

MKP Parts

A supplier of stature!

EcoRDU

Technical information and installation manual



MKP Parts



Basic description

HW7 GPS is a terminal equipment for navigation data collection which transfers the collected data to the server using the GSM network (only 2G). This equipment suits well for asset tracking and or vehicle relative to time and location. Among the data acquired are the location, speed, battery level, fuel level and many more. It is important to be noted that the equipment has several IO's usable for many different purposes.



Deliverables:

1. HW7 GPS equipment
2. mRRD unit for tachograph remote download
3. External active antenna
4. Mating 10 pin connector
5. mating 3mm pitch 6 pin connector for CAN or RS232



- Sizes: 92mm x 58mm x 23mm
- Weight: 120g
- Connector GPS: 3.5mm standard SMA with normal polarity
- 10 pole connector: Eurocontact or compatible plug in terminal block 10 pin 3.5mm, female, PN: SH10-3,5
- 6 pole connector: Wuerth ConMPC3 Micro Power Connectors 3.00 mm, PN: 66200621022

Basic characteristics

- GSM/GPRS characteristics:
- Quectel M960 quad band module (GSM 850 / 900 / 1800 / 1900 MHz); GPRS class 12
- Characteristici GPS characteristics:
- Quectel L76 dual constellation receiver GPS//GLONASS (SBAS WAAS, EGNOS, MSAS, GAGAN)
- Sensibility of -163 dBm
- Voltage supply: 10 ÷ 30V;
- Digital inputs: 2
- Digital outputs: 1 (open-drain)
- 1W input: 1 (Dallas thermometer)
- Analog inputs: 2
- LED for state signaling
- RS485 interface port: 1
- RS232 interface port: 1
- CAN interface port: 1

Environmental conditions













- Storage temperature: -40°C ... +70°C
- Storage moisture: 5 ... 95 % (no condensable)
- Working temperature: -25°C ... +50°C

Electrical characteristics

Values	Min.	Typ.	Max.	UM
Power supply				
Voltage supply (recomended working conditions)	9	-	28	V
Internal battery voltage (in recomend working conditions)	3,35	-	4,3	V
Current consumption				
Deep Sleep, average current	-	1.5	4	mA
U _{BATT} =12.6V, all the modules are working the battery is under charge	-	-	210	mA
U _{BATT} =12.6V, all the modules are working the battery is charged	-	-	155	mA
U _{BATT} =12.6V, only GPS is working GPRS is in stand-by, battery charged	-	-	60	mA
Output				
Maximum output current	-	-	900	mA
R _{DS_on} , Drain-Source	-	-	200	mOhm
Digital inputs				
Input resistance	1,5	-	-	kOhm
Recomended input voltage	10	-	U _{BATT}	V
Treshold voltage for transition L to H	-	8	-	V
1Wire input				
Voltage domain on this pin	0	-	+3V3	V
Maximum cable lenght (with two sensors connected to the bus)	0	-	23	m
Analog Inputs				
Input resistance for input range 0..6V	-	164	-	kOhm
Input resistance for input range 0..30V	-	91,1	-	kOhm
Input voltage divided into two subranges	0	-	30	V
RS485 interface				
Load resistance	-	120	-	Ohm
Survival absolut maximum voltage applied to pins A or B, long term	-13	-	16	V
Survival absolut maximum voltage applied to pins A or B, short term (spikes)	-100	-	100	V
Differential treshold voltage	2	2.5	-	V
RS232 interface				
Survival absolut maximum voltage applied to pins TxD or RxD, long term	-30	-	30	V
Minimum load resistance on TxD pin	300	-	-	Ohm
CAN interface				
Load resistance	-	120	-	Ohm
Survival absolut maximum voltage applied to pins CAN-H or CAN-L, long term	-4	-	16	V
Survival absolut maximum voltage applied to pins CAN-H or CAN-L, short term (spikes)	-25	-	25	V
Differential recessive voltage	-	2.3	-	V

LED status



Green	Blue	Amber	Red	Meaning
 0,1s				Internal battery charged, GPS signal lost, missing GSM/GPRS network.
		 0,1s		Internal battery charging, missing GSM/GPRS network.
	 0,5s			Connected to GSM network, connected to the ecoMotive server.
	 0,1s			Connected to GSM network, running from internal battery
 0,5s	 0,1s			Valid GPS fix, RTC valid and GSM network received.
 0,5s	 0,5s			Valid GPS fix, RTC valid and GSM network received, connected to the ecoMotive server.
 0,5s	 0,5s	 0,1s		Valid GPS fix, RTC valid and GSM network received, connected to the ecoMotive server, battery charging
			 1s	Error, error code = number of flashes (See the belows tabel!)


Error codes:


Number of flashing	Meaning
1	DeviceRestart occurred
2	GPRSRestart
3	GPSRestart
4	DieselMeterRestart
5	DieselMeter1_NotResponding
6	DieselMeter2_NotResponding
7	DieselMeterSaturated
8	BatteryCharged
9	BatteryCharging
10	BatteryFault
11	RunningFromBattery
12	PowerManagementFailed
13	Invalid_Packet
14	RS485LRCErrors
15	RS485LengthError
16	FWUpdateWasPerformed
17	GPRSEmergencyRestart
18	RAMPushError
19	RAMPopError
20	FWUpdateError
21	WakeUpFromDeepSleep
22	SendingSMS
23	SMSSendSuccessfull
24	GSMNoNetworkRestart
25	GSMNoServerRestart
26	DebugAntiStuck
27	DebugChangeLevel

Notes:


- The green LED reflects the GPS state and if the battery is fully charged.
- The blue LED shows the GPRS modem state.
- The red LED shows any occurred error.

Connector layout

10 pole connector	Pin Nr.	Pin name	Description
	1	GND	Ground or battery return
	2	+Batt	Voltage supply or battery (permanent +12V or +24V from the vehicle's battery)
	3	Ignition	Ignition (+12V or +24V)
	4	+BATT-aux	Output for supplying any auxiliary equipment (capacitive probe , RFID reader or else)
	5	AN_in2 DIG-in1 DIG-out	Analog input, 0-6V or 0-30V, (selectable from the internal jumpers) or Digital input 1 or Digital Output, the external load will be connected to this pin and +Batt.
	6	RS485_N	RS485 interface lower line (or B)
	7	GND	Ground for RS485
	8	RS485_P	RS485 interface higher line (or A)
	9	1W/An-in	Thermometer input 1W or Analog input, 0-6V or 0-30V, (selectable from the internal jumpers)
	10	DIG-in2	Digital input 2, positiv signal or negative signal, (selectable from the internal Jumpers)

	Pin Nr.	Pin name	Description
	1	RS232-RX	RS232 bus Rx line
	2	+BATT-aux	Output for supplying any auxiliary equipment
	3	RS232-TX	RS232 bus Tx line
	4	CAN-H	CAN bus HIGH line
	5	GND	Ground
	6	CAN-L	CAN bus LOW line

Jumpers

	Jumper	Position	Description
	P14	Jumper set LEFT	10 pole connectors's pin 5 have digital input functionality (DIG-in1)
		Jumper set RIGHT	10 pole connectors's pin 5 have digital output functionality (DIG-out)
		Jumper open	10 pole connectors's pin 5 have analog input functionality (AN_in2)
	P13	Jumper set LEFT	Digital input DIG-in1 with referenced to +Batt, (External switch has to be connected between DIG-in and Gnd)
		Jumper set RIGHT	Digital input DIG-in1 with referenced to Gnd, (External switch has to be connected between DIG-in and +Batt)
	P20	Jumper set LEFT	10 pole connectors's pin 9 have analog input functionality (AN_in1)
		Jumper set RIGHT	10 pole connectors's pin 9 have 1W One wire input functionality (Any thermometer from the DS19B20 Dallas/Maxim family can be used, connect between 1W pin and Gnd)
	P16	Jumper set LEFT	Digital input DIG-in2 with referenced to +Batt, (External switch has to be connected between DIG-in and Gnd)
		Jumper set RIGHT	Digital input DIG-in2 with referenced to Gnd, (External switch has to be connected between DIG-in and +Batt)

Identification of the equipment



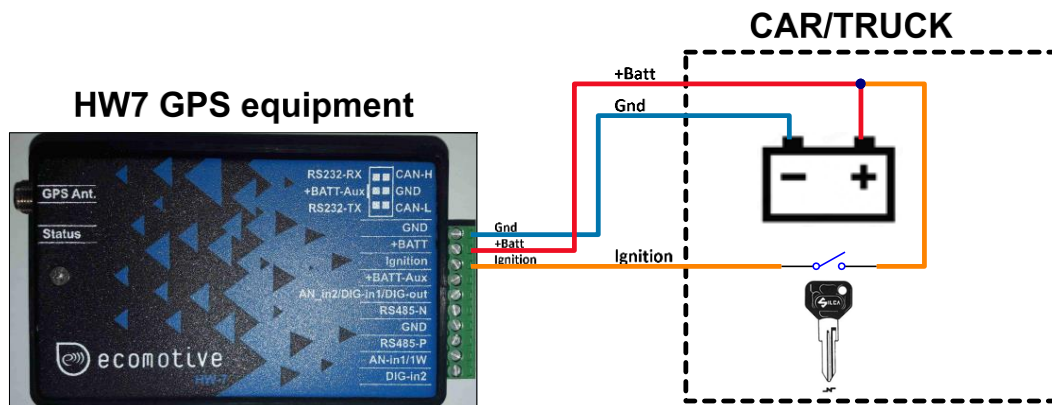
Serial number	Equipment type	Subtype of the equipment	Versions
7774	GPS	M (MIDI) m (mini) u (micro)	7.5

Possible version (at the issue of this document):

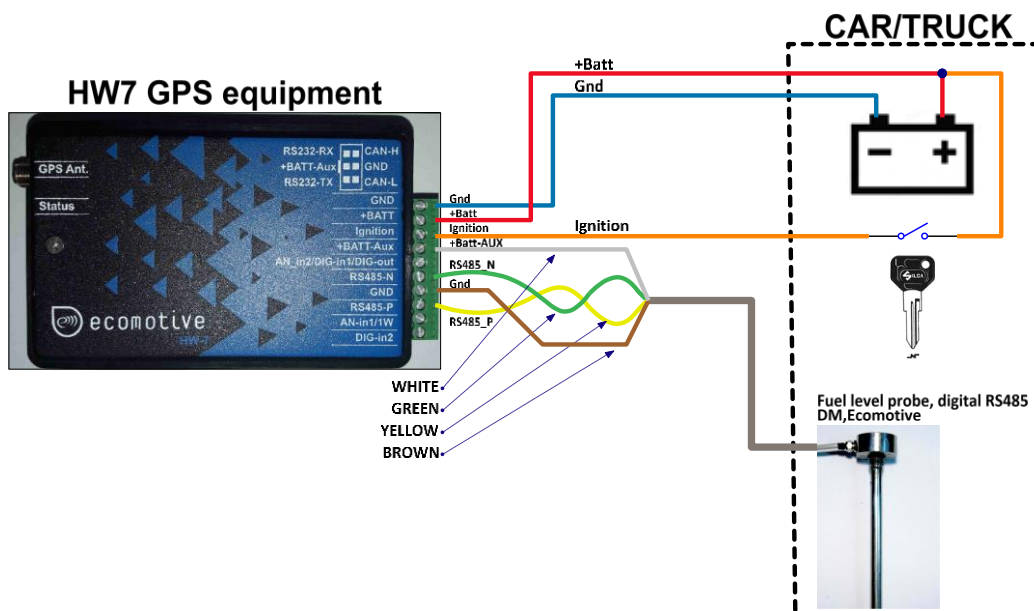
- M – As MIDI version. Full version with RS232 and CAN interface
- m - As mini version. Version without the secondary 6 pin connector (without the functionality of the RS232 and CAN)
- u - As micro version. Version with lowest functionality, only the first four pin's of the 10 pole connector are in use! (The 6 pole connector is missing as well.)

Connection examples

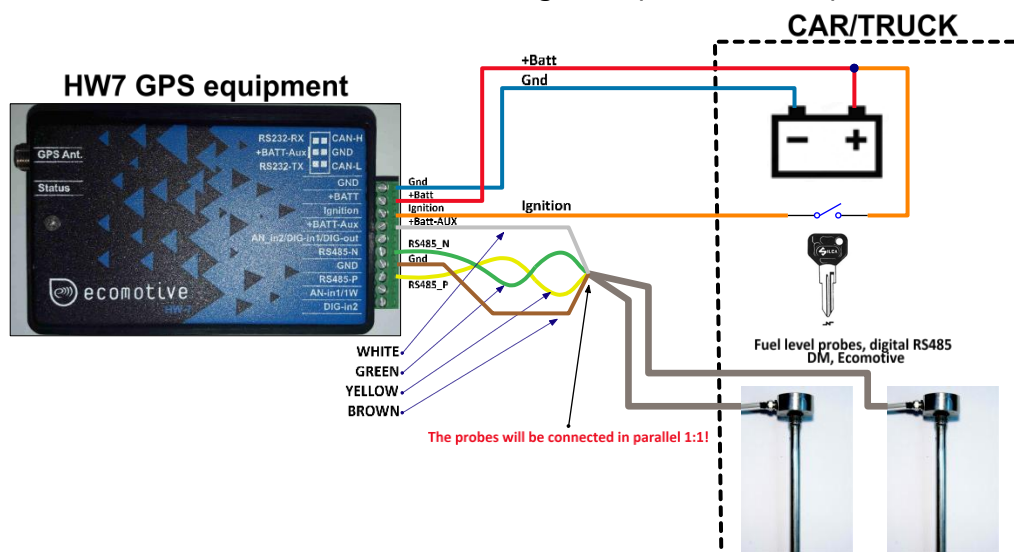
- Basic connection



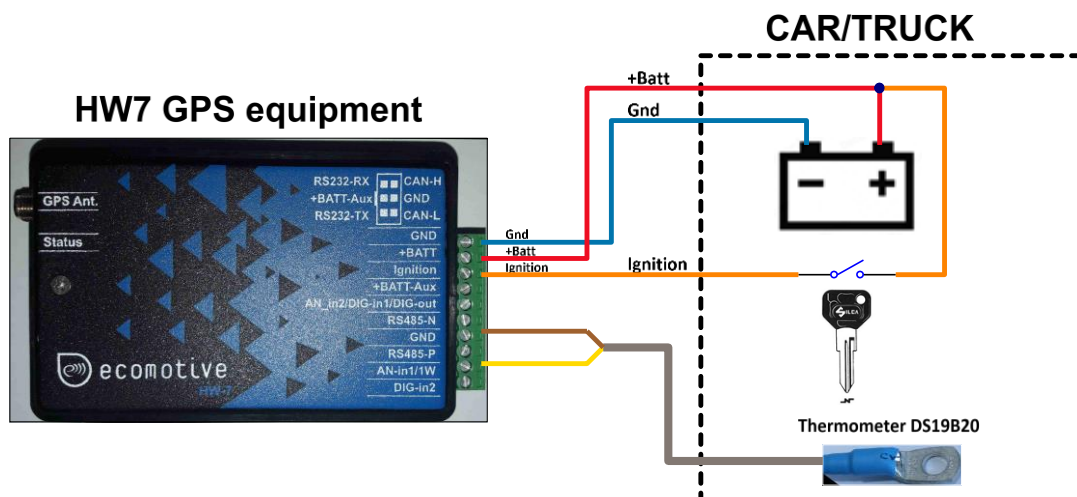
- Connection to an Ecomotive digital capacitive level probe



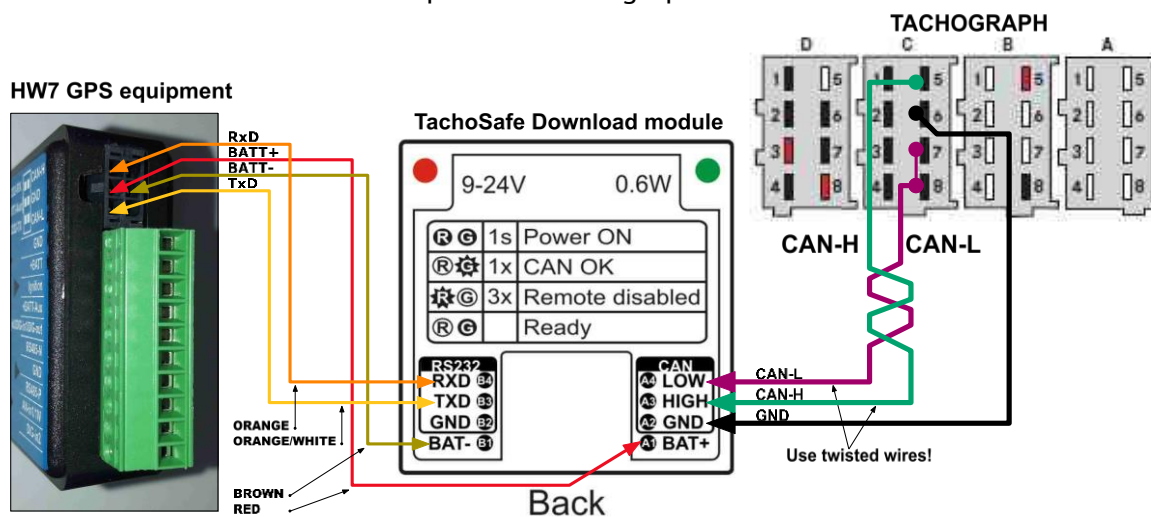
- Connection to two Ecomotive digital capacitive level probes



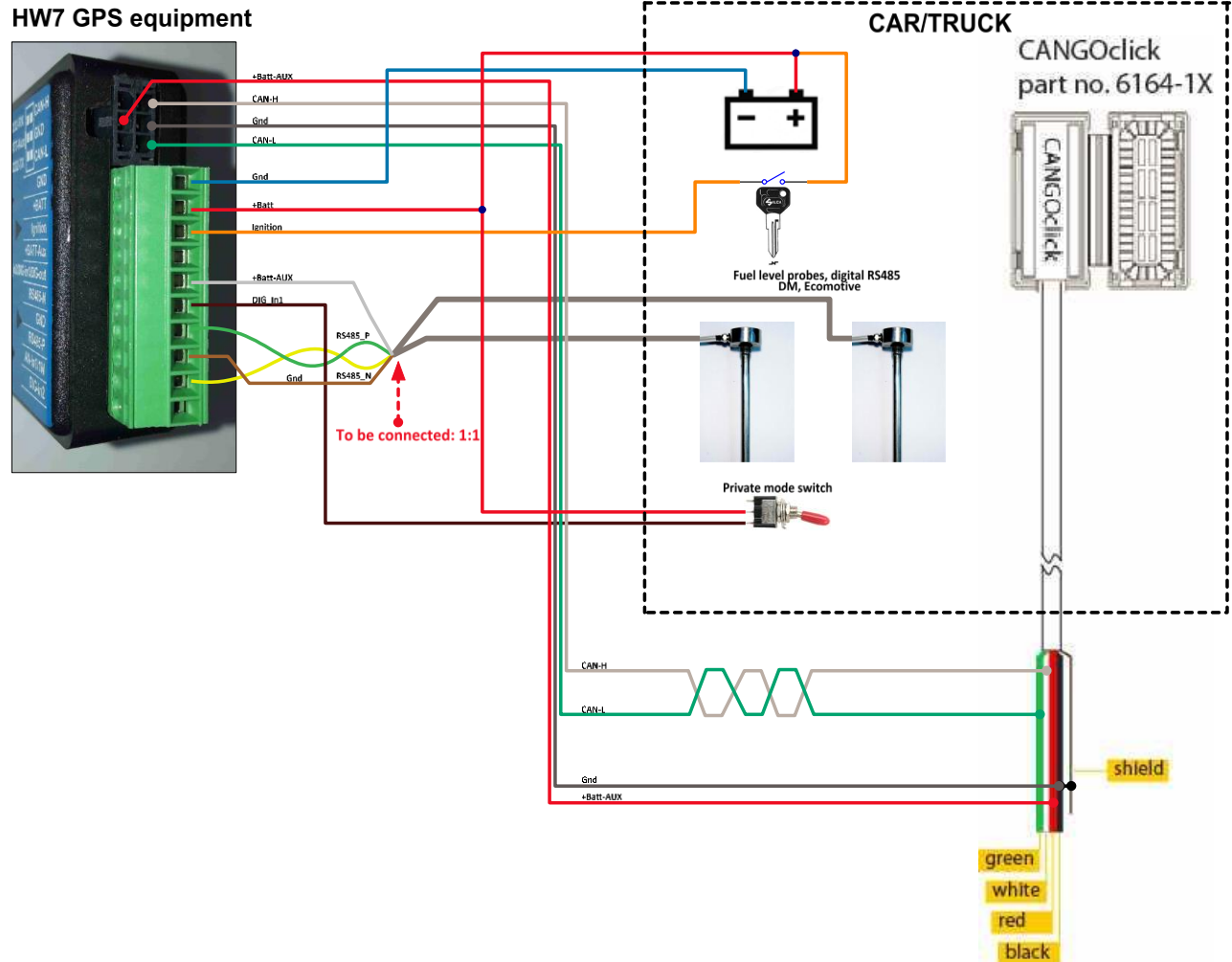
- Connection example to a 1W interfaced DALLAS thermometer



- Connection example to a Tachograph Remote Download Unit



- Connection example to a vehicle equipped with private switch and CANGo for FMS compliant data reading (non-contacting CAN reader)



Notes regarding the usage of the 1W interface:

- Maximum 3 sensors can be connected to the 1W bus.
- Connection has to be made with standard two wires connection, the wires are not interchangeable!
- Please consider maximum cable length!

Please note:

- Digital output refers to +Batt (DIG_out is open drain), in active state the DIG_out is connected to Gnd