SEO CANeasy
SELF PROGRAMMING CONTACTLESS CONVERTER
GENERAL DESCRIPTION

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CAN BUS devices

AVL and GPS/GSM systems

CAR security systems

1. Brief description of contactless SEO CANeasy converter

SEO CANeasy contactless converter allows **reading of all vehicle's digital transmissions.** It reads not only 1- and 2-wire CAN transmissions, but also UART, J 1939, J 1708/1587, K-LINE, LIN and many others. Contactless reading does not require insulation of copper wire to be cut.

All digital CAN BUS speeds from 33,33 to 1 Mb/s and all UART speeds from 4800 to 125000 b/s are readable. SEO CANeasy is the best contactless solution on the market – it does not lose any readable frames. SEO CANeasy reads 100% of frames, but in worst electromagnetic conditions the device is capable of reading 98% of frames. SEO CANeasy is a contactless CAN reader and CAN converter all-in-one. Not all the parameters from CAN BUS may be read, because SEO CANeasy does only read CAN data. It does not transmit any requests into CAN BUS. One SEO CANeasy is capable of reading one CAN BUS only – if SEO CANeasy contactless converter needs to be connected to two CANbuses, a SEO CANtouch reader on the second CAN BUS is necessary.

Thanks to advanced algorithms, SEO CANeasy is capable of automatically selecting the Program number adequate for specific vehicle. Furthermore SEO CANeasy device chooses 4 additional Program numbers that may also be compatible with specific vehicle.

SEO CANeasy may be powered by 9 ÷ 63 V.
The device is designed to be installed in vehicles of M1 and N1 categories with 12V-24V-38V electrical systems.

The SEO CANeasy software can be updated using O350 programmer device.

The www.can24.pro website contains connection diagrams that help during installation of various types of SEO CAN converters. Due to the limited availability, not all existing vehicles in the world with CAN BUS have been added to the compilation of our devices. The SEO CANeasy contactless converter allows automatic and safe (due to the use of contactless reader) Program number selection that is the most compatible with a specific vehicle, from an existing database of over 2500 vehicles in such a way that you can acquire the most parameters possible even in a vehicle that has not been read by us. The device automatically recognizes the CAN-L and CAN-H polarization, BUS speed and adopts to the noise level, interference and signal level – all you need is to attach and tighten the CAN BUS twisted pair to the SEO CANeasy electrodes to make sure that you can obtain the necessary parameters from the selected CAN BUS. The installer does not have to have access to the vehicle connection diagram or know the dedicated Program number in order to successfully perform the installation of SEO CANeasy device in any vehicle in such a way that obtaining of all the necessary parameters is possible.

2. What is SEO CANeasy used for and how does it work?

SEO CANeasy is used to **obtain detailed vehicle data** from available digital buses. Connecting the device to the GPS/GSM system (AVL – Automatic Vehicle Location) significantly **extends fleet management capabilities.** It can also improve driving safety and influence the savings in fuel consumption and exploitation of automotive parts.

The basic AVL system gives the possibility to determine the location, i.e. the location of the vehicle on the map. By analyzing the "point movement in time", you can, for example, calculate vehicle speed and acceleration using simple algorithms. SEO CANeasy converter additionally provides **up to 300 parameters** obtained from over 2500 different types of vehicles. It is the largest database of this type in the world. In order to obtain useful data from a particular machine, we had to have access to the original vehicle's CAN transmission description or check the wires transmitting digital data and select the most optimal buses according to the amount of useful information. There are many buses in the vehicles and not all of them have a complete set of data, so our standard devices have a possibility of connecting usually two buses, but we produce modules with the ability to **read data from five CAN buses** – depending on the customer's needs. We analyze over 1000 events that carry the necessary parameters, but the information from CAN BUS requires decryption and use of complex calculations and computational algorithms based on a lot of data from various CAN identifiers – this is a complicated and time-consuming programming process. We obtain digital data from ECU (Engine Computer Unit), BCM (Body Computer Module), ICM (Instrument Cluster Module) and other digital modules existing in vehicles. We have 15 years of experience in reading CAN BUS.

3. Obtained parameters and software Levels

SEO CANeasy reads CAN data from **vehicles of various types and makes**.

- passenger cars,
- electric cars,
- delivery vans,
- trucks,
- buses,
- agricultural machinery,
- construction machines,
- forest industry machines,
- port/harbor transhipment machines,
- mining equipment,
- municipal and road machinery (cleaning machines, salt/sand spreaders, snow plows, asphalt cutting machines, pouring asphalt, etc.),
- forklifts and other special machinery, such as: cranes, pumps, refrigerator trucks, etc.

We provide information about a vehicle from a database of about 300 various acquired parameters.

Basic read values are related to fuel, engine, safety, dashboard indicators and special parameters for special machinery.
Simplified sample extract of the acquired parameters from cars of various types and makes is attached.

A complete database of acquired parameters from cars together with connection-diagrams is available at **www.can24.pro** after logging using assigned **login and password.**

SEO CANeasy, unlike SEO CANlog converter, works only in the listening mode, i.e. it does not send any requests to the CAN BUS, hence not all data from the vehicle can be obtained. By entering the Program number automatically selected by SEO CANeasy into the SEO CANlog converter, it may be possible to obtain more needed parameters.

MAIN PARAMETERS

- Total engine work time
- Total engine work time - counted
- Total mileage of the vehicle
- Total mileage of the vehicle - counted
- Total fuel consumption
- Total fuel consumption - counted
- Fuel level in percent
- Fuel level in liters
- Engine speed RPM
- Engine temperature
- Vehicle speed
- Fuel rate
- AdBlue level in percent
- AdBlue level in liters
- VIN number
- Acceleration pedal position
- Engine load
- Retarder load
- Engine pressure
- Drive system temperature
- Current trip distance

CAN BUSES CONNECTION FLAGS

- CAN1 connected
- CAN2 connected
- CAN3 connected
- CAN4 connected
- CAN5 connected
- CAN6 connected

- Overall distance covered during work time
- Current distance covered during work time
- Oil pressure
- Temperature outside
- Battery voltage
- HV battery temperature
- HV battery level
- Average power consumption HV battery
- HV battery pack health
- Electric engine work time - counted
- Wheel speed sensor impulses - counted
- Electric engine comsumed kWh
- Time left until the end of the battery charge
- Total CNG use
- Total CNG use - counted
- CNG level in percent
- CNG level in kilograms
- Vehicle's range
- Vehicle's range on HV battery
- Vehicle's range on CNG
- Brake pedal position
- Axle 1 load
- Axle 2 load
- Axle 3 load
- Axle 4 load
- Axle 5 load
- Load weight
- Gross combination vehicle weight
- Service - distance to next service
- Service - distance elapsed since the occurrence of the need for servicing
- Service - distance from the last service
- Service - time to next service
- Service - time exceeded since the occurrence of the need for servicing
- Service - time elapsed since the last service

SECURITY STATE FLAGS

- Ignition on
- The key is in the ignition lock
- Webasto on
- Engine is working
- Standalone engine is working
- Ready to drive
- Engine is working on CNG
- Work mode - company
- Operator is absent
- Interlock active
- Engine lock active
- Request to lock the engine
- Handbrake is active
- Footbrake is active
- Clutch is pushed
- Status of the hazard warning lights switch active
- Front left door opened
- Front right door opened
- Rear right door opened
- Rear left door opened
- Trunk door opened
- Engine cover opened
- Charging wire is plugged
- Battery charging on
- Electric engine is working
- Car is closed
- Car is closed with factory remote control
- Factory installed alarm is active
- Emulated alarm is active
- Signal of closing with factory remote control was sent
- Signal of opening with factory remote control was sent
- Rearm signal was sent
- Trunk was opened with remote control
- Signal of closing with factory remote control was sent three times
- Parking is active (automatic gearbox)
- Reverse off
- Neutral is active (automatic gearbox)
- Drive is active (automatic gearbox)

STATE FLAGS

- Parking lights turned on
- Dipped headlights turned on
- Full beam headlights turned on
- Rear fog lights turned on
- Front fog lights turned on
- Additional front lights on
- Additional rear lights on
- Light signal turned on
- Air conditioning turned on
- Cruise control turned on
- Automatic retarder turned on
- Manual retarder turned on
- Driver's seatbelt fastened
- Front passenger's seatbelt fastened
- Rear left passenger's seatbelt fastened
- Rear right passenger's seatbelt fastened
- Rear center passenger's seatbelt fastened
- Front passenger is present
- PTO on

STATE FLAGS - INDICATORS

- Check engine indicator turned on
- ABS indicator turned on
- ESP indicator turned on
- ESP is turned off
- STOP indicator turned on
- Oil pressure/level indicator turned on
- Coolant liquid temperature/level indicator turned on
- Battery not charging indicator turned on
- Handbrake system indicator turned on
- AIRBAG indicator turned on
- EPS (Electric Power Steering) indicator turned on
- Warning indicator turned on
- Lights failure indicator turned on
- Low tire pressure indicator turned on
- Wear of brake pads indicator turned on
- Low fuel level indicator turned on
- Maintenance required indicator turned on
- Glow plug indicator turned on
- FAP indicator turned on
- EPC (Electronic Power Control) indicator turned on
- Engine oil filter clogged indicator turned on
- Low engine oil pressure indicator turned on
- Too high engine oil pressure indicator turned on
- Low coolant level indicator turned on
- Hydraulic system oil filter clogged indicator turned on
- Hydraulic system low pressure indicator turned on
- Hydraulic oil low level indicator turned on
- Hydraulic system high temperature indicator turned on
- Oil overflow in hydraulic chamber indicator turned on
- Air filter is clogged indicator turned on
- Fuel filter is clogged indicator turned on
- Water in fuel indicator turned on
- Clogged brake system filter indicator turned on

STATE FLAGS FROM AGRICULTURAL VEHICLES

- Right joystick moved right active
- Right joystick moved left active
- Right joystick moved forward active
- Right joystick moved back active
- Left joystick moved right active
- Left joystick moved left active
- Left joystick moved forward active
- Left joystick moved back active
- First rear hydraulic turned on
- Second rear hydraulic turned on
- Third rear hydraulic turned on
- Fourth rear hydraulic turned on
- First front hydraulic turned on
- Second front hydraulic turned on
- Third front hydraulic turned on
- Fourth front hydraulic turned on
- Front three-point hitch turned on
- Rear three-point hitch turned on
- Front power take-off turned on
- Rear power take-off turned on
- Mowing active
- Threshing active
- Grain release from hopper turned on
- Grain tank is less than 100%
- Grain tank is less than 70%
- Grain tank is opened
- Unloader drive is on; unloading tube is in idle position
- Cleaning fan control turned off
- Threshing drum control turned off
- Straw walker is clogged
- Excessive clearance under the threshing drum
- Low temperature of drive system hydraulics <5
- High temperature of drive system hydraulics >86
- Ear auger speed below the norm
- Grain auger speed below the norm
- Straw chopper speed below the norm
- Straw shaker speed below the norm
- Feeder speed below the norm
- Straw chopper switched on
- Corn header connected
- Grain header connected
- Feeder reverse switched on
- Pressure filter of the hydraulic pump is clogged

STATE FLAGS FROM UTILITY VEHICLES

- Salt/sand disperser is on
- Pouring chemicals turned on
- Conveyor belt turned on
- Salt spreader's drive wheel turned on
- Brushes turned on
- The amount of spreaded coarse-grained calcium

- Vacuum cleaner turned on
- Water supply turned on
- High pressure washer turned on
- Liquid pump turned on
- Unloading from the hopper turned on
- Low salt/sand level in container indicator turned on
- Low water level in container indicator turned on
- Chemicals turned on
- Compressor turned on
- Water valve is opened
- Cabin moved up status active
- Cabin moved down status active

STATE FLAGS FROM CISTERNS

- Section 1 - presence of fluid in the downpipe
- Section 1 - filled
- Section 1 - overfilled
- Section 2 - presence of fluid in the downpipe
- Section 2 - filled
- Section 2 - overfilled
- Section 3 - presence of fluid in the downpipe
- Section 3 - filled
- Section 3 - overfilled
- Section 4 - presence of fluid in the downpipe
- Section 4 - filled
- Section 4 - overfilled
- Section 5 - presence of fluid in the downpipe
- Section 5 - filled
- Section 5 - overfilled
- Section 6 - presence of fluid in the downpipe
- Section 6 - filled
- Section 6 - overfilled
- Section 7 - presence of fluid in the downpipe
- Section 7 - filled
- Section 7 - overfilled
- Section 8 - presence of fluid in the downpipe
- Section 8 - filled
- Section 8 - overfilled

PARAMETERS READ FROM AGRICULTURAL VEHICLES

- Harvesting time
- Harvesting area
- Mowing efficiency
- Mown grain volume
- Grain moisture
- Threshing drum RPM
- Gap under threshing drum
- Rotational speed of auger conveyor
- Rotational speed of grain auger
- Rotational speed of chopper
- Rotational speed of straw shaker
- Rotational speed of fan
- Rotational speed of feeder
- Speed of reel
- The amount of load in the grain elevator
- Current hours of harvester's work with threshing drum on
- Overall hours of combine harvester's work with threshing drum on
- Current harvest area
- Total harvest area
- Total bale count
- Bale count
- Bale count cut
- Bale slices

PARAMETERS READ FROM SPECIAL VEHICLES

- The slope of the arm
- Rotation of the arm
- Ejection of the arm
- Horizontal distance between the arm and vehicle
- Height of the arm above the ground
- Level of water for fire fighting
- Level of fire fighting foam
- Pressure in fire fighting pump
- Wind speed
- Outside temperature
- Drill RPM

PARAMETERS READ FROM MUNICIPAL VEHICLES

- The amount of salt/sand spreaded per square meter
- The amount of spreaded fine-grained salt
- The amount of spreaded coarse-grained salt
- The amount of spreaded mixture DiMix
- The amount of spreaded calcium chloride
- The amount of spreaded sodium chloride
- The amount of spreaded magnesium chloride
- The amount of spreaded gravel
- The amount of spreaded sand
- The width of pouring left
- The width of pouring right
- Salt spreader work hours
- Distance during salting

PARAMETERS READ FROM TACHOGRAPH DRIVER CARD

- Driver name
- Driver surname
- Driver ID
- Driver state
- Driver continuous driving time
- Driver cumulative break time
- Driver duration of selected activity
- Driver cumulated driving time for previous and current week
- Driver current daily driving time
- Numer of times driver exceeded 9 h daily driving time during a week
- Driver cumulative uninterrupted rest time
- Driver remaining current driving time
- Driver remaining driving time on current shift
- Driver remaining driving time of current week
- Driver remaining 2 weeks driving time
- Driver time left until next driving period
- Driver remaining time until next break or rest
- Driver end of last daily rest period
- Driver end of second last weekly rest period
- Driver current weekly driving time
- Driver maximum daily driving time
- Driver number od used reduced daily rest periods
- Driver duration of next driving period
- Driver duration of next break rest
- Driver remaining time of current break rest
- Driver time left until new daily rest period
- Next mandatory download date from driver card
- Driver time left until new weekly rest period
- Driver end of last weekly rest period
- Driver card expiry date
- Driver minimum daily rest
- Driver open compensation in the last week
- Driver open compensation in week before last
- Driver open compensation in 2nd week before last

GENERAL PARAMETERS READ FROM TACHOGRAPH

- Total vehicle distance from tachograph
- Trip distance from tachograph
- Vehicle speed from tachograph
- Tachograph driver card presence
- Tachograph next mandatory download date

DDD FILES

AVAILABLE **SOFTWARE LEVELS**, DETERMINING THE RANGE OF SUPPORTED DATA

			Level 1	Level 2	Level 3	Level 4
Supported vehicles		Passenger and electric cars	•	•	•	•
		Delivery vehicles (vans, pickups)	•	•	•	•
		Buses		•	•	•
		Heavy duty transport, HGV, TIR		•	•	•
		Agricultural, construction, utility, forestry, municipal and special machinery				•
SPUUPORTED PARAMETERS	Basic vehicle's data	Total vehicle mileage,	•	•	•	•
		Total fuel consumption,	•	•	•	•
		Fuel level,	•	•	•	•
		Engine RPM,	•	•	•	•
		Vehicle speed,	•	•	•	•
		Acceleration pedal position,	•	•	•	•
		Engine temperature,			•	•
		Ignition,	•	•	•	•
		Door status,	•	•	•	•
		Footbrake status,	•	•	•	•
		P, R, N, D position of automatic gearbox,	•	•	•	•
		R position of manual gearbox,	•	•	•	•
		CNG level,	•	•	•	•
		CNG consumption,	•	•	•	•
		Battery level (electric cars),	•	•	•	•
		Charging wire plug-in status (electric cars),	•	•	•	•
		Charging status (electric cars),	•	•	•	•
		Parameters read from tachograph driver card.		•	•	•
	Other obtained data	Dashboard indicators			•	•
		Other parameters from about 300 supported			•	•

4. The way of sending data to the GPS/GSM system

Vehicle's data is sent in a specific protocol to the GPS/GSM system. To read data sent from SEO CANeasy, the GPS/GSM system must have one of the communication protocols implemented. Protocol 4.0 is used in SEO CANeasy, but it can also send data in a standardized **FMS** protocol extended with additional parameters (SEO FMS protocol). Depending on the version, we provide clients with UART and/or RS232 or CAN/FMS J1939 outputs. The basic versions of the device have the following communication ports:

- SEO CANeasy (33XXXXXX): INPUTS – 2x CAN BUS, OUTPUTS – UART and RS232,
- SEO CANeasyFMS (35XXXXXX): INPUTS – 2x CAN BUS, OUTPUTS – CAN/FMS SAE J1939 and RS232.

5. Driver's work mode – business/company and private

To enable the employer to determine the working time or when the vehicle is used for private purposes, and when for business purposes, in SEO CANlog, SEO CAneasy and SEO CANmax devices we provide the possibility of switching the driver's work modes between private and business/company.

The parameter can be useful in cars used by sales representatives or in delivery vehicles (i.e. pizza delivery).

The device is in business/company mode by default. To switch to private mode, switch the ignition on with the accelerator pedal pressed (the accelerator pedal should remain pressed for about 1 second after switching the ignition on). The change of operating mode to business/company mode occurs automatically after 4 seconds after switching the ignition off.