DATA LOGGER SPECIFICATION

FOR EV AND DV VEHICLES

FORMULA STUDENT EAST

WHO IS READY?

VERSION 1.2

RELEASE DATE: 2ND MAY 2018

#FSEAST2018 #DATALOGGER

PARTS PROVIDED BY THE ORGANISER FOR EV (NOT DV) VEHICLES:

- Current- and voltage-sensor with mounting assembly
- Data logger electronics with optional mounting plate
- Sensor cable (more information later in this document)
- Power supply cable (more information later in this document)

PARTS PROVIDED BY THE ORGANISER FOR ELECTRIC DV VEHICLES:

- Current- and voltage-sensor with mounting assembly
- Data logger electronics with optional mounting plate
- Sensor cable (more information later in this document)

PARTS PROVIDED BY THE ORGANISER FOR INTERNAL COMBUSTION DV VEHICLES:

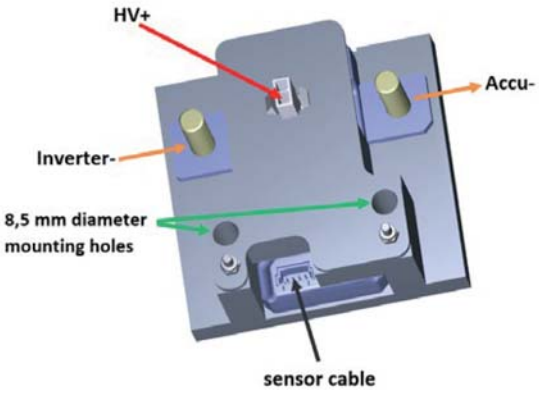
- Data logger electronics with optional mounting plate

Paramtere	Minimum	Typical	Maximum
LV supply voltage	10VDC	-	60VDC
LV supply current	-	160mA @ 10VDC 130mA @ 12VDC 80mA @ 24VDC 45mA @ 48VDC 40mA @ 60VDC	320mA @ 10VDC 260mA @ 12VDC 160mA @ 24VDC 90mA @ 48VDC 80mA @ 60VDC
RES CAN termination	No termination		
RES CAN speed	500kbit/s		

SENSOR ASSEMBLY CURRENT AND VOLTAGE | **SENSOR CABLE** | **DATA LOGGER** | **DATA LOGGER POWER SUPPLY AND DV RES CAN CABLE**

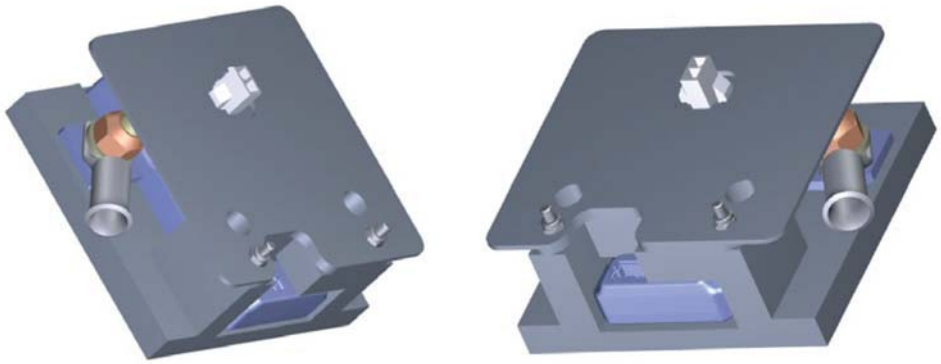
SENSOR ASSEMBLY

SENSOR ASSEMBLY | CURRENT- AND VOLTAGE:
(Drawing and step model provided in the FS East data logger information pack.)

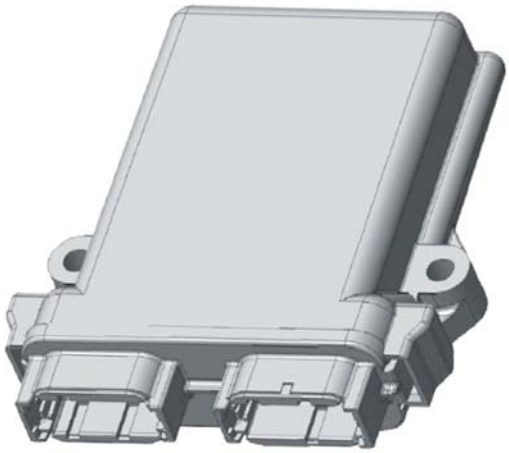


SENSOR ASSEMBLY COVER:

SENSOR ASSEMBLY WITH COVER AND CABLE LUGS:



DATA LOGGER ASSEMBLY



DATA LOGGER:

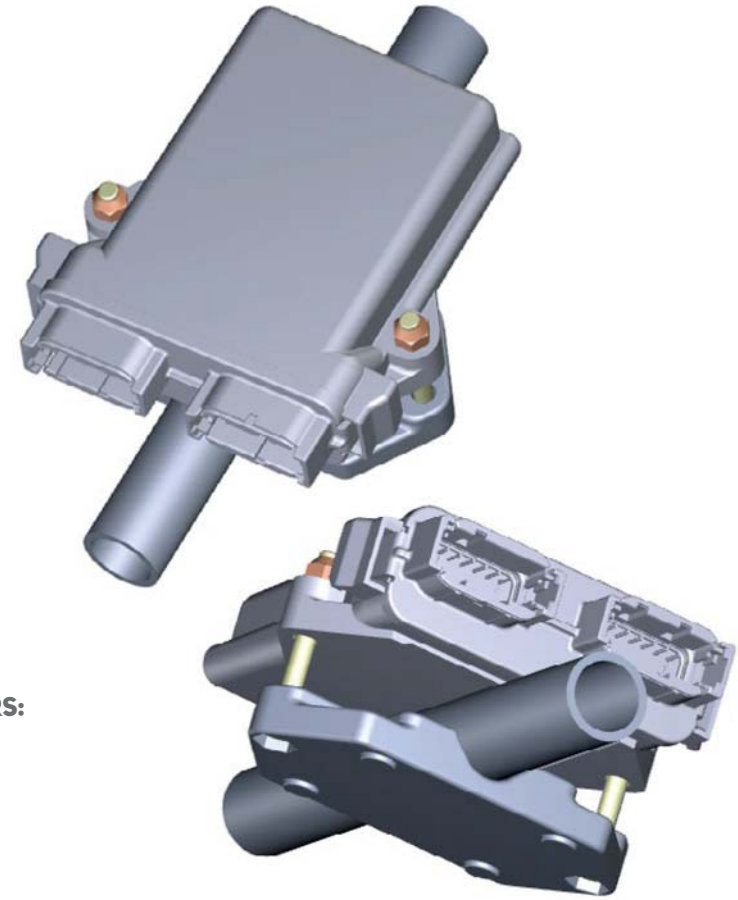
(Drawing and step model provided in the FS East data logger information pack. You may mount the data logger in/to any other component of the vehicle, but please pay attention to:

- Sensor cable length
- Power supply cable length
- The data logger transmits the data using WiFi connection. The officials will download the log between dynamic runs, so they must be able connect to the data logger.

DATA LOGGER MOUNTING PLATE:

(This is an optional part to mount the data logger on the main hoop.)

DATA LOGGER ASSEMBLY:



SENSOR ASSEMBLY CONNECTIONS/CONNECTORS:

1. Battery- connection
   M8, 10.9 bolt
2. Inverter- connection
   M8, 10.9 bolt
3. HV+ connector (sensor side):
   Mini-Fit Jr. Series, Plug, 2 Ways, 4.2 mm
   Molex: 39-01-2026
   Farnell: 1697125
   (Pin contacts on the sensor side.)

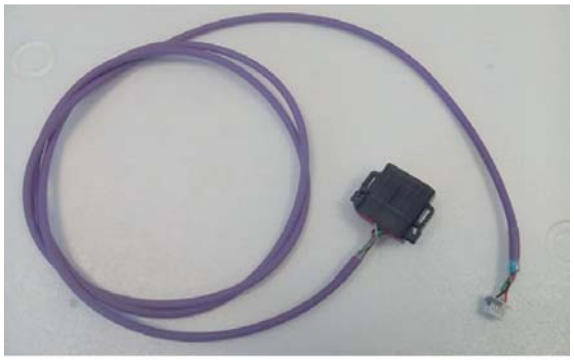
RECOMMENDED PARTS FOR THE HV+ CONNECTION (VEHICLE SIDE)(PROVIDED BY THE TEAM):

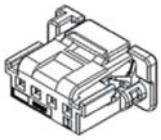
1. HV+ connector:
   Mini-Fit Jr. Series, Receptacle, 2 Ways, 4.2 mm
   Molex: 39-01-2020
   Farnell: 151866
2. HV+ connector's socket contact:
   Molex: 39-00-0429
   Farnell: 1783775
3. HV+ wire:
   Wire, Stranded, Hook Up MIL-W-76B Type MW, PVC, Orange, 20 AWG, 0.51 mm^2
   Voltage rating: 1kV
   Alpha wire: 1553 OR005
   Farnell: 2291077

SENSOR CABLE ASSEMBLY:

					Recommendations			
	Connector type	**Part name**	**Manufacturer**	**Part number**	**Distributor**	**Order number**	**OPTION A**	**OPTION B**
Data logger side	DTM06 series	Connector housing	TE connctivity	DTM06-12SB	mouser	571-DTM06-12SB	provided by organizer	provided by the team
		Pin	TE connctivity	1062-20-0222	mouser	571-1062-20-0222-LP	provided by organizer	provided by the team
		Wedgelock	TE connctivity	WM-12S	farnell	2138288	provided by organizer	provided by the team
Sensor side	DuraClik ISL RECPT HSG 4CKT	Connector housing	Molex	560123-0400	mouser	538-560123-0400	provided by organizer	provided by the team
		Pin	Molex	560124-0101	mouser	538-560124-0101-CT	provided by organizer	provided by the team

Pin No. at data logger side	**Signal**	**Pin No. at sensor side**
B2	12V	4
B3	GND	1
B12	CANL	3
B11	CANH	2





OPTION A: PROVIDED BY THE ORGANIZER

1. Connector - sensor side
   DuraClik ISL RECPT HSG 4CKT,
   see table for more information (Drawing and step model provided in the FS East data logger information pack.)
2. Connector - data logger side
   DTM-12B type, see table for more information
3. Cable
   Outer diameter max: 8 mm
   (this is only the diameter of the cable, without the connectors)
   Outer diameter min: 4 mm
   Length: 1,5 m

OPTION B: PRIVIDED BY THE TEAM

The team provides the cable assembly as the part of the car wire harness,
connector type definitions can be found in the table above

DATA LOGGER POWER SUPPLY AND RES CAN CABLE ASSEMBLY:

					Recommandations			
	Connector type	**Part name**	**Manufacturer**	**Part number**	**Distributor**	**Order number**	**non DV EV**	**DV**
Data logger side	DTM06 series	Connector housing	TE connctivity	DTM06-12SA	mouser	571-DTM06-12SA	provided by organizer	provided by the team
		Pin	TE connctivity	1062-20-0222	mouser	571-1062-20-0222-LP	provided by organizer	provided by the team
		Wedgelock (needed part, not optional!)	TE connctivity	WM-12S	farnell	2138288	provided by organizer	provided by the team
Car harness side plug	ATM series	Connector housing	Amphenlo	ATM06-2S	x	x	provided by organizer	not needed, optional
Car harness side recep-tacle (part of the car wire harness)	ATM series	Connector housing	Amphenol	ATM04-2P	farnell	2361175	**provided by the team**	Not applicable
		Pin machined	Amphenol	AT60-202-20141	farnell	2361204	**provided by the team**	Not applicable
		Pin stamped	Amphenol	AT60-20-0122	farnell	2361202 , 2529244	**provided by the team**	Not applicable
		Wedgelock (needed part, not optional!)	Amphenol	AWM-2P	farnell	2318739	**provided by the team**	Not applicable

Pin No. at data logger side	**Signal**
A1	10-60VDC supply
A12	iGND
A3	CANH
A4	CANL

FOR EV (NON DV) VEHICLES (ONLY POWER SUPPLY IS NEEDED) (PROVIDED BY THE ORGANIZER):

1. Connector - data logger side
   DTM-12SA
2. Connector - vehicle side
   ATM Series, Plug, 2 Ways (with socket contacts)
3. Cable
   Outer diameter max: 8 mm (this is only the diameter of the cable, without the connectors)
   Outer diameter min: 4 mm
   Length: 1,5 m

FOR DV VEHICLES (POWER SUPPLY AND RES CAN BUS) (PROVIDED BY THE TEAM):

- The team provides the whole cable assembly as the part of the car wire harness
- The ATM series intermediate connector is optional in this case

RES CAN DATA SPCIFICATION (DV ONLY)

The Remote Emergency System (RES) and the data logger must share the same CAN bus.
The RES has to be configured to Node-ID 0x011 with 500kbit/s CAN speed
The DV vehicle state must be provided as a CAN message defined by the following table with 100ms cycle time:

CAN-ID	Name	Length	Format
0x502	DV system status	5 B	
	ASSI_state_off		1
	ASSI_state_ready		2
	ASSI_state_driving	bit 0-2	3
	ASSI_state_emergency_brake		4
	ASSI_state_finish		5
	EBS_state_unavailable		1
	EBS_state_armed	bit 3-4	2
	EBS_state_triggered		3
	AMI_state_acceleration		1
	AMI_state_skidpad		2
	AMI_state_trackdrive	bit 5-7	3
	AMI_state_braketest		4
	AMI_state_inspection		5
	Steering_state	bit 8	bool
	Service_brake_state_disengaged		1
	Service_brake_state_engaged	bit 9-10	2
	Service_brake_state_available		3
	Lap_counter	bit 11-14	unsigned
	Cones_count_actual	bit 15-22	unsigned
	Cones_count_all	bit 23-39	unsigned

CHANGELOG

Version	Date	Modification	Page
1.0.0	13th March 2018	Initial release	-
1.1.0	14th March 2018	Updated document	
1.2.0	2nd May	Updated document	