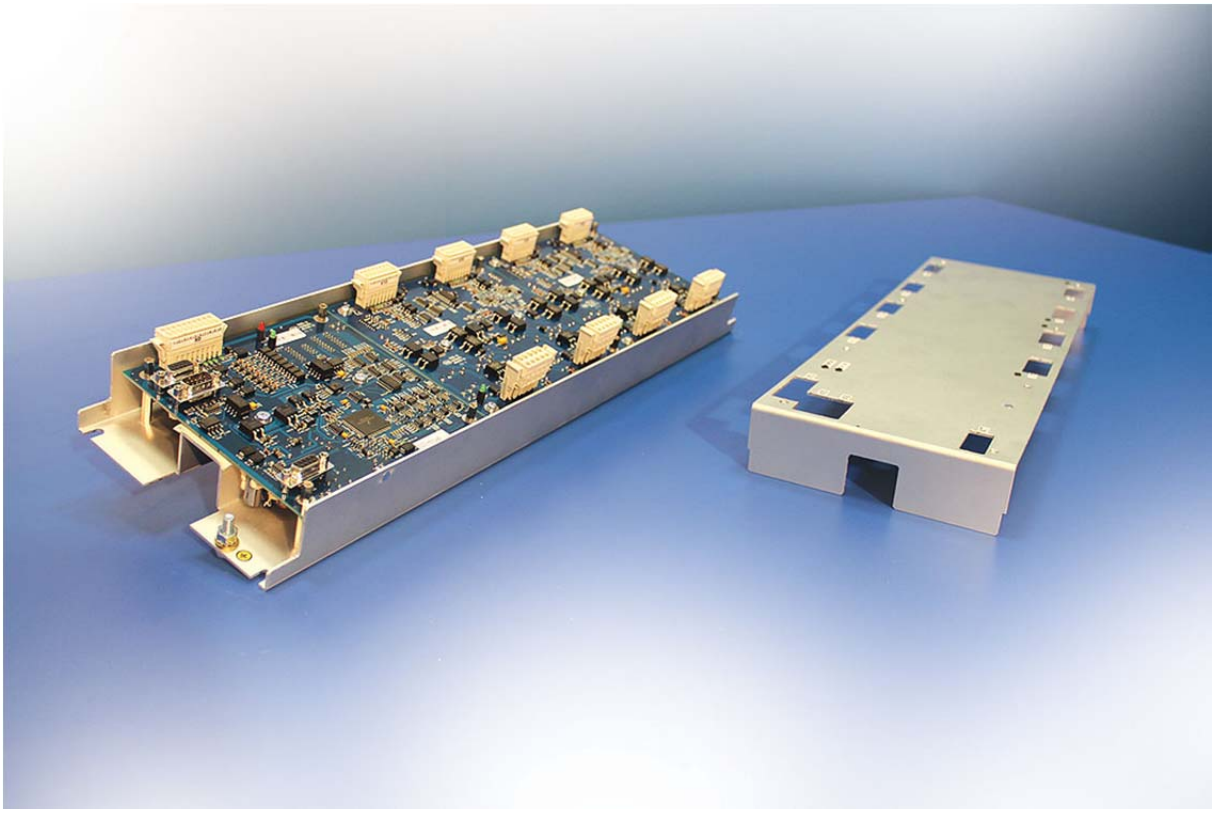
Sanding System Control Unit PJP-04-02

Operating Instruction



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1. INTRODUCTION

PJP04 control units are intended for controlling the sanding system of rail vehicles and trams. The sanding system increases the adhesive capacity coefficient (adhesion) between the wheel and the rail during accelerating, slip, skid and braking of the vehicle. Adhesion is increased by pouring the sand between the wheel and the rail.

The control unit is a modular unit intended for controlling four independent sandboxes. The modularity enables supplying sandboxes in two designs: PJP-04-02 – unit for two sandboxes or PJP-04-04 for controlling four sandboxes.

A sandbox always comprises a sand container with a sensor reading the minimum and the maximum sand levels in the container, a dosing device attached to the sand container and a blower which serves as a source of air pressure for transmitting the sand from the sand container. The sand container is tempered by a heating element located inside the container. Heating the sand reduces its humidity and prevents freezing of the sand in the container. The pipeline for sand transmission is heated by another heating element to prevent its freezing under unfavourable climatic conditions.

The vehicle controls the sanding system by a superior control via a CAN line. Basic safety signals and signals for a limited function of the sanding system when the superior vehicle control is out of control or when there is a failure in CAN communication are transmitted by means of direct HW signals. The other signals are transmitted via CAN communication.

2. BLOCK WIRING DIAGRAM

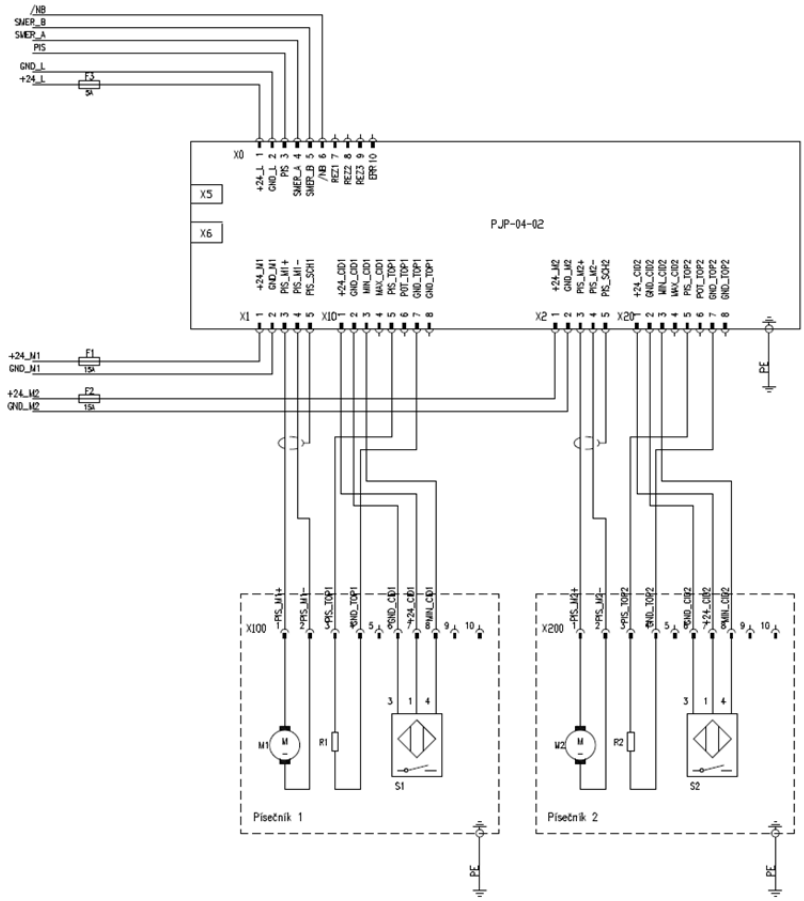


Fig. 1: PJP-04-02 block wiring diagram

3. TECHNICAL DATA

3.1. Climatic conditions

The structure and design of the control unit allow operation in a vehicle operated in mild climatic conditions as per EN 50125-1 with the following parameters:

Air temperature range outside the vehicle	-40°C to +40°C
Temperature for storage and transport	-40°C to +70°C
Maximum height above sea level	Class A1 as per EN50125-1 (up to 1,400 m above sea level)
External humidity – annual average (summer/winter)	average relative humidity ≤80% (75% / 85%)
External humidity continuously for 30 days in a year	relative humidity between 75% and 95%
External humidity randomly on other days	relative humidity between 95% and 100%
Environmental pollution as per EN 60721-3-5	Class 5C2

3.2. Working conditions

The control unit is intended for being installed into a vehicle case. The control unit design and model enables operating in working conditions present inside the vehicle defined according to EN 50155 with the following parameters:

Temperature	-40°C to +70°C
Relative humidity	10% to 90%, non-condensing
Cooling air quantity	natural
Mechanical impacts and vibrations	Category 1 Class A as per EN 61373
Electromagnetic environment	see EN 50121-3
Supply system characteristics	see EN 50125-1

3.3. Basic technical data

Nominal voltage	24 VDC
Operating range	16.8…31.2 VDC
Max. permanent voltage	30 VDC
Supply voltage interruption class	S2 (up to 10ms) as per EN 50155
Control unit consumption	250 mA max. (the controlling part consumption),
Blower consumption per sandbox	nominal current of the motor up to 10A,
Protection	IP 20 as per EN60529
Service life	10 years as per EN 50155 (provided that the system is operated according to the working conditions and maintained according to manufacturer's instructions),
Resistance to electromagnetic interference	as per EN 50121-1

3.4. Inputs

There are 7 logical inputs for direct control of the vehicle.
The inputs are two-state inputs and they are enabled by connecting +24VDC.
The minimum voltage level to enable the inputs is 15VDC (log. 1 is at the voltage range from 15V to 32V, log 0 is at the voltage range from 0V to 15V).
The input impedance is 2kΩ<Zin<3kΩ.
The inputs can be evaluated either statically or dynamically, as required.
To enable or disable an input, a change of the signal is required at least for the period of 30 ms.

There are 4 logical input for sensing the sand level in the sandbox.

The inputs are two-state inputs and they are enabled by connecting +24VDC.
The minimum voltage level to enable the inputs is 15VDC (log. 1 is at the voltage range from 15V to 32V, log 0 is at the voltage range from 0V to 15V).
The input impedance is 2kΩ<Zin<3kΩ.
The inputs can be evaluated either statically or dynamically, as required.
To enable or disable an input, a change of the signal is required at least for the period of 30 ms.

Special inputs see 2.15 System Safety
IN1 - Sanding - the driver (direct HW sanding by the driver – a pedal)
IN4 – Emergency brake (an inverted signal)

3.5. Outputs for blowers

2 M1-M2 outputs

- PWM, the blower output set-up
- A two-quadrant control, the half-bridge is supplied by an independent terminal, the bridge supply check – the check of a circuit breaker failure (every sandbox is secured separately)
- The maximum nominal current of the motor is 10A, the start-up current depends on the type of the blower
- Analog current measuring at the range of 0-30A (for the purpose of controlling the blower output, detecting the blower disconnection, the blower overload (a blower failure))
- The output resistant to overload.

3.6. Output for controlling the heating of the sandbox container

2 PNP outputs for controlling the heating element of the sandbox, T1-T2
The voltage of the output when switched-on corresponds to the Uin-1V supply voltage.
The maximum load of 55W (at the nominal voltage of 24VDC)
The maximum output current of 3.8A DC
The output resistant to short-circuit and overload.

3.7. Output for the sanding nozzle heating control

2 PNP outputs for the sanding nozzle heating control, T5-T8
The voltage of the output when switched-on corresponds to the Uin-1V supply voltage.
The maximum load of 55W (at the nominal voltage of 24VDC)
The maximum output current of 3.8A DC
The output resistant to short-circuit and overload.

3.8. ERR output (error report)

1 PNP output, O1
The voltage of the output when switched-on corresponds to the Uin-1V supply voltage.
The maximum load of 25W (at the nominal voltage of 24VDC)
The maximum output current of 1.5A DC
The output resistant to short-circuit and overload.

4. SIGNAL DISTRIBUTION ON CONNECTORS

The layout of connectors is shown in the figure below.

Fig. 2 The layout of connectors on the PJP-04-02 unit

4.1.1. Control connection to the vehicle - connector X0

The connection of the control electronics supply + the connection of common HW IO signals.

X0:1	+24_L	Control part supply	PWR IN
X0:2	GND_L	Minus pole	PWR IN
X0:3	PIS	Sanding - the driver (direct HW sanding by the driver – a pedal)	IN 1
X0:4	SMER_A	Entered vehicle movement direction – Direction A (Potentially input – SKID_A - Traction inverter A – Skid)	IN 2
X0:5	SMER_B	Entered vehicle movement direction – Direction B (Potentially input – SKID_B - Traction inverter B – Skid)	IN 3
X0:6	/NB	Emergency brake (inverse signal)	IN 4
X0:7	REZ_1	Reserve	IN 5
X0:8	REZ_2	Reserve	IN 6
X0:9	REZ_3	Reserve	IN 7
X0:9	ERR	Error output	O 1

4.1.1. Sandbox 1 connection – connector X1, X10

X1 the connection of sandbox 1 blower

X1:1	+24_M1	Power supply (2.5mm^2 connector)	PWR IN
X1:2	GND_M1	Power supply (2.5mm^2 connector)	PWR IN
X1:3	PIS_M1+	Motor – blower	OUT M1
X1:4	PIS_M1-	Motor – blower	OUT M1
X1:5	PIS_SCH1	Shielding	

X10 the connection of sensors and heating of sandbox 1

X10:1	+24V_CID	Sand level sensor supply	PWROUT
X10:2	GND_CID	Connection of the negative pole of sand sensors	PWROUT
X10:3	MIN_CID1	Minimum level sensor – sandbox 1	IN11
X10:4	MAX_CID1	Maximum level sensor – sandbox 1	IN12
X10:5	PIS_TOP1	Sandbox heating output	OUT 11
X10:6	POT_TOP1	Sanding nozzle heating output	OUT 12
X10:7	GND_TOP1	Sandbox heating negative pole	
X10:8	GND_TOP1	Sanding nozzle heating negative pole	

4.1.1. Sandbox 2 connection – connector X2, X20

X2 the connection of sandbox 2 blower

X2:1	+24_M2	Power supply (2.5mm^2 connector)	PWR IN
X2:2	GND_M2	Power supply (2.5mm^2 connector)	PWR IN
X2:3	PIS_M2+	Motor – blower	OUT M2
X2:4	PIS_M2-	Motor – blower	OUT M2
X2:5	PIS_SCH2	Shielding	

X20 the connection of sensors and heating of sandbox 2

X20:1	+24V_CID	Sand level sensor supply	PWROUT
X20:2	GND_CID	Connection of the negative pole of sand sensors	PWROUT
X20:3	MIN_CID2	Minimum level sensor – sandbox 1	IN21
X20:4	MAX_CID2	Maximum level sensor – sandbox 1	IN22
X20:5	PIS_TOP2	Sandbox heating output	OUT 21
X20:6	POT_TOP2	Sanding nozzle heating output	OUT 22
X20:7	GND_TOP2	Sandbox heating negative pole	
X20:8	GND_TOP2	Sanding nozzle heating negative pole	

4.1. CAN - communication line – connector X5, X6

The unit is fitted with the CAN interface on the basic board. The CAN line exciter is galvanically separated. There is an input and output connector, DSUB type, 9 pins. The physical address of the device is set by pinning at the X5 DSUB connector of the female. See the figure.

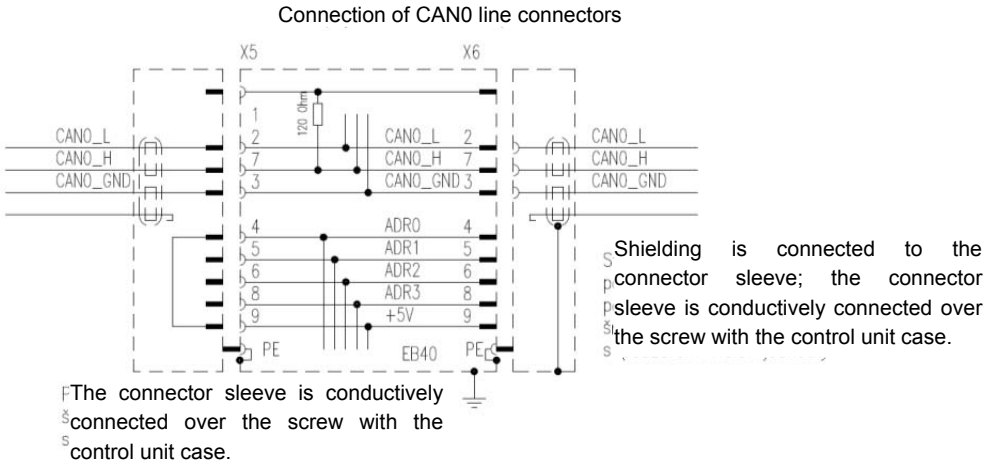


Fig. 3: Connection of CAN connectors

4.1.1. Addressing the Control Units of the Sanding System

ADR3	ADR2	ADR1	ADR0	ID_CAN
0	**0**	**0**	**1**	70 (0x46)
0	**0**	**1**	**0**	71 (0x47)
0	**1**	**0**	**1**	118 (0x76)
0	**1**	**1**	**0**	119 (0x77)

4.2. RS232 – Diagnostics and unit administration – connector X7

The RS232 interface for diagnostics, upgrade and the control unit administration

4.3. Indication LEDs

The following indication LEDs are fitted at connectors on the DPS printed circuit:
The indication of supply to the control part +24L
Error LED
Indication LEDs of individual input and output statuses

4.4. Grounding

The unit is fitted with an M6 grounding screw on the cover.

5. LIST OF PARAMETERS

The function of the control unit can be influenced by setting up the set of parameters. For example, it is possible to change the blower output for the given mode of sanding. The following table describes the list of parameters of the control unit. There are hidden parameters (S) and parameters marked P, which are accessible for the user. In general, parameters for the given type of drive, project and SW version are set by the drive manufacturer and parameters cannot be changed without manufacturer's knowledge. Parameters of the control system may only be changed by an authorized worker with the knowledge of the control system function and the sanding system.

Parameters can be set up by means of the PJPSetup programme. Parameters are protected with a password.

Parameter	Parameter description	Default
P1	Blocking of sanding at a speed lower than the value of the parameter. The set-up range is 1-7 km/h by 1 km/h	5
P2	Intensity of sanding under the full control by the driver. The set-up range is 10 - 24V by 1V.	20
P3	Intensity of sanding when the emergency brake is enabled. The set-up range is 10 - 24V by 1V.	20
P4	Intensity of full sanding. The set-up range is 10 - 24V by 1V.	20
P5	The maximum sanding time at the direct driver's request at a speed lower than set by parameter P1. The set-up range is 0 - 20s by 1y.	10
P6	The connection of the pipeline heating to the unit. 0 - OFF, 1 - ON.	1
S1	Number of sandboxes. 2 - two-unit sandbox, 4 - four-unit sandbox	2
S2	Output of blowers. The set-up range is 0 - 170W by 10W.	170
S3	Permission of control by a CANOpen protocol. 0 - CANOpen disabled, 1 - CANOpen enabled.	1

There is a separate table of blower output dependence on the speed of the vehicle which is applied at the request for sanding via CAN.

Speed [km/h]	Voltage on the blower motor [V]
>= 0	0
> P1	10
> 8	12
> 11	14
> 14	15
> 17	15
> 20	16
> 23	17
> 26	17
> 29	18
> 32	18
> 35	19
> 38	19
> 41	20
> 44	20
> 47	20

6. LIST OF EVENTS AND FAULTS

To diagnose the sanding system, the control unit saves 61 faults and statuses in the memory. Faults and statuses are classified in three categories - F – Fault, W – Warning, I – information. The table below gives a summary of faults and events. Faults and statuses can be calculated by PC by means of diagnostic tools. A fault and a status of the control unit is also indicated with a red ERR LED on the PCB at connector X0. An error is indicated according to the number of flashes. A long flash indicates tens and a short flash indicates units.

(F – Fault, W – Warning, I – information)

Event	Event description	
0	Restart (switching off) of the control unit	I
1	Unexpected restart of the control unit – watchdog.	W
2	Configuration of the control unit. This status occurs after connecting PC to the configuration SW.	I
3	Damage to parameters in the permanent memory.	F
4	Fault at recording to the data FLASH memory.	F
5	Internal SW fault in the control unit.	F
6	Short-circuit at the blower 1 output.	F
7	Short-circuit at the blower 2 output.	F
8	Short-circuit at the blower 3 output.	F
9	Short-circuit at the blower 4 output.	F
10	Overload at the blower 1 output.	F
11	Overload at the blower 2 output.	F
12	Overload at the blower 3 output.	F
13	Overload at the blower 4 output.	F
14	Zero current to blower 1.	F
15	Zero current to blower 2.	F
16	Zero current to blower 3.	F
17	Zero current to blower 4.	F
18	Low supply voltage (Un < 16.8V) to the logical part of the control unit.	W
19	Low supply voltage (Un < 16.8V) of sandbox 1.	W
20	Low supply voltage (Un < 16.8V) of sandbox 2.	W
21	Low supply voltage (Un < 16.8V) of sandbox 3.	W
22	Low supply voltage (Un < 16.8V) of sandbox 4.	W
23	High supply voltage (Un > 31.2V) to the logical part of the control unit.	W
24	High supply voltage (Un > 31.2V) of sandbox 1.	W
25	High supply voltage (Un > 31.2V) of sandbox 2.	W
26	High supply voltage (Un > 31.2V) of sandbox 3.	W
27	High supply voltage (Un > 31.2V) of sandbox 4.	W
28	Short circuit or overload at output V1 - Supply of sensors of sand level 1	W
29	Short circuit or overload at output V2 - Supply of sensors of sand level 2	W

30	Short circuit or overload at output V3 - Supply of sensors of sand level 3	W
31	Short circuit or overload at output V4 - Supply of sensors of sand level 4	W
32	Short circuit or overload at output O11 - The output of sandbox 1 heating	W
33	Short circuit or overload at output O21 - The output of sandbox 2 heating	W
34	Short circuit or overload at output O31 - The output of sandbox 3 heating	W
35	Short circuit or overload at output O41 - The output of sandbox 4 heating	W
36	Short circuit or overload at output O12 - The output of pipeline 1 heating	W
37	Short circuit or overload at output O22 - The output of pipeline 2 heating	W
38	Short circuit or overload at output O32 - The output of pipeline 3 heating	W
39	Short circuit or overload at output O42 - The output of pipeline 4 heating	W
40	Short circuit or overload at output OE1 ─ Error output	W
41	CANOpen address (node id) outside the range of 1 ─ 127.	W
42	Overflow of the CAN receive buffer.	W
43	Overflow of the CAN transmit buffer.	W
44	The superior CANOpen control system out of order.	W
45	User request	I
46	Minimum sand level in sandbox 1.	W
47	Minimum sand level in sandbox 2.	W
48	Minimum sand level in sandbox 3.	W
49	Minimum sand level in sandbox 4.	W
50	Disconnection of output V1 - Supply of sensors of sand level 1	W
51	Disconnection of output V2 - Supply of sensors of sand level 2	W
52	Disconnection of output V3 - Supply of sensors of sand level 3	W
53	Disconnection of output V4 - Supply of sensors of sand level 4	W
54	Disconnection of output O11 - The output of sandbox 1 heating	W
55	Disconnection of output O21 - The output of sandbox 2 heating	W
56	Disconnection of output O31 - The output of sandbox 3 heating	W
57	Disconnection of output O41 - The output of sandbox 4 heating	W
58	Disconnection of output O12 - The output of pipeline 1 heating	W
59	Disconnection of output O22 - The output of pipeline 2 heating	W
60	Disconnection of output O32 - The output of pipeline 3 heating	W
61	Disconnection of output O42 - The output of pipeline 4 heating	W

7. FUNCTION DESCRIPTION

7.1. Blower output control

The blower output is controlled by means of Pulse Width Modulation (PWM). The output can be set for every sanding mode independently by means of parameters. The set-up is performed by parameters and the value is given at [V], where the value corresponds to the voltage of the blower motor. The delivered sand quantity according to the set-up of the voltage on the blower motor corresponds to the sand quantity in the range of 750 g/30 s ÷ 1050 g/30 s. The output of the blower can also be set up depending on the speed of the vehicle.

7.2. System safety

As the sanding system is generally a safety system with the impact on the braking properties of the vehicle, the system also operates (although partially) at the failure of communication or a fault of the sanding control unit. This means that the basic control of blowers is carried out by means of a direct HW method with added SW blockages at functional control. The direct control is possible both by a HW instruction from the driver, and by the emergency brake. The condition is the functional supply to the controlling part and the power part of blowers. During the direct control by HW switching elements of the blower circuit are switched on and PWM is not applied.

7.3. Sanding configuration

The control unit of the sanding system is designed for operating 2 sanding devices. With regard to the fact that various projects differ in the number of fitted sandboxes, the current configuration for the given vehicle and the control unit of the sanding system is specified. The configuration is carried out via CAN. It is an eight-bit signal when every combination is assigned a functional profile of the control unit.

The following configuration applies to typical vehicle:

00000001 – Control unit 1 (Cell A)
sandboxes 1 and 2 are fitted
sandboxes 1 and 2 are intended for Direction A

00000010 – Control unit 2 (Cell B)
sandboxes 1 and 2 are fitted
sandboxes 1 and 2 are intended for Direction B

7.4. Direction selection

The currently selected travel direction is distinguished at two-way vehicles. For this purpose, two inputs on X0-4 SMĚR-A and X0-5 SMĚR-B connectors are used. The function of specific sandboxes is then enabled depending on the selected direction and the current configuration of the control unit.

Unless any direction is selected, or if both directions are selected, the function of all sandboxes is always enabled.

7.5. Speed of the vehicle

The control system gives the information about the current speed of the vehicle to the control unit via the CAN communication.

The control system of the sanding system uses the signal about speed especially for eliminating the sanding when the vehicle is in standstill and for controlling the sand quantity depending on the speed of the vehicle.
When the communication or the control unit of the sanding system is out of order, the relation to speed is not functional – the sanding system is functional without any limitation even at standstill.

7.6. Emergency brake

The information that the emergency brake has been enabled is transmitted to the control unit via the HW signal on the X0:6 PIS = 0 connector.

When the emergency brake is applied, depending on the status of control, the following is enabled:

- functional CAN communication – the full sanding of all sprayers according to the currently selected travel direction with the blocking of sanding according to the speed – blocking at a speed below the value set by P1 parameter.
- non-functional CAN communication – the full sanding of all sprayers according to the currently selected travel direction
- non-functional control unit of sandboxes – the full sanding of all sprayers.

The intensity of sanding when the emergency brake is applied is set by P3 parameter.

7.7. Driver's request

The information about driver's request for sanding is transmitted to the control unit via the HW signal via the X0:3 PIS = 1 connector.
When the driver gives a direct request, depending on the status of control, the following is enabled:

- functional CAN communication – the full sanding of all sprayers according to the currently selected travel direction with the blocking of sanding at vehicle standstill – blocking at zero speed lasting for more than 10s. It is set up by P5 parameter.
- non-functional CAN communication – the full sanding of all sprayers according to the currently selected travel direction
- non-functional control unit of sandboxes – the full sanding of all sprayers

The intensity of sanding at direct control by driver's request is set by P2 parameter.

7.8. Automatic sanding

The request for automatic sanding is transmitted from VCU (tram central control unit) to the control unit of the sanding system via CAN communication. The request is transmitted for individual sandboxes in two steps – normal sanding and intensive sanding.
On the basis of the request, the control unit of the sanding system enables sandboxes according to the currently selected travel direction with the blocking of sanding at vehicle standstill – blocking at zero speed lasting for more than 10s.

When the communication or the control unit of the sanding system is out of order, automatic sanding is not functional.
The intensity of automatic sanding depends on the speed of the vehicle. This means that the output of the blower is defined for individual speeds by the conversion table, see the parameters.

7.9. Sanding function indication

The control unit of the sanding system sends the information about the function of individual sandboxes back to VCU.

7.10. Heating of sandboxes

The heating of sandboxes is controlled by direct outputs from the control unit of the sanding system. The request for enabling the heating is transmitted from VCU to the control unit of the sanding system via CAN communication. For the cases of two-stage heating, or separated heating of the sand container and the pipeline, there are two outputs to heating on the unit per sandbox.

To reduce the consumption of the vehicle, the heating of the sanding system is automatically blocked during active sanding (blowers are running).

When the communication or the control unit of the sanding system is out of order, the heating of the sanding system is not functional.

7.11. Sand level sensing

The sanding system is equipped with a sand level sensor. The minimum sand level is sensed. The minimum quantity means approximately 1/3 of the sand quantity – the indication for a driver that it is necessary to replenish the sand). As an option, it is also possible to sense the maximum sand level (a full sandbox).

When the communication or the control unit of the sanding system is out of order, the sand quantity sensing is not functional.

Software correctness inspection

By means of the SHA-1 algorithm, the control unit of the sanding system generates a check fingerprint of the current software and the set of parameters (SHA-1 is an abbreviation for Secure Hash Algorithm variant 1 generating a check fingerprint with the length of 160 bits. The algorithm for creating the fingerprint is defined by FIPS 180-1.)

The calculation is carried out under the following conditions:

within the initiation procedure of the control unit, i.e. after connecting the control electronics to the supply of 24V, or

if VCU requires the calculation to be performed. After finishing the fingerprint calculation, the control unit enables the output attribute for 10s.

8. INSTALLATION INSTRUCTIONS AND REGULATIONS

8.1. Installation regulations

The position of the control unit is arbitrary but it is recommended to install it as close to sandboxes as possible. To ensure trouble-free operation of the control unit, sufficient space for air circulation must be ensured around the unit.

The control unit must be earthed by the connection between a quality grounding point and an grounding screw to the cover of the control unit. The M6 screw serves for grounding the unit.

The control unit has the IP20 protection. Therefore, the device must only be used at places where humidity from the outside cannot enter and where the protection against the entry of foreign objects is ensured. At any case the device must not be operated at places exposed to direct weather effects.

The supply lead to the control system for individual blowers must have the minimum conductor diameter of 2.5 mm^2. A 15A/T fuse or another comparable circuit-breaking element must be included in the supply line for every blower.

The motor of the blower must always be connected by means of a shielded cable.

The control unit may only be connected or disconnected from connectors when it is without voltage.

9. DIAGNOSTICS OF THE CONTROL UNIT

The PJP-04 control unit has numerous functions for saving and transmitting the diagnostic data. In general, the diagnostics of the control unit is divided to the Operating Diagnostics and the Service Diagnostics and the parameter administration. The diagnostics in the control unit should facilitate finding a fault in the sanding system.

9.1. Operating diagnostics

Operating diagnostic data re handed over to the information system of the vehicle via CAN communication in real time. It is limited set of attributes handed over in PDO objects which represents the status of the sanding system.

9.2. Service diagnostics and administration

Service diagnostic data are data handed over via CAN communication in extended PDO objects.

9.2.1. Current service data

Current service data are detailed data informing about the current status of the system (e.g. the current status of inputs, the current status of outputs). These data are not transmitted in the operating mode. They are transmitted upon request by means of PDO.

9.3. History of events

The control unit has an energy-independent memory which serves for saving the events. Events are saved when any event, warning or fault occurs. When an event is saved, the type of event and the real time of the event are recorded. The unit enables saving up to 50 latest events occurred. Older events are re-written.

9.4. Administration of parameters

The control unit is a partly configurable control system where a change of parameters can influence the behaviour of the sanding system (e.g. the blower output etc.). Parameters can be set up and changed by means of the PJPSetup programme.

Note that the parameters of the control system may only be changed by an authorized worker with the knowledge of the control system function and the sanding system. In general, parameters must not be changed without the sanding system supplier's knowledge. Parameters are set up during the prototype assembly.

10. DIAGNOSTIC TOOLS

10.1. DSP Programmer

The application intended for the upgrade of firmware in control units. An upgrade can be performed by means of the RS232 serial line or the CAN line. To programme the control units via CAN communication, a special converter must be used. A converter made by Systec is supported.

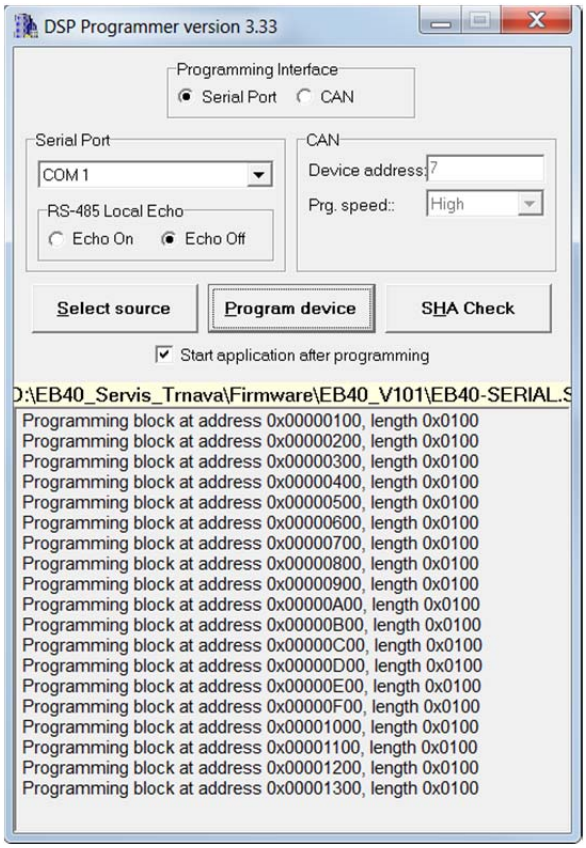


Fig. 4: DSP programmer

The DSP Programmer can also be controlled from the command line, which enables starting the programming by means of a batch as well.

- Command line parameters:
- f name of the source code file,
- s start of the programme in the control unit after programming (0 – no, 1 – yes),
- i interface (0 – serial port, 1 – CAN),
- c COM port number (serial interface number),
- r RS485 local echo (0 – echo off, 1 – echo on),
- a address of the equipment (1 - 127, CAN interface),
- b programming rate via the CAN line (0 – slow, 1 – medium, 2 – fast),
- h check sum of the SHA code (CAN interface only).

10.2. PJPSetup Programme

The PJPSetup programme enables:

- setting up and changing the parameters according to the table (the change of parameters is blocked by a password),
- record and save individual profiles with the set-up parameters,
- extract the latest 50 events,
- an extract of operating statistics.

PJPSetup supports the RS232 as well as CAN interfaces.

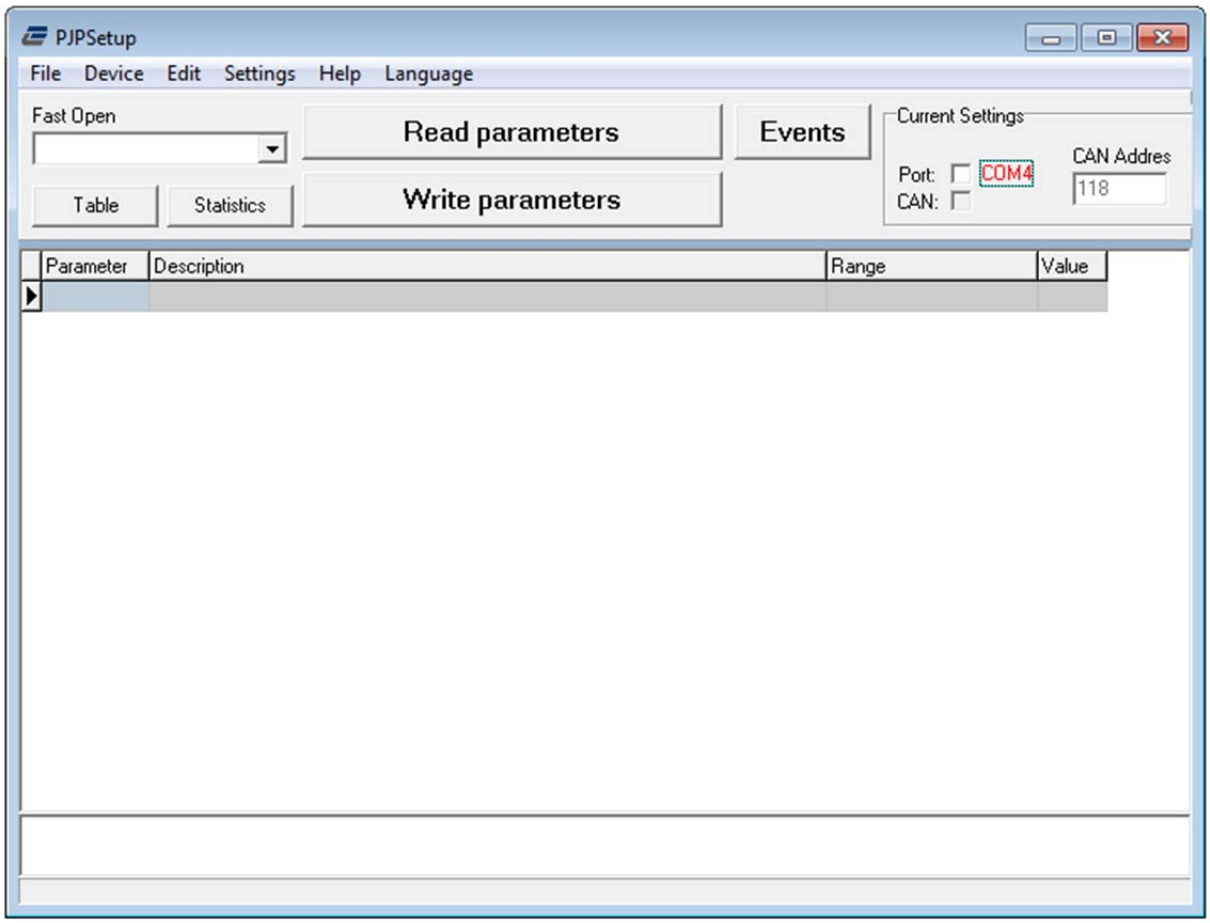


Fig. 5: A window of the PJP Setup programme

10.3. SDiagnostic

An application intended for on-line monitoring of the sanding system. It serves for debugging and detecting faults during a service intervention. It supports the RS232 interface.

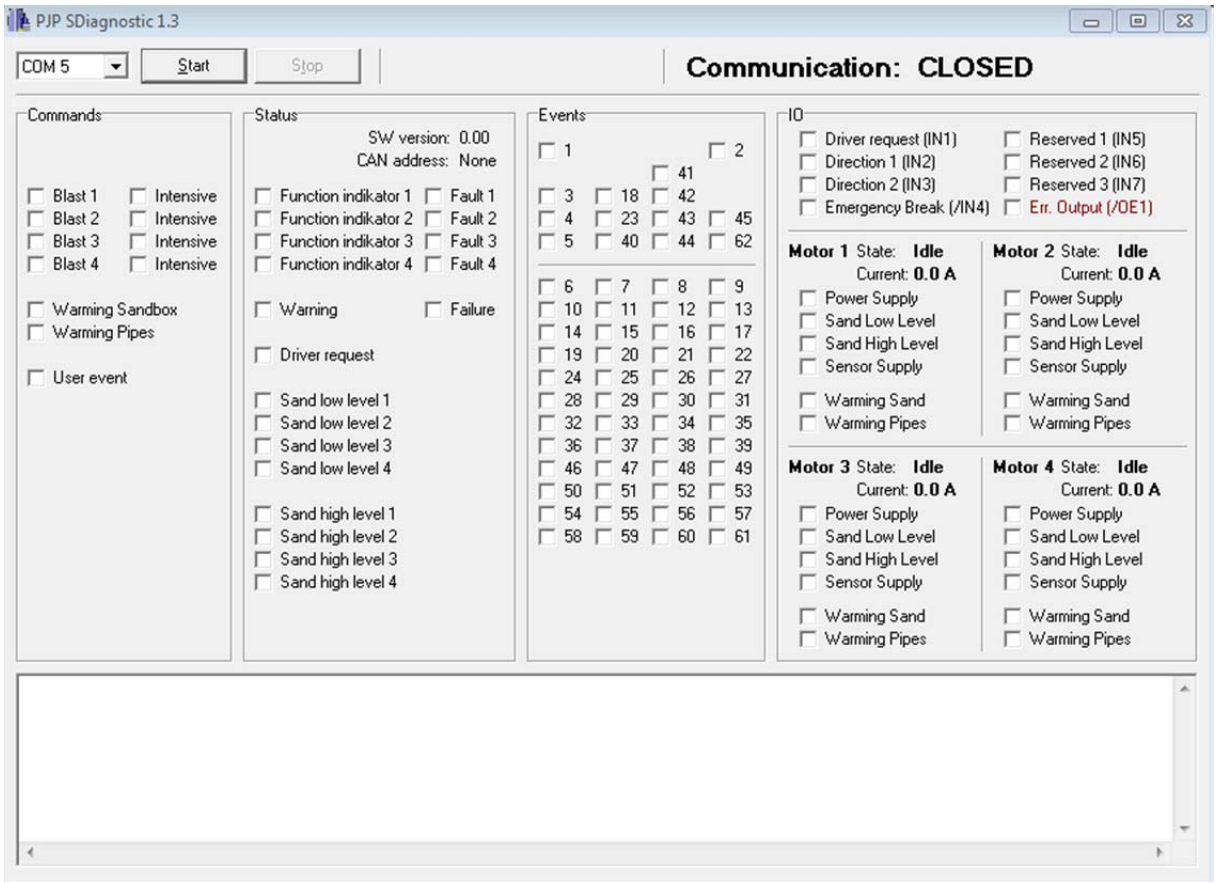
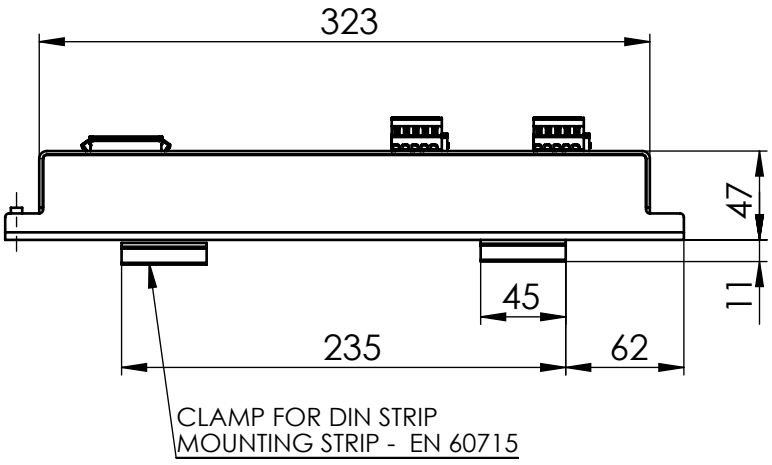
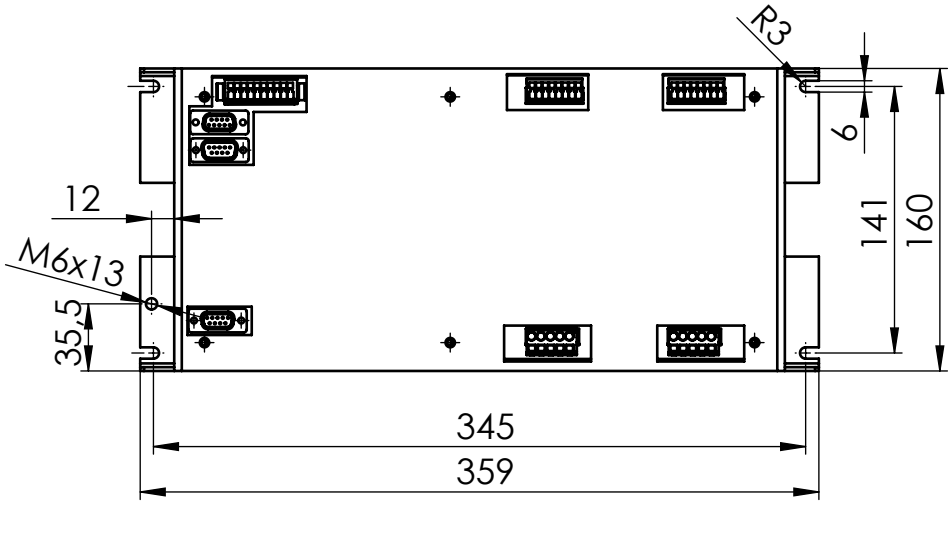


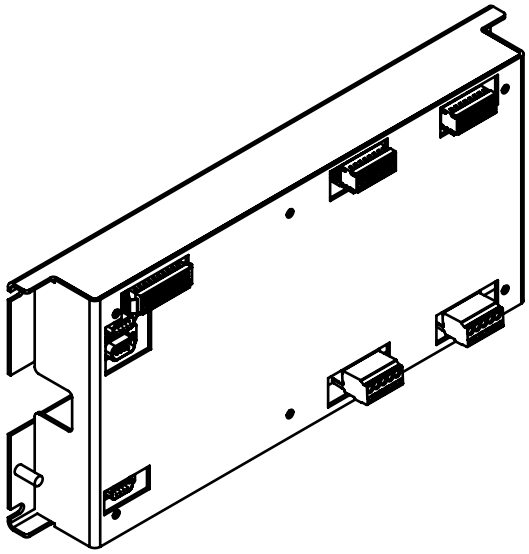
Fig. 6: A window of the PJP SDiagnostic programme

11. CHANGES

15/2/2013 - A correction of the address text in Chapter 11.1.1 Addressing the Control Units of the Sanding System – Ščudla.







WEIGHT: 1,6 Kg

Name:	Sanding control unit PJP-04-02			
Code:	386444411202	Page: 1	Pages: 1	TriboTec spol. s r.o. Košuličova 4 619 00 Brno
Designer: Kubec	Date: 2.3.2015	Sign:		