

# GPS TRACKER

## PS140 Protocol Description v1.7

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## Types of Packets from Device to Server & Server Response

S. No.	Packet Type	Description	Server Response
1	Login Packet	This is the first packet sent immediately after connection is established with server	+++Received OK
2	Normal Packet	This is regular tracking packet, as per AIS140 standard, sent at defined interval or turn detection or alert	+++Received OK
3	Health Packet	This is regular health parameters packet sent at defined interval	+++Received OK
4	Emergency Packet	This packet is sent at defined interval when emergency state is ON or when emergency state is turned off by server	No Acknowledgement required
			To turn off emergency state +++STOP_MSG

## Login Packet

\$LGN,PICT14A,DL01PC9821,862631032208018,1.6.5,AIS140,28.7589630,N,77.6277844,E\*54

Field	Description	Format	Size	Example
Start Character	Indicates start of login packet	\$	1 byte	\$
Header	Header of login packet	LGN	3 bytes	LGN
Vendor ID	Vendor identification header	Alpha-numeric	Variable	PICT14A
Device Name	Vehicle number on which device is installed	Alpha-numeric	Variable	DL01PC9821
IMEI	IMEI	15 Digit Number	15 Bytes	862631032208018
Firmware Version	Version of firmware used in the device	x.x.x	5 bytes	1.6.5
Protocol Version	Version of frame format protocol	Alpha-numeric	variable	AIS140
Latitude	Latitude value in decimal degree (7 places after decimal)	dd.mmmmmmm	10 Bytes	28.7589630
Latitude Direction	Latitude direction, value will be either N or S, N = North, S = South	Single Alphabet	1 Bytes	N
Longitude	Longitude value in decimal degree (7 places after decimal)	dd.mmmmmmm	10 Bytes	77.6277844
Longitude Direction	Longitude direction, value will be either E or W, E = East, W = West	Single Alphabet	1 Bytes	E
End Character	Indicates end of packet	*	1 byte	*
Checksum	Ensures no error in transmission (optimal)	CC	2 Bytes	54

## Normal Packet

\$NMP,PICT14A,1.6.5,NR,6,L,862631032208018,DL01PC9821,1,24032018,060122,28.7589630,N,77.6277844,E,022.5,320.55,04,183.5,1.0,0.3,INA Airtel,1,1,12.5,4.2,0,C,25,404,10,00D6,CFBD,-74,1806,2031,-74,1878,151,-77,1806,2012,-81,1806,2032,0001,01,000005,03.1,10.2,0,(192.168.1.1,SET:APN,iot)\*49

Field	Description	Format	Size	Example
Start Character	Indicates start of Normal packet	\$	1 byte	\$
Header	Header of Normal packet	NMP	3 bytes	NMP
Vendor ID	Vendor identification header	Alpha-numeric	Variable	PICT14A
Firmware Version	Version of firmware used in the device	x.x.x	5 bytes	1.6.5
Packet Type	Specify the packet type NR = Normal EA = Emergency Alert TA = Tamper Alert HP = Health Packet IN = Ignition On IF = Ignition Off BD = Vehicle Battery Disconnect BR = Vehicle Battery Reconnect BL = Internal Battery Low OT=OTA Update Alert RT=Rash Turn	XX	2 bytes	NR

	HB=Harsh Breaking HA=Harsh Acceleration			
Message & Alert ID	Refer, <b>Message &amp; Alert ID</b> Table below	Numeric	Variable Max. 2 bytes	6 10
Packet Status	L=Live or H= History	Single Alphabet	1 byte	L
IMEI	IMEI	15 Digit Number	15 Bytes	862631032208018
Vehicle Reg. No	Mapped vehicle registration number	Alpha-numeric	Variable	DL01PC9821
GPS Fix	1 = GPS fix OR 0 = GPS invalid	Single Alphabet	1 byte	1
Date	Date value as per GPS date time per GPS date time (DDMMYYYY)	DDMMYYYY	8 bytes	24032018 For 24-mar-2018
Time	Time value as per GPS date time in UTC format (hhmmss)	Hhmmss	6 bytes	060122 For 06:01:22 am  180122 For 06:01:22 pm
Latitude	Latitude value in decimal degree (7 places after decimal)	dd.mmmmmmm	10 Bytes	28.7589630
Latitude Direction	Latitude direction, value will be either N or S, N = North, S = South	Single Alphabet	1 Bytes	N
Longitude	Longitude value in decimal degree (7 places after decimal)	dd.mmmmmmm	10 Bytes	77.6277844
Longitude Direction	Longitude direction, value will be either E or W, E = East, W = West	Single Alphabet	1 Bytes	E
Speed	Speed of Vehicle as Calculated by GPS module in VLT. (in km/hr) (Upto One Decimal places)	ddd.d	5 bytes	022.5 For 22.5 km/hr
Heading	Course over ground in degrees (Upto two Decimal places)	ddd.dd	6 bytes	320.55  010.20
No of	Number of satellites available for	Dd	2 bytes	04

Satellites	fix			14
Altitude	Height above mean sea level in meters, max: 100000m (Upto 1 Decimal place)	Decimal number, variable size	Max. 8 bytes	183.5 21000.4
PDOP	Positional dilution of precision, max: 99.0 (upto 1 decimal place)	Decimal number, variable size	Max. 4 bytes	1.0 10.4
HDOP	Horizontal Dilution of Precision, max: 99.0 (upto 1 decimal place)	Decimal number, variable size	Max. 4 bytes	0.3 10.2
Network Operator Name	Name of Network Operator	Variable length string	Variable	INA Airtel
Ignition	Ignition input status of vehicle	1= Ignition On 0 = Ignition Off	1 byte	1
Main Power Status	Device main power connection status	0 = Vehicle Battery disconnected 1= Vehicle Battery reconnected	1 byte	1
Main Input Voltage	Indicator showing source voltage in Volts. (Upto One Decimal Value)	dd.d	4 bytes	12.5
Internal Battery Voltage	Indicator for level of battery charge remaining. (Upto One Decimal Value)	d.d	3 bytes	4.2
Emergency Status	Emergency mode status	1= On , 0 = Off	1 byte	0
Tamper Alert	Device casing status	C = Cover Closed, O = Cover Open	1 byte	C
GSM Signal Strength	Current GSM signal strength value	Value Ranging from 0 – 31, 99 - network not known or not detectable	Variable, Max. 2 bytes	25 6
MCC	Mobile Country Code (serving)	Numeric	Variable	404

			Max. 3 bytes	Below value when no data from network x
MNC	Mobile Network Code (serving)	Numeric	Variable Max. 3 bytes	10 Below value when no data from network x
LAC	Location Area Code (serving)	2 bytes hex value in ascii	Variable Max. 4 bytes	00D6 Below value when no data from network x
Cell ID	GSM Cell ID (serving)	2 bytes hex value in ascii	Variable Max. 4 bytes	CFBD 151 Below value when no data from network x
NMR (Network Measurement Report) Neighbouring Cell ID	Neighbouring 4 cell ID along with their LAC & signal strength (ss)	<ss1>,<lac1>,<cellid1>, <ss2>,<lac2>,<cellid2>, <ss3>,<lac3>,<cellid3>, <ss4>,<lac4>,<cellid4>	Variable	-74,1806,2031,-74, 1878,151,-77,1806,2012,- 81,1806,2032  Below value when no data from network  x,x,x,x,x,x,x,x,x,x,x,x
Digital Input Status	4 external digital input status (Status of Input 1 to Input 4)  DIN1 (0=Off; 1=On)  DIN2 (0=Off; 1=On)  DIN3 (0=Ignition Off; 1=Ignition On)  DIN4 (0=Panic Button Pressed; 1=Panic Button Connected; 2=Panic Button Not Connected)	bbbb  (DIN1 DIN2 DIN3 DIN4)	4 bytes	0001  1111  1112  0002

Digital Output Status	2 external digital output status (0=Off; 1=On)	bb  (DOUT1 DOUT2)	2 bytes	01
Frame Number	Sequence Number of the messages (000001 to 999999)	Numeric	6 bytes	000005
Analog Input 1	Voltage reading on analog input 1 (upto 1 decimal value)	dd.d	4 bytes	03.1  11.5
Analog Input 2	Voltage reading on analog input 2 (upto 1 decimal value)	dd.d	4 bytes	10.2  00.1
Distance	Delta distance from previous location in meters	Numeric variable	Variable	0 25
OTA Update Details	ID of parameter changed and source of command  <source> : IP or mobile number from which command sent  <parameter id> : Command sent to Device  <status> : 1 – success, 0 – failed or parameter value	(<source>,<parameter id>,<status>)	Variable	(192.168.1.1,SET:APN,iot)  (+919212499082,GET:APN,1)  (192.168.1.1,GET:APN,iot)
End Character	Indicates end of packet	*	1 byte	*
Checksum	Ensures no error in transmission (optimal)	CC	2 Bytes	49



## Message & Alert ID Table

Alert ID	Message & Alerts	Remarks
1	Location Update	Default message coming from each device
2	Location Update (history)	Would be sent, if GPRS is not available at the time of sending the message in protocol format Zero, BLANK, NIL, etc.
3	Alert – Disconnect from main battery	If device is disconnected from vehicle battery and running on its internal battery
4	Alert – Low battery	If device internal battery has fallen below a defined threshold
5	Alert – Low battery removed	Indicates that device internal battery is charged again
6	Alert – Connect back to main battery	Indicates that device is connected back to main battery
7	Alert – Ignition ON	Indicates that Vehicle's Ignition is switched ON
8	Alert – Ignition OFF	Indicates that Vehicle's Ignition is switched OFF
9	Alert – GPS box opened (Optional)	Optional message would be generated indicating GPS box opened
10	Alert – Emergency state ON	When any of the emergency button is pressed
11	Alert – emergency State OFF	When emergency state of vehicle is removed
12	Alert Over the air parameter change	When any parameter is changed over the air. Shall include the name of parameter changed and source of command

13	Harsh Braking	Alert indicating for harsh braking.
14	Harsh Acceleration	Alert indicating for harsh acceleration.
15	Rash Turning	Alert indicating for Rash turning.
16	Device Tempered	Alert Indicating Emergency button wire disconnect/ wire cut etc.

## Health Packet

\$HLP,PICT14A,1.6.7,868997035844909,99,30,0,20,600,001100,00\*

Field	Description	Format	Size	Example
Start Character	Indicates start of Health packet	\$	1 byte	\$
Header	Header of Health packet	HLP	3 bytes	HLP
Vendor ID	Vendor identification header	Alpha-numeric	Variable	PICT14A
Firmware Version	Version of firmware used in the device	x.x.x	5 bytes	1.6.5
IMEI	IMEI	15 Digit Number	15 Bytes	862631032208018
Battery Percentage	Indicates the internal battery charge percentage (0 to 100)	Numeric	Variable Max. 3 Bytes	30 95
Low Battery Threshold value	Indicates value on which low battery alert generated in percentage (0 to 100)	Numeric	Variable Max. 2 Bytes	30
Memory Percentage	Indicates flash memory percentage used (0 to 100)	Numeric	Variable Max. 3 Bytes	1 30
Data Update Rate When Ignition ON	Indicates packet frequency on Ignition ON (value in sec) Min. Value is 5 sec	Numeric	Variable Max. 4 Bytes	20 100
Data Update Rate When Ignition OFF	Indicates packet frequency on Ignition OFF (value in sec) Min. Value is 300 sec i.e. 5 min	Numeric	Variable Max. 4 Bytes	300 600
Digital I/O Status	Inputs connected to the device (DIN1 DIN2 DIN3 DIN4 DOUT1 DOUT2)	bbbbbb	6 Bytes	001100 000101
Analog I/O Status	Analog input status (AIN1 AIN2)	bb	2 Bytes	00 01
End Character	Indicates end of packet	*	1 byte	*

## Emergency Packet

\$EPB,EMR,868997035844909,NM,11052019104331,A,30.8825130,N,75.8476639,E,173.50,000.00,  
0,G,PB10CE0911, 09212499082\*32

Field	Description	Format	Size	Example
Start Character	Indicates start of Emergency packet	\$	1 byte	\$
Header	Header of Emergency packet	EPB	3 bytes	EPB
Packet Type	Message types supported. Emergency Message (EMR) or Stop Message (SEM)	Character	3 bytes	EMR SEM
IMEI	IMEI	15 Digit Number	15 bytes	868997035844909
Packet Status	NM – Normal Packet SP – Stored Packet	Character	2 bytes	NM SP
Date	Date and time of location	DDMMYYYYhhmmss	14 bytes	11052019104331
GPS Validity	A – Valid V - Invalid	Single Alphabet	1 byte	A V
Latitude	Latitude value in decimal degree (7 places after decimal)	dd.mmmmmmm	10 bytes	28.7589630
Latitude Direction	Latitude direction, value will be either N or S, N = North, S = South	Single Alphabet	1 Bytes	N
Longitude	Longitude value in decimal degree (7 places after decimal)	dd.mmmmmmm	10 Bytes	77.6277844
Longitude Direction	Longitude direction, value will be either E or W, E = East, W = West	Single Alphabet	1 Bytes	E
Altitude	Height above mean sea level in	Decimal number,	Max.	183.5

	meters, max: 100000m (Upto 1 Decimal place)	variable size	8 bytes	21000.4
Speed	Speed of Vehicle as Calculated by GPS module in VLT. (in km/hr) (Upto One Decimal places)	ddd.d	5 bytes	022.5 For 22.5 km/hr
Provider	G – Fine GPS N – Coarse GPS or data from network	Single Character	1 byte	G N
Distance	Distance calculated from previous GPS data (in meters)	Decimal number variable size	Variable Max. 6 bytes	221 11
Vehicle Reg. No	Mapped vehicle registration number	Alpha-numeric	Variable	PB10CE0911
Reply Number	The mobile number to which test response needs to be sent (Emergency Mobile No. As specified by MHA/MoRTH/States)	Numeric	Variable size	09212499082
End Character	Indicates end of packet	*	1 byte	*
Checksum	Ensures no error in transmission (optimal)	CC	2 Bytes	32

## OTA Commands via GPRS

These commands are used to configure device directly from server. Commands are of 3 types i.e. SET, GET, or CLR. Server will send these commands as required, only when connection is established between device and server.

ID	Command	Function
1	<b>+S*R:&lt;type&gt;:GIP#&lt;IP&gt;,&lt;PORT&gt;;</b>	<p style="text-align: center;">To set IP and PORT for backend govt. server for VLT data</p> <p style="text-align: center;"><b>Example:</b> +S*R:SET:GIP#122.161.1.5,9501;</p> <p style="text-align: center;">+S*R:GET:GIP#;</p> <p style="text-align: center;">+S*R:CLR:GIP#;</p>
2	<b>+S*R:&lt;type&gt;:APN#&lt;APN&gt;;</b>	<p style="text-align: center;">To set access point name for provided network</p> <p style="text-align: center;"><b>Example:</b> +S*R:SET:APN#airtelgprs.com;</p> <p style="text-align: center;">+S*R:GET:APN#;</p> <p style="text-align: center;">+S*R:CLR:APN#;</p>
3	<b>+S*R:&lt;type&gt;:SOS#&lt;mobile no&gt;;</b>	<p style="text-align: center;">To set backend emergency control centre mobile number</p> <p style="text-align: center;"><b>Example:</b> +S*R:SET:SOS#9212499082;</p> <p style="text-align: center;">+S*R:GET:SOS#;</p> <p style="text-align: center;">+S*R:CLR:SOS#;</p>
4	<b>+S*R:&lt;type&gt;:EIP#&lt;IP&gt;,&lt;PORT&gt;;</b>	<p style="text-align: center;">To set IP and PORT for backend Emergency control centre</p> <p style="text-align: center;"><b>Example:</b> +S*R:SET:EIP#52.56.202.1,8900;</p> <p style="text-align: center;">+S*R:GET:EIP#;</p> <p style="text-align: center;">+S*R:CLR:EIP#;</p>

5	<b>+S*R:&lt;type&gt;:VRN#&lt;vehicle no&gt;;</b>	<p>To set vehicle registration number</p> <p><b>Example:</b> +S*R:SET:VRN#PB10DY0911;</p> <p>+S*R:GET:VRN#;</p> <p>+S*R:CLR:VRN#;</p>
6	<b>+S*R:&lt;type&gt;:LOGS#&lt;interval&gt;;</b>	<p>To set logs interval in sec when ignition ON</p> <p><b>Example:</b> +S*R:SET:LOGS#20;</p> <p>+S*R:GET:LOGS#;</p> <p>+S*R:CLR:LOGS#;</p>
7	<b>+S*R:&lt;type&gt;:LOG2#&lt;interval&gt;;</b>	<p>To set logs interval in sec when ignition OFF</p> <p><b>Example:</b> +S*R:SET:LOG2#600;</p> <p>+S*R:GET:LOG2#;</p> <p>+S*R:CLR:LOG2#;</p>
8	<b>+S*R:&lt;type&gt;:HPTI#&lt;interval&gt;;</b>	<p>To set health packet transmission interval in sec</p> <p><b>Example:</b> +S*R:SET:HPTI#120;</p> <p>+S*R:GET:HPTI#;</p> <p>+S*R:CLR:HPTI#;</p>
9	<b>+S*R:&lt;type&gt;:EPTI#&lt;interval&gt;;</b>	<p>To set emergency packet transmission interval in sec</p> <p><b>Example:</b> +S*R:SET:EPTI#60;</p> <p>+S*R:GET:EPTI#;</p> <p>+S*R:CLR:EPTI#;</p>
10	<b>+S*R:&lt;type&gt;:EMTD#&lt;interval&gt;;</b>	<p>To set emergency mode timeout duration in sec</p> <p><b>Example:</b> +S*R:SET:EMTD#1200;</p> <p>+S*R:GET:EMTD#;</p> <p>+S*R:CLR:EMTD#;</p>

11	<b>+S*R:IMON#;</b>	This command will switch ON Relay connected to device (Digital Output 1) and Vehicle Ignition will be OFF
12	<b>+S*R:IMOFF#;</b>	This command will switch OFF Relay connected to device (Digital Output 1) and Vehicle Ignition will be ON
13	<b>+S*R:RST#&lt;logs erase bit&gt;;</b>	<p>To restart device with/without erasing logs</p> <p><b>Example:</b> To restart without erasing stored logs</p> <p>+S*R:RST#0;</p> <p>To restart with erasing all stored logs</p> <p>+S*R:RST#1;</p>

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