

GPRS Communication Protocol Between GPS Tracker and Server-SP

version V3.5

Update by 2023-07-13

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I Command Format

Commands format of GPRS Packets are defined as following:

From Server to Device:

```
))<Command(1byte)><L(2 bytes)><ID(4bytes)><Parameter(s)><Checksum>|r
```

From Device to Server:

```
))<Command(1byte)><L(2 bytes)><ID(4bytes)><data><Checksum>|r
```

Note:

1. Do not input '<' and '>' in the command content.
2. All Multi-byte data complies with the following sequence: High byte prior to the low byte (**Big Endian**).
3. The size of one location data packet is about 50 bytes.

Item	Specification
))	2bytes. It is header for all correct packets. '))' is ASCII code, in hex code it is 0x29 0x29.
Command	1 byte. It is in hex code, every packet have one and only command word. For detail, please refer to Part II Command List
L	2 bytes. It means the length from Length byte (not include length byte) to packet end, include the end byte. It is in hex code.
ID	4bytes. It is in hex code. Every device has one and only ID, It is calculate from the device SN. For example: Suppose the device SN is: 29800298 Divide into 4 parts: 29 80 02 98 Convert to hex: 1D 50 02 62 Add 0x80 to 2 nd ,3 rd part: 1D D0 82 62 Then you get the device ID: 1DD08262
Parameter/data	Minimum 0 byte, maximum 200byte, see appendix 1 for data description.
Checksum	1 bytes, it is xor checksum, for example: if the packet is: 29 29 B1 00 07 0A 9F 95 38 0C 82 0D 0x82 = 29 xor 29 xor B1 xor 00 xor 07 xor 0A xor 9F xor 95 xor 38 xor 0C
r	1 bytes, it is end byte of package, in hex it is 0D

III Command Details

1. Login – 0xB1

Command:	))<0xB1><L><ID><reserved><Checksum><\r>
Description:	After your device installed properly, device will send this packet to server for login. It will send every 30s, like heart beat. It must be reply, If server does not give reply (see Loginconfirmation), device will keep send this packet without any other packet; after get reply, other commands start work.
Example:	29 29 B100 07 0A 9F 95 38 0C 82 0D
Note:	In example, the ID is 0A9F9538, change to device SN, it is 10312156. In <content> part 0x0C, we keep it as future use; do not have certain meaning now.

2. Login/Server Confirmation – 0x21

Command:	))<0x21><L><receive package check sum><receive package command><reserved><Checksum><\r>
Description:	This command is send from server to device, to confirm some information, like login, some important alarm, and so on.
Example:	29 29 2100 05 82 B1 0C1B 0D
Note:	The example is the confirmation for packet 29 29 B1 00 07 0A 9F 95 38 0C 82 0D, <receive package check sum> is 0x82, <receive package command> is 0xB1, <receive package sub-command(first byte of the content)> part is 0x0C. Example 2(if device need server to give 0x21 ack): 29 29 82 00 23 0C 80 80 32 14 10 24 15 10 58 02 23 57 72 11 35 28 35 00 00 00 00 FB 00 00 00 01 00 00 00 00 00 00 25 0D The reply should be: 29 29 21 00 05 258214 97 0D.

3. Send Dispatch Info – 0x3A

Command:	))<0x3A><L><ID><info content><Checksum><\r>
Description:	This command sends from server to device. It used in send GPRS dispatch command to device for setting/query parameters. Device will give Set Reply after receive this command.
Example:	29293A000C0AA48311 2A32363923437D0D
Note:	means send"*269#C" to device(10360317), the parameter is the ASCII code of "*269#C" in hex.

4. Alarm Info – 0x82(OLD)

Command:	))<0x82><L><ID><Data><Checksum><\r>
Description:	This command sends from device to server. It is alarm data, this packet need deal with in the first class. This command words is for important and emergency situation.
Example:	29 29 82 00 23 0C 80 80 32 14 10 24 15 10 58 02 23 57 72 11 35 28 35 00 00 00 00 FB 00 00 00 01 00 00 00 00 00 00 25 0D
Note:	About the instruction for the <data> the parse shows below: 14 10 24 15 10 58 02 23 57 72 11 35 28 35 00 00 00 00 FB 00 00 this 21 byte data check in section Appendix 1 Position Data please; 00 01 00 this part is alarm status data, please check the instruction in section Appendix 2 Alarm Data ; for this example, it is SOS alarm happen. 00 00 00 00 00 this part is alarm parameters data, please check the instruction in section Appendix 2 Alarm Data .

Note:

1. Each alarm after first time trigger, will only send 0x82 alarm once, if still under trigger state, will save the alarm status in 0x80 position package;
2. Need server to give 0x21 confirmation for each alarm.

For example(SOS alarm):

29 29 82 00 23 0C 80 80 32 14 10 24 15 10 58 02 23 57 72 11 35 28 35 00 00 00 00 FB 00 00 00 01 00 00 00 00 00 00 25 0D

The reply should be:

29 29 21 00 05 25 82 14 97 0D.

5. Alarm OFF – 0x83(OLD)

Command:	))<0x83><L><ID><Data><Checksum><\r>
Description:	This command sends from device to server. It is alarm data, this packet need deal with in the first class. This command words is for important and emergency situation.
Example:	29 29 83 00 23 0A A2 CC 39 12 05 03 05 05 22 02 85 94 79 03 10 95 50 00 80 02 07 84 00 00 00 02 00 00 00 00 00 00 74 0D
Note:	About the instruction for the <data> the parse shows below: 12 05 03 05 05 22 02 85 94 79 03 10 95 50 00 80 02 07 84 00 00 this 21 byte data check in section Appendix 1 Position Data please; 00 02 00 this part is alarm OFF status data, please check the instruction in section Appendix 2 Alarm Data ; for this example, it is over speed alarm OFF.

	00 00 00 00 00 this part is alarm OFF parameters data, please check the instruction in section Appendix 2 Alarm Data .
--	---

6. Alarm Info – 0x82(NEW)

Name	Length	Content
Package Head	2	29 29
Command	1	82
Length	2	
Device ID	4	1D D0 8C 22
Date & time	6	
Lat & long	8	
Speed	2	
Direction	2	
GPS statue	1	
GSM signal	1	HEX; Range:0-31
GPS satellite	1	Hex; Range:0-66
Alarm parameters1	3	
Alarm parameters2	5	
Mileage	3	Same as A3
peripheral data	N	Same as A3
checksum	1	
Package End	1	

Note:

If 82 update with new protocol, 83 need keep same as 82.

7. Set Reply – 0x85

Command:	))<0x85><L><ID><Data><Checksum><\r>
Description:	This package sends from device to server, for reply most of the commands send from server to device. It will put the command words of packet it reply for in the last byte of <data> part. The detail description of <Data> part please find in Appendix 1 Position Data .
Example:	29 29 8500 081D D0 8C 22 12 03 12 17 40 26 02 65 45 71 03 12 54 17 00 00 00 00 F8 19 C8 39 FF FF 1D 00 00 1E 00 50 00 00 00 3AF9 0D

Note:	In this example, the last byte of <Data> part is 0x3A, so it is a reply packet for Send Dispatch Info .
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8. Device Reply for Query Parameters– 0x84

Command:	))<0x84><L><ID><Data><Checksum><\r>
Description:	This command is reply for firmware check, send from device to server. <Data> part is firmware version of this device, in ASCII code.
Example:	29 29 8400 310A A2 8A 07 54 33 36 30 2D 31 30 33 41 57 28 47 54 4D 29 56 32 2E 30 31 20 40 20 53 65 70 20 32 33 20 32 30 31 31 20 31 32 3A 34 38 3A 31 38CF 0D
Note:	In this example, the firmware version of this device is : T360-103AW(GTM)V2.01 @ Sept. 23 2011 12:48:18

9. Peripheral data info upload –0xA3

Command:	))<0xA3><L><ID><Parameter><Checksum><\r>
Description:	This packet will be send from device to server by set interval time to replace the command packet 0x80 when device has connected peripheral unit like fuel tank sensor, temperature sensor etc. Anyway, this packet equal 0x80 packet, but added peripheral sensor data.
Example:	29 29 A3 L 0A 9F 95 38Location_info Peripheral_data Xor 0D
Note:	1). Location_info: Please see Appendix 1 Positon data . Peripheral_data: see Appendix 3 peripheral data .

Appendix 1 Position Data

There have 2 kinds of Position data, one is for normal position data, and another is for alarm data (such as 0x82).

1. ymdhmswwwjjjssffstlichen1 lichen2 lichen3st1st2st3st4v1v2v3v4v5v6v7v8

Ex: 12 03 12 17 40 2602 65 45 7103 12 54 1700 0000 00FB19 C8 39FF FF 1D 0000 1E 00 50 00 00 00 00

2. ymdhmswwwjjjssffloadsign(For 82 alarm packet)

Ex: 12 05 03 05 05 22 02 85 94 79 03 10 95 50 00 80 02 07 84 00 00

From the format, we can see that these 2 kinds of data have same part: **ymdhms**
www jjjj ssff st, and different parts: **lichen1 lichen2 lichen3 st1st2st3st4**
v1v2v3v4v5v6v7v8 and **load sign**.

Will describe it in 3 parts:

I. instruct for **ymdhmswwwjjjjssff**

Field Name	Length(Byte)	Content	Note
Datetime	6	ymdhms 12 03 12 17 40 26	Date range: Year, 2000-2099; Month 1-12; Day, 1-31; Time range: Hour, 00-23; Min, 00-59; Second, 00-59. Hour/min/second use compressed BCD code For example: 12 03 12 17 40 26 means 2012-3-12 17:40:26
Latitude	4	www 02 65 45 71	Latitude range: 00° 00.000' ~89° 59.999' . Use compressed BCD code, But the highest bit is sign bit. "Positive" Means "North Latitude", "negative" means "south latitude"; The Unit for ' is 0.001' . For example: South latitude 30° 37.901' express as: 83H, 03H, 79H, 01H 02 65 45 71 means: north latitude 26° 54.571' .
Longitude	4	jjjj 03 12 54 17	Longitude range: 000° 00.000' ~179° 59.999' ; Use compressed BCD code, the highest bit is sign bit. "Positive" Means "east longitude", "negative" means "West longitude"; The Unit for ' is 0.001' . For example: west longitude 130° 45.608' express as: 93H, 04H, 56H, 08H 03 12 54 17 means: 31° 25.417' .
Speed	2	ss 00 80	Speed express method: Range: 0-9999km/h Use compressed BCD code. 00 80=(00H,80H)=80km/h For example: 120km/h express as: 01H, 20H
Direction	2	ff 02 07	Direction range: 000-359° Use compressed BCD code, true North is 0° , clockwise counting. The unit is degree. For example: 154° express as: 01H, 54H 02 07 means 207° .

II. Instruct for st1 lichen1 lichen2 lichen3 st1 st2 st3 st4 v1 v2 v3 v4 v5 v6 v7 v8

Field Name	Length(Byte)	Content	Note																																	
GPS/antenna /power status	1	st1 FB	<table><tr><td>D7</td><td>0 Not located</td><td>1Located</td></tr><tr><td>D6</td><td>1 1 GPS antenna normal 1 0 GPS antenna short circuit</td><td></td></tr><tr><td>D5</td><td>0 1 GPS antenna open circuit 0 0 GPS module error</td><td></td></tr><tr><td>D4</td><td>1 1 main power normal 1 0 main power off</td><td></td></tr><tr><td>D3</td><td>0 1 main power abnormal(too high/low)</td><td></td></tr><tr><td>D2</td><td>0: mileage unit KM 1: mileage unit 0.1km</td><td></td></tr><tr><td>D1</td><td rowspan="2">D1D0: 00:mileage unit m; 01:mileage unit m; 10: mileage unit Km; 11:mileage unit Km</td><td></td></tr><tr><td>D0</td><td></td></tr></table> In the example FB =1111 1011, means located/gps normal/power normal/mileage is Km.	D7	0 Not located	1Located	D6	1 1 GPS antenna normal 1 0 GPS antenna short circuit		D5	0 1 GPS antenna open circuit 0 0 GPS module error		D4	1 1 main power normal 1 0 main power off		D3	0 1 main power abnormal(too high/low)		D2	0: mileage unit KM 1: mileage unit 0.1km		D1	D1D0: 00:mileage unit m; 01:mileage unit m; 10: mileage unit Km; 11:mileage unit Km		D0											
D7	0 Not located	1Located																																		
D6	1 1 GPS antenna normal 1 0 GPS antenna short circuit																																			
D5	0 1 GPS antenna open circuit 0 0 GPS module error																																			
D4	1 1 main power normal 1 0 main power off																																			
D3	0 1 main power abnormal(too high/low)																																			
D2	0: mileage unit KM 1: mileage unit 0.1km																																			
D1	D1D0: 00:mileage unit m; 01:mileage unit m; 10: mileage unit Km; 11:mileage unit Km																																			
D0																																				
Mileage	3	lichen1 lichen2 lichen3 19 C8 39	HEX format 0x00-0XFFFFFF (16777215) meters. 19 C8 39 means 1689657m																																	
Status	4	st1st2s t3st4 FF FF 1D 00	<table><tr><td>bit</td><td>St1</td><td>St2</td><td>St3</td><td>St4</td></tr><tr><td>D7</td><td>1 ACC off 0 ACC on</td><td>1 normal 0 SOS</td><td>1 Fatigue driving 0 normal</td><td>1 OUT1 enabled; 0 OUT1 disable</td></tr><tr><td>D6</td><td>1 DEF(1)no alarm 0 alarm happen</td><td>1 normal 0 over speed</td><td>1 need reply 0x21 0 do not need reply</td><td>1 OUT2 enabled; 0 OUT2 disable</td></tr><tr><td>D5</td><td>1 DEF (2) no alarm 0 alarm happen</td><td>1 normal 0 stop overtime</td><td>1 Temperature abnormal 0 normal</td><td>1 Lock wire cut 0 normal</td></tr><tr><td>D4</td><td>1 DEF (3) no alarm 0 alarm happen</td><td>1 normal 0 out area alarm</td><td rowspan="3">D4-D0: GSM signal strength. CSQ(GSM) value: 0~31</td><td>1 LBS location 0 GPS location</td></tr><tr><td>D3</td><td>1 DEF (4)/Lora connect normal no alarm 0 alarm happen</td><td>1 normal 0 in area alarm</td><td>1 motor stuck 0 normal</td></tr><tr><td>D2</td><td>1 Fuel pump not cut 0 Fuel pump</td><td>1 DEF (5) no alarm 0 alarm happen</td><td>1 unlock 0 lock on</td></tr></table>	bit	St1	St2	St3	St4	D7	1 ACC off 0 ACC on	1 normal 0 SOS	1 Fatigue driving 0 normal	1 OUT1 enabled; 0 OUT1 disable	D6	1 DEF(1)no alarm 0 alarm happen	1 normal 0 over speed	1 need reply 0x21 0 do not need reply	1 OUT2 enabled; 0 OUT2 disable	D5	1 DEF (2) no alarm 0 alarm happen	1 normal 0 stop overtime	1 Temperature abnormal 0 normal	1 Lock wire cut 0 normal	D4	1 DEF (3) no alarm 0 alarm happen	1 normal 0 out area alarm	D4-D0: GSM signal strength. CSQ(GSM) value: 0~31	1 LBS location 0 GPS location	D3	1 DEF (4)/Lora connect normal no alarm 0 alarm happen	1 normal 0 in area alarm	1 motor stuck 0 normal	D2	1 Fuel pump not cut 0 Fuel pump	1 DEF (5) no alarm 0 alarm happen	1 unlock 0 lock on
bit	St1	St2	St3	St4																																
D7	1 ACC off 0 ACC on	1 normal 0 SOS	1 Fatigue driving 0 normal	1 OUT1 enabled; 0 OUT1 disable																																
D6	1 DEF(1)no alarm 0 alarm happen	1 normal 0 over speed	1 need reply 0x21 0 do not need reply	1 OUT2 enabled; 0 OUT2 disable																																
D5	1 DEF (2) no alarm 0 alarm happen	1 normal 0 stop overtime	1 Temperature abnormal 0 normal	1 Lock wire cut 0 normal																																
D4	1 DEF (3) no alarm 0 alarm happen	1 normal 0 out area alarm	D4-D0: GSM signal strength. CSQ(GSM) value: 0~31	1 LBS location 0 GPS location																																
D3	1 DEF (4)/Lora connect normal no alarm 0 alarm happen	1 normal 0 in area alarm		1 motor stuck 0 normal																																
D2	1 Fuel pump not cut 0 Fuel pump	1 DEF (5) no alarm 0 alarm happen		1 unlock 0 lock on																																

				cut(immobilize).				
			D1	1 Detach/light sensor normal 0 alarm/light sensor on	1 no alarm 0 IDLE alarm happen		1 on charging 0 normal	
			D0	1 not in sleep 0 in sleep mode	1 OUT3 enabled 0 OUT3 disable		1 casing/sim tamper 0 normal	
			FF FF 1D 00 means acc off / no DEF alarm / no immobilize/ not sign in/ no defence/ no alarms/ gprs registerd/no need reply 0x21 command/ UDP mode/ csq=29/no accessories.					
			Customized for Gurtam:					
			bit	St1	St2	St3	St4	
			D7	1 ACC off 0 ACC on	1 SOS 0 normal	1 Fatigue driving 0 normal	1 OUT1 enabled; 0 OUT1 disable	
			D6	1 DEF(1) alarm 0 normal	1 over speed 0 normal	1 need reply 0x21 0 do not need reply	1 OUT2 enabled; 0 OUT2 disable	
			D5	1 DEF (2) alarm 0 normal	1 Vibration 0 normal	1 Temperature abnormal 0 normal	1 Lock wire cut 0 normal	
			D4	1 DEF (3) alarm 0 normal	1 exit Geo-fence 0 normal	D4-D0: GSM signal strength. CSQ(GSM) value: 0~31	1 LBS location 0 GPS location	
D3	1 DEF (4)/Lora disconnect alarm 0 normal	1 Enter Geo-fence 0 normal	1 enable protection mode 0 disable					
D2	1 immobilize 0 recover Fuel pump	1 DEF (5) alarm 0 normal	1 unlock 0 lock on					
D1	1 Detach/light sensor alarm 0 normal	1 IDLE alarm happen 0 normal	1 on charging 0 normal					
D0	1 in sleep 0 exit from sleep	1 OUT3 enabled; 0 OUT3 disable		1 casing/sim tamper 0 normal				
V1V2	2	v1v2						
V3 Satellite Number	1	v3	Range: 0-12					

V4 SIM under used	1	v4	0=SIM1 1=SIM2 <table><tr><td>Bit</td><td></td></tr><tr><td>D1-D7</td><td>Reserved</td></tr><tr><td>D0</td><td>0=SIM1 1=SIM2</td></tr></table>	Bit		D1-D7	Reserved	D0	0=SIM1 1=SIM2
Bit									
D1-D7	Reserved								
D0	0=SIM1 1=SIM2								
V5	1	v5							
V6	1	v6							
V7	1	v7							
V8	1	v8 00							

III. Instruct for

Field Name	Length(Byte)	Content	Note		
GPS status	1	80	D7	0 Not located	1 Located
			D6	Reserved	
			D5		
			D4		
			D3		
			D2		
			D1		
			D0		
			In the example 80 =10000000, means located.		
			AT10 battery percent	1	45
AT10D unlock medium	1			1	
			D7	Reserved	
			D6		
			D5		
			D4		
			D3	Unlock by auto unlock	
			D2	Unlock by SMS	
			D1	Unlock by GPRS	
			D0	Unlock by RFID	

Appendix 2 Alarm Data

In alarm info packet, there have 8 bytes of data to describe the alarm status and alarm parameters. For example: 29 29 82 00 23 0A A2 CC 39 12 05 03 05 05 22 02 85 94 79 03 10 95 50 00 80 02 07 84 00 00 00 02 00 00 00 00 00 00 75 0D. The part 00 02 00 00 00 00 00 00 is what we will describe in this part.

About the 8 bytes of data, first 3 bytes for alarm status and 5 bytes for alarm parameters.

I. Instruct for alarm status 00 02 00

	1 st byte	2 nd byte	3 rd byte
D7	In area alarm	Door open alarm (DEF(3) alarm)	Idle alarm
D6	Out area alarm	Tow away alarm/move alarm(ACC OFF)	Fatigue alarm
D5	Enter Sleep	G-Sensor alarm (see 4th byte in <u>alarm parameters</u>)	Parking status
D4	Low power alarm	DEF (4) alarm /Lora disconnect	Tamper box Alarm/sim card slot tamper (customized)/ Detach alarm(light sensor)
D3	DEF(5) alarm	Power cut alarm	Harsh turning
D2	DEF(2) alarm	Stop over time alarm	Temperature abnormal
D1	DEF(1) alarm	Over speed alarm	GSM Jamming alarm
D0	Illegal ignition alarm	SOS alarm	Fuel Sensor Disconnect alarm

1 means alarm happen; 0 means no alarm. So 00H 02H 00H = 00000000B 00000010B 00000000B means **over speed** alarm; 00H 00H 04H = 00000000B 00000000B 00000100B means **Temperature Abnormal**.

II. Instruct for alarm parameters 00 00 00 00 00

	1 st byte	2 nd byte	3 rd byte	4 th byte	5 th byte
D7	Geo-Fence Number of GEO Fence alarm	Charging alarm (1 alarm)	Route number of Offset route alarm	Crash alarm	High impact (customized)
D6		1=Temp high alarm, 0=Temp low alarm		Turnover	Unlock with wrong PWD alarm
D5		Reserved		Harsh Acceleration	Low speed alarm (1 alarmed)
D4		Protection alarm		Harsh deceleration	Disconnect the load sensor(AT09+ only for KSA version)

D3		Lock wire cut alarm		Shake/vibrate alarm	Reserved
D2		Camera disconnect alarm(AT22)		Temp sensor disconnect alarm(AT22)	Refilling alert (LL)
D1		Charge full Alarm (1 alarm)		Fuel stolen alarm	Reserved
D0		ACC status (0 on ;1 off); Or AT10 Lock status(0 locked on; 1 unlock)		Low fuel alarm	Unauthorized card swipe alarm(AT10D&E)

Appendix 3 peripheral data

Peripheral data structure:

Field Name	Length(Byte)	Description
All KLV data length	2	The data length of all KLV list, including length byte.
KLV data list	N	KLV list, see Peripheral data KLV list as follow.

Peripheral data KLV list:

K(key)	L(length)	V(value)
0x0D	2	Temperature value. Bit15: signed mark; Bit0-14:temperature value. The unit is 0.1°C. For example: 0x000A = 1°C, 0x800A=-1°C.
0x0E	1	Fuel level percent: 0-100%.
0x10	2	Main power voltage value, HEX data. For example: 10 02 00 EF voltage value=(0xEF)/10=239/10=23.9
0x16	N+1	RFID/MIFARE Card: Format: Sign status(1BYTE)+CARD NO.(n BYTE,ASCII) Explain: 0x00 sign in start+CARD NO.(n BYTE,ASCII) 0x01 sign in status+CARD NO.(n BYTE,ASCII) 0x02 sign out+CARD NO.(n BYTE,ASCII) 0x03 unauthorized RFID+CARD NO.(n BYTE,ASCII)
0x1A	1+6	Ibutton(HEX): Format: Sign status(1BYTE)+CARD NO.(6 BYTE,hex) Explain: 0x00 sign in start+CARD NO.(6 BYTE,hex) 0x01 sign in status+CARD NO.(6 BYTE,hex)

		0X02 sign out+CARD NO.(6 BYTE,hex)			
0x1B	11	LBS data(4G)			
		Location code ID(LAC)	4 bytes	00002490	hex
		Cell ID(CID)	4 bytes	02BC5810	hex
		Mobile network carrier(MNC)	1 byte	00	Hex convert to decimal
		Mobile country code(MCC)	2 bytes	01CC	Hex convert to decimal 01CC=>460
		Example: "servingcell","NOCONN","LTE","FDD",460,00,2BC5810,419,1300,3,5,5,2490,-100,-13,-89,5,23 LBS by default disabled. Enable command: *2629#LBS,x //x=0 disable, 1=enable.			
0X20	1	Battery power percent, range: 0% - 100% For example: 0x45=69%			
0x2A(humidity)	2	Hex code, unit is 0.1% For example: 2A 02 03B7 Humidity=0x(03B7)/10=95.1%			
0x2E	2	ADC1 value, upload with voltage Hex code, unit is 0.01V For example: 2E 02 003B Percent=0x(003B)/100=0.59V			
0x44	SEN003 sensor 1+70bytes	PP(1byte)+Group1(24bytes)+Group2(14bytes)+Group3(24bytes)+Group4(8 bytes) PP: Protocol used by the vehicle (hexadecimal text format): 15 (0x31:0x35) : J1708/J1587 19 (0x31:0x39) : J1939 Group1(24bytes):			

		AAAAAAAA : Total fuel consumption in idle (hexadecimal text format) <table> <tr> <th>Protocol</th><th>Units</th><th>Resolution</th></tr> <tr> <td>J1708/J1587</td><td>Gallons</td><td>0.125 Gallons</td></tr> <tr> <td>J1939</td><td>Litres</td><td>0,5 Liters</td></tr> </table> BBBBBBBB : Total hours in idle (hexadecimal text format) <table> <tr> <th>Protocol</th><th>Units</th><th>Resolution</th></tr> <tr> <td>J1708/J1587</td><td>Hours</td><td>0.05 Hours</td></tr> <tr> <td>J1939</td><td>Hours</td><td>0.05 Hours</td></tr> </table> CCCCCCCC : Total distance traveled (hexadecimal text format) <table> <tr> <th>Protocol</th><th>Units</th><th>Resolution</th></tr> <tr> <td>J1708/J1587</td><td>Miles</td><td>0.1 Miles</td></tr> <tr> <td>J1939</td><td>Kilometers</td><td>0.125 km</td></tr> </table> DDDDDDDD : Total Hours (Hexadecimal Text Format) <table> <tr> <th>Protocol</th><th>Units</th><th>Resolution</th></tr> <tr> <td>J1708/J1587</td><td>Hours</td><td>0.05 Hours</td></tr> <tr> <td>J1939</td><td>Hours</td><td>0.05 Hours</td></tr> </table> EEEEEEEE : Total PTO Hours (Hexadecimal Text Format) <table> <tr> <th>Protocol</th><th>Units</th><th>Resolution</th></tr> <tr> <td>J1708/J1587</td><td>Hours</td><td>0.05 Hours</td></tr> <tr> <td>J1939</td><td>Hours</td><td>0.05 Hours</td></tr> </table> FFFFFFFF : Total Fuel Consumption (Hexadecimal Text Format) <table> <tr> <th>Protocol</th><th>Units</th><th>Resolution</th></tr> <tr> <td>J1708/J1587</td><td>Gallons</td><td>0.125 Gallons</td></tr> <tr> <td>J1939</td><td>Litres</td><td>0,5 Liters</td></tr> </table> Liters >RTT,19,000007D0,00000FA0,0006D600,00002EE0,000001F4,000032C8< Shipping Totalizers Protocol: 19 Total Fuel Idle: 1000 Liters Total Hours Idle: 200 Hours Total Distance: 56000 Km Total Hours: 600 Hours Total Hours PTO: 25 Hours Total Consumption: 6500 Group2(14bytes):	Protocol	Units	Resolution	J1708/J1587	Gallons	0.125 Gallons	J1939	Litres	0,5 Liters	Protocol	Units	Resolution	J1708/J1587	Hours	0.05 Hours	J1939	Hours	0.05 Hours	Protocol	Units	Resolution	J1708/J1587	Miles	0.1 Miles	J1939	Kilometers	0.125 km	Protocol	Units	Resolution	J1708/J1587	Hours	0.05 Hours	J1939	Hours	0.05 Hours	Protocol	Units	Resolution	J1708/J1587	Hours	0.05 Hours	J1939	Hours	0.05 Hours	Protocol	Units	Resolution	J1708/J1587	Gallons	0.125 Gallons	J1939	Litres	0,5 Liters
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		YYYY : Coolant Temperature (Hexadecimal Text Format)			
		Protocol	Units	Resolution	Offset
		J1708/J1587	° Fahrenheit	1st Fahrenheit	0
		J1939	° C	1 ° C	-40
		BBBB : Fuel Temperature (Hexadecimal Text Format)			
		Protocol	Units	Resolution	Offset
		J1708/J1587	° Fahrenheit	0.25° Fahrenheit	0
		J1939	° C	1 ° C	-40
		CCCC : Engine Oil Temperature (Hexadecimal Text Format)			
		Protocol	Units	Resolution	Offset
		J1708/J1587	° Fahrenheit	0.25° Fahrenheit	0
		J1939	° C	1/32 ° C	-273
		DDDD : Turbo Oil Temperature (Hexadecimal Text Format)			
		Protocol	Units	Resolution	Offset
		J1708/J1587	° Fahrenheit	0.25° Fahrenheit	0
		J1939	° C	1/32 ° C	-273
		EEEE : Engine Intercooler Temperature (Hexadecimal Text Format)			
		Protocol	Units	Resolution	Offset
		J1708/J1587	° Fahrenheit	1st Fahrenheit	0
		J1939	° C	1 ° C	-40
		FFFF : PTO Oil Temperature (Hexadecimal Text Format)			
		Protocol	Units	Resolution	Offset
		J1708/J1587	° Fahrenheit	1.2nd Fahrenheit	0
		J1939	° C	1 ° C	-40
		GGGG : Transmission Oil Temperature (Hexadecimal Text Format)			
		Protocol	Units	Resolution	Offset
		J1708/J1587	° Fahrenheit	0.25° Fahrenheit	0
		J1939	° C	1/32 ° C	-273
		Example:			
		>RTE,19,007D,0069,0C51,0AD1,006C,005F,0BB1<			
		Temperature Shipping Protocol: 19			
		Temp. Refrigerant: 85 °C			
		Temp. Fuel: 65 °C			
		Temp. Motor Oil: 90 °C			
		Temp. Turbo Oil: 78 °C			
		Temp. Intercooler Motor: 68 °C			
		Tmep. PTO Oil: 55 °C			
		Temp. Transmission Oil: 85 °C			
		Group3(24bytes):			

		YYYY : % Engine Load (Hexadecimal Text Format)		
		Protocol	Units	Resolution
		J1708/J1587	%	0,5 %
		J1939	%	1 %
		BBBB : Engine Oil Level (Hexadecimal Text Format)		
		Protocol	Units	Resolution
		J1708/J1587	%	0,5 %
		J1939	%	0,4 %
		CCCC : Engine Oil Pressure (Hexadecimal Text Format)		
		Protocol	Units	Resolution
		J1708/J1587	LBF/IN ² (PSI)	0.5 LBF/IN ² (PSI)
		J1939	KPa	4 KPa
		DDDD : Refrigerant Level (Hexadecimal Text Format)		
		Protocol	Units	Resolution
		J1708/J1587	%	0,5 %
		J1939	%	0,4 %
		EEEE : Fuel Rate (Hexadecimal Text Format)		
		Protocol	Units	Resolution
		J1708/J1587	gallons/hour	1/64 gallons/hour
		J1939	Litres	0,05 Liter/Hour
		FFFF : Fuel Economy (Hexadecimal Text Format)		
		Protocol	Units	Resolution
		J1708/J1587	MPG (miles per gallon)	1/256 MPG
		J1939	KML (Km per liter)	1/512 KML
		GGGG : Average fuel economy (Hexadecimal Text Format)		
		Protocol	Units	Resolution
		J1708/J1587	MPG (miles per gallon)	1/256 MPG
		J1939	KML (Km per liter)	1/512 KML

		HHHH : Alternator Voltage (Hexadecimal Text Format)		
		Protocol	Units	Resolution
		J1708/J1587	Volt	0.05 Volts
		J1939	Volt	0.05 Volts
		IIII : Battery voltage (Hexadecimal Text Format)		
		Protocol	Units	Resolution
		J1708/J1587	Volt	0.05 Volts
		J1939	Volt	0.05 Volts
		JJJJ: Transmission Oil Level (Hexadecimal Text Format)		
		Protocol	Units	Resolution
		J1708/J1587	%	0,5 %
		J1939	%	0,4 %
		KKKK : Transmission Oil Pressure (Hexadecimal Text Format)		
		Protocol	Units	Resolution
		J1708/J1587	LBF/IN ² (PSI)	0.5 LBF/IN ² (PSI)
		J1939	KPa	16 KPa
		LLLL :fuel level (Hexadecimal Text Format)		
		Protocol	Units	Resolution
		J1708/J1587	%	0,5 %
		J1939	%	0,4 %
		Example; >RTI,19,0032,00BC,0000,00A2,044C,2800,4600,00F0,00F0,00AC,0000,00EE < Sending Information Protocol: 19 Porc. Engine load: 50% Engine Oil Level: 75% Engine Oil Pressure: 2 KPa Coolant Level: 65% Fuel Rate: 55ltsh Fuel Economy: 20 kmIt Avg. Fuel Economy: 35 kmIt Alternator Volts: 12 volt Battery Volts: 12 volt Transmission Oil Level: 69% Transmission Oil Pressure: 4 KPa Combustible Level: 95% Group4(8bytes):		

		AAAA : Speed (Hexadecimal Text Format) <table> <tr> <th>Protocol</th><th>Units</th><th>Resolution</th></tr> <tr> <td>J1708/J1587</td><td>MPH</td><td>0.5 MPH</td></tr> <tr> <td>J1939</td><td>KMH</td><td>1/256 KM/H</td></tr> </table> BBBB : RPM's (Hexadecimal Text Format) <table> <tr> <th>Protocol</th><th>Units</th><th>Resolution</th></tr> <tr> <td>J1708/J1587</td><td>RPM</td><td>0.25 RPM</td></tr> <tr> <td>J1939</td><td>RPM</td><td>0.125 RPM</td></tr> </table> CCCC : Percentage Accelerator Pedal (Hexadecimal Text Format) <table> <tr> <th>Protocol</th><th>Units</th><th>Resolution</th></tr> <tr> <td>J1708/J1587</td><td>%</td><td>0,4 %</td></tr> <tr> <td>J1939</td><td>%</td><td>0,4 %</td></tr> </table> DDDD : Brake Pedal Percentage (Hexadecimal Text Format) <table> <tr> <th>Protocol</th><th>Units</th><th>Resolution</th></tr> <tr> <td>J1708/J1587</td><td>-</td><td>-</td></tr> <tr> <td>J1939</td><td>%</td><td>0,4 %</td></tr> </table>	Protocol	Units	Resolution	J1708/J1587	MPH	0.5 MPH	J1939	KMH	1/256 KM/H	Protocol	Units	Resolution	J1708/J1587	RPM	0.25 RPM	J1939	RPM	0.125 RPM	Protocol	Units	Resolution	J1708/J1587	%	0,4 %	J1939	%	0,4 %	Protocol	Units	Resolution	J1708/J1587	-	-	J1939	%	0,4 %
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J1708/J1587	-	-																																				
J1939	%	0,4 %																																				
0x45	Unlock by SMS phone No. N bytes	Phone No.(with country code) N is the sim number length. Example: 450D38363138353833323234333431 Number is 8618583224341																																				
0x46	Altitude 2bytes	2 bytes, unit meter, max 65535m																																				
0x48	Version name N	AT200H support for example: AT200H_U-1.2-May 26 2023-182054 Report with:AT200H_U-1.2-May 26 2023 48184154323030485F552D312E322D4D61792032362032303233																																				

KLV structure frame:

K(1byte): the key id of the data part.

L(1byte): the length of the data part of **V**.

V(nbyte): the value of the data part.

For example, Temperature sensor KLV: **0x0D0x020x00 0x0A**, means 1°C.