a 20mA current applied to the 4-20mA interface.

Command	Parameter	Notes
[SET LOOP RATIO]		

Response	Parameter	Notes
[OK]		

1.9.5 Get Loop Calibration Command

Gets the Loop Calibration figures.

Command	Parameter	Notes
[GET LOOP CALIBRATION]		

Response	Parameter	Notes
[OFFSET=x]		Loop offset reading
[RATIO=x]		Loop ratio reading



1.9.6 Get Loop Low Command

Gets the Loop Low value. This is the value that should be read at 4mA.

Command	Parameter	Notes
[GET LOOP LOW]		

Response	Parameter	Notes
[VALUE=x]		Application specific value at 4mA

1.9.7 Set Loop Low Command

Sets the Loop low value. This is the value that should be read at 4mA.

Command	Parameter	Notes
[SET LOOP LOW]	VALUE	Application specific value at 4mA

Response	Parameter	Notes
[OK]		

1.9.8 Get Loop High Command

Gets the Loop Low value. This is the value that should be read at 20mA.

Command	Parameter	Notes
[GET LOOP HIGH]		Application specific value at 20mA

Response	Parameter	Notes
[VALUE=x]		

1.9.9 Set Loop High Command

Sets the Loop low value. This is the value that should be read at 20mA.

Command	Parameter	Notes
[SET LOOP HIGH]	VALUE	Application specific value at 20mA

Response	Parameter	Notes
[OK]		

1.9.10 Get Loop Units Command

Gets the Loop Units for the 4-20mA interface.

Command	Parameter	Notes
[GET LOOP UNITS]		

Response	Parameter	Notes
[UNITS=x]		

1.9.11 Set Loop Units Command

Sets the Loop Units for the 4-20mA interface.

Command	Parameter	Notes
[SET LOOP UNITS]	UNITS	Alphanumeric (Max 10 characters)

Response	Parameter	Notes
[OK]		



1.9.12 Get Pulse 1 Counter Command

Get the Pulse 1 Counter value. This register holds the actual number of pulses received and needs to be multiplied by the Pulse 1 Weight in order to get a volume reading.

Command	Parameter	Notes
[GET PULSE1 COUNTER]		

Response	Parameter	Notes
[COUNT=x]		Pulse Counter (0-4294967295)

1.9.13 Set Pulse 1 Counter Command

Sets the Pulse 1 Counter. The Pulse counter needs to be calculated by Pulse 1 Count=Volume/Pulse 1 Weight.

Command	Parameter	Notes
[SET PULSE1 COUNTER]	COUNT	Counter value (0-4294967295)

Response	Parameter	Notes
[OK]		

1.9.14 Get Pulse 1 Weight Command

Gets the Pulse 1 Weight.

Command	Parameter	Notes
[GET PULSE1 WEIGHT]		

Response	Parameter	Notes
[WEIGHT=x]		

1.9.15 Set Pulse 1 Weight Command

Sets the Pulse 1 Weight.

Command	Parameter	Notes
[SET PULSE1 WEIGHT]	WEIGHT	Numeric (Max 10 digits)

Response	Parameter	Notes
[OK]		

1.9.16 Get Pulse 1 Units Command

Gets the Pulse 1 Units.

Command	Parameter	Notes
[GET PULSE1 UNITS]		

Response	Parameter	Notes
[UNITS=x]		

1.9.17 Set Pulse 2 Units Command

Sets the Pulse 2 Units.

Command	Parameter	Notes
[SET PULSE2 UNITS]	UNITS	Alphanumeric (Max 10 characters)

Response	Parameter	Notes
[OK]		

1.9.18 Get Pulse 2 Counter Command

Get the Pulse 2 Counter value. This register holds the actual number of pulses received and needs to be multiplied by the Pulse 2 Weight in order to get a volume reading.

Command	Parameter	Notes
[GET PULSE2 COUNTER]		

Response	Parameter	Notes
[COUNT=x]		Pulse Counter (0-4294967295)

1.9.19 Set Pulse 2 Counter Command

Sets the Pulse 2 Counter. The Pulse counter needs to be calculated by Pulse 2 Count=Volume/Pulse 2 Weight.

Command	Parameter	Notes
[SET PULSE2 COUNTER]	COUNT	Counter value (0-4294967295)

Response	Parameter	Notes
[OK]		

1.9.20 Get Pulse 2 Weight Command

Gets the Pulse 2 Weight.

Command	Parameter	Notes
[GET PULSE2 WEIGHT]		

Response	Parameter	Notes
[WEIGHT=x]		

1.9.21 Set Pulse 2 Weight Command

Sets the Pulse 2 Weight.

Command	Parameter	Notes
[SET PULSE2 WEIGHT]	WEIGHT	Numeric (Max 10 digits)

Response	Parameter	Notes
[OK]		

1.9.22 Get Pulse 2 Units Command

Gets the Pulse 2 Units.

Command	Parameter	Notes
[GET PULSE2 UNITS]		

Response	Parameter	Notes
[UNITS=x]		

1.9.23 Set Pulse 2 Units Command

Sets the Pulse 2 Units.

Command	Parameter	Notes
[SET PULSE2 UNITS]	UNITS	Alphanumeric (Max 10 characters)

Response	Parameter	Notes
[OK]		



1.9.24 Get Digital Input Command

Gets the Digital Input status.

Command	Parameter	Notes
[GET DIGITAL INPUT]		

Response	Parameter	Notes
[STATE=x]		ON/OFF

1.9.25 Get Output Command

Gets the Digital Output Status.

Command	Parameter	Notes
[GET OUTPUT]		

Response	Parameter	Notes
[STATE=x]		On/off

1.9.26 Set Output Command

Sets the Digital Output State.

Command	Parameter	Notes
[SET OUTPUT]	STATE	ON/OFF

Response	Parameter	Notes
[OK]		

1.9.27 Pulse Output Command

Pulses the Output for a specific length of time.

Command	Parameter	Notes
[PULSE OUTPUT]	TIME	Pulse time in Seconds (0.1-25.5)

Response	Parameter	Notes
[OK]		



1.9.28 Get Aquamaster Status Command - CDS538 only

Get the Aquamaster status information from the Modbus port. The units for these readings need to be interrogated directly from the Aquamaster meter.

Command	Parameter	Notes
[GET AQUAMASTER STATUS]		

Response	Parameter	Notes
[FLOW=x]	FLOW	Current Flow rate
[FLOW%=x]	FLOW%	Percentage of total possible Flow rate
[PRESSURE=x]	PRESSURE	Current Pressure
[PRESSURE%=x]	PRESSURE%	Percentage of total possible pressure

1.9.29 Get Aquamaster Totalisers Command - CDS538 only

Gets the Aquamaster Totalisers from the Modbus port. The units for these readings need to be interrogated directly from the Aquamaster meter.

Command	Parameter	Notes
[GET AQUAMASTER TOTALISERS]		

Response	Parameter	Notes
[TOTAL FWD=x]	TOTAL FWD	Forward Totaliser
[TOTAL REV=x]	TOTAL REV	Reverse Totaliser
[TOTAL NET=x]	TOTAL NET	Net Totaliser
[TOTAL A=x]	TOTAL A	Totaliser A
[TOTAL B=x]	TOTAL B	Totaliser B



1.9.30 Send Modbus Command - CDS538 only

Sends a Modbus packet out the port and waits for a response.

Command		Notes
[SEND MODBUS COMMAND]	COMMS WAIT COMMAND	Comms settings for the packet. See Table 1. Response wait time in 100ms steps (1-255). Command Packet in hexadecimal.

Response	Parameter	Notes
[REPLY=x]		Modbus reply packet in Hexadecimal.

Table 1

Comms Number	Setting
0	4800,N,8,2
1	9600,N,8,2
2	19200,N,8,2
3	38400,N,8,2
4	57600,N,8,2
5	4800,E,8,1
6	4800,E,8,1
7	9600,E,8,1
8	19200,E,8,1
9	38400,E,8,1
10	57600,E,8,1
11	115200,E,8,1
12	4800,O,8,1
13	9600,O,8,1
14	19200,O,8,1
15	38400,O,8,1
16	57600,O,8,1
17	115200,O,8,1
18	4800,N,8,1
19	9600,N,8,1
20	19200,N,8,1
21	38400,N,8,1
22	57600,N,8,1
23	115200,N,8,1



1.9.31 Get ECO Push Command - CDS541 Only

Gets the ECO push packet from a GWF meter. Mbus format

Command	Notes
[GET ECO PUSH]	

Response	Parameter	Notes
[SERIAL=x]	SERIAL	Meter serial number
[MANUFACTURER=x]	MANUFACTURER	Manufacturer code
[VERSION=x]	VERSION	Firmware Version
[MEDIUM=x]	MEDIUM	Metering medium (see GWF specifications)
[ACCESS NUMBER=x]	ACCESS NUMBER	Access number (see GWF specifications)
[MBUS STATUS=x]	MBUS STATUS	Mbus status (see GWF specifications)
[SIGNATURE=x]	SIGNATURE	Signature (see GWF specifications)
[VIF=x]	VIF	Volume identifier (see GWF specifications)
[VOLUME=x] or [VALUE=x]	VOLUME or VALUE	Volume or Value reading
[FACTOR=x]	FACTOR	Multiplication factor
[PACKET=x]	PACKET	ECO packet in hexadecimal

1.9.32 Send ECO Command - CDS541 Only

Sends an ECO command packet to a GWF meter.

Command	Notes
[SEND ECO COMMAND]	COMMAND

Response	Parameter	Notes
[REPLY=x]		Reply packet in Hexadecimal

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