

SD-3000 SOLENOID DIAGNOSER USER'S MANUAL V4.2



INJECTRON

STYLE SUPPLY

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STYLE SUPPLY

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1. Preface

1.1. Symbols

The following symbols are used throughout this manual. Safety warnings must be strictly observed during operation.



Caution: Cautions describe conditions, activities, operations which could result in danger.



Note: Notes provide important supplementary information.

1.2. Handling

- Avoid any heavy impact on the device.
- Do not insert foreign objects into the connection sockets of the device.
- Do not allow water or other liquid to flow into the device or accessories
- Remove the battery to avoid the outflow of electrolyte damaging the circuit board if not using the device for a long time
- Use only the manufacturer specified battery
- Recycle exhausted battery by following the local environmental regulation.

2. Description

2.1. Function

The SD-3000 Solenoid Diagnoser is designed to diagnose faults for various solenoids on vehicles such as those on diesel engines with common rail, EUI/EUP, and HEUI fuel systems, and also injector solenoids on gasoline engines, and those used on EGR and after treatment systems.

The SD-3000 Diagnoser is a hand-hold portable device and its features are as the following.

- Diagnose engine solenoid faults on the site of a faulty vehicle, or at repairing shops and test labs
- Pre-installed database contents various solenoids data for most of engine solenoids on the market
- Check solenoid faults by measuring its resistance and inductance simultaneously and then comparing the test results with database reference data.
- Resistance resolution of 0.01ohm is much more accurate than a normal multimeter. The device is able to diagnose a solenoid with coil resistance 0.2 to 0.7 ohm, while a multimeter is not capable.
- User can add new solenoid data with new part number into the device database to expand its application
- Ambient temperature compensation to ensure accurate measurement in environment temperature range of -20 to 40°C.

2.2. Front Panel

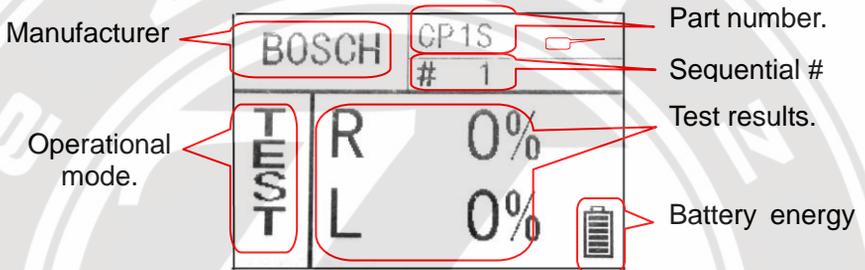


2.3. Back Panel



Battery
Compartment

2.4. LCD Screen



- The LCD screen top section is to identify component, which consists three items, name of manufacturers, part number, and sequential number.
 - 13 names of manufacturer have been preset
 - The part number is the combination of up to 10 letters and numbers. The user may add new part number or edit the part number created by user. However the part numbers of factory pre-installed data do not allow to be modified.
 - The sequential numbers are generated by the device according to the sequence of data recording, which is in the range from 1 to 100.
- The left side of the LCD screen is to indicate the operational modes, namely:
 - “TEST” mode
 - “EDIT” mode
 - “NEW” mode
- The main section of the LCD screen is to show the test results.
- The battery symbol is shown on the low right corner to indicate battery power remain.

2.5. Mini Key Pad

7-key mini-key pad for operating the device.



- **【MODE】** to switch "TEST", "EDIT" and "NEW" three operational modes in sequence .
- **【◀】 / 【▶】** and **【▲】 / 【▼】** , have two functions. Normal function under the "TEST" mode and to perform part number editing in "EDIT" and "NEW" operational modes.
- In "TEST" mode, the functions as:
 - 【◀】 / 【▶】** to choose manufacturers.
 - 【▲】 / 【▼】** to choose part numbers.
- When switched to "EDIT" or "NEW" mode, the initial function of **【▲】 / 【▼】** is still as part number selection. However, once the part number is determined, and a single press of **【◀】** or **【▶】** will alter the function

of **【◀】 / 【▶】** and **【▲】 / 【▼】** to part number editing, as:
【◀】 / 【▶】 to move cursor, or the position of character editing
【▲】 / 【▼】 to choose characters.

- **【START】** to start a measurement.
- **【SAVE】** to save measured data into database.

The operation procedure will be described in details later in this manual.

2.6. Build-in Database

The structure of the build-in database of the SD-3000 solenoid diagnoser as

- Preset 13 names of manufacturers, see table below.
- Up to 100 part numbers for each manufacturer
- Up to 10 characters of the combination of digits and capital letters to define each part number.
- A sequential number is assigned to each part by the system based on the saved sequence.
- The pre-installed part numbers DO NOT allow to be modified by user
- The user may edit the part number added by themselves.

Manufacturers and preinstalled part numbers in database.

Manufacturer	Sequential #	Amount of factory pre-installed parts
Bosch	1-100	31
Delphi	1-100	7
Denso	1-100	13
Caterpillar	1-100	8
Cummins	1-100	4
Siemens	1-100	2
DDC	1-100	3
Ford	1-100	1
Scania	1-100	1
Gasoline engine	1-100	1
User 1	1-100	0
User 2	1-100	1
User 3	1-100	1

The Appendix II shows the details of the pre-installed database contents.

2.7. Harnesses



One end is 2-pin quick connector to connect the instrument
The other end splits to 7 different connectors, to connect

- Bosch common rail injectors and pumps
- Delphi common rail injectors
- Delphi EUI E1 and E3
- Denso common rail injectors
- Cat HEUI injectors
- Alligator clamps for screw terminals
- Socket terminals

2.8. Specifications

Power: 2 AA alkaline batteries

Profile dimension (Height × Width × Thickness): 135×67×25 mm

Net weight: 200 g

Package weight: 400g

Operation temperature: -10~50℃

3. Operation

3.1. Test a Solenoid

- Connect the diagnoser and the target component with measurement cable harnesses. Ensure the contacts of solenoid terminals and cable clamps are firm and reliable, then perform the procedure below.
- Turn on **【POWER】** switch of the Solenoid Diagnoser.
- The default is **“TEST”** mode as power turns on. Otherwise press **【MODE】** key to select **“TEST”** mode. The LCD screen shows **“TEST”**.

BOSCH		CP1S
		# 1
TEST	R	0%
	L	0% 

“TEST” Mode



Power-ON screen. The power-ON operational mode of this device is always **“TEST”**. As the device being turned-ON power the first time by the user after the purchase, the manufacturer on screen should be **“BOSCH”** and the part number **“CP1S”** with

sequential # "1". After the first use, the manufacturer and part number on the power-ON screen should be those being tested before last power-OFF.

- Press 【◀】 or 【▶】 key to choose the target manufacturer..
- Press 【▲】 or 【▼】 key to choose the target part number.
- Press 【START】 key to start solenoid test. The right side of “R” and “L” are the relative values of measured resistance and inductance of the target solenoid. 100% indicates the measured value is equal to the standard value in database. >100% indicates the measured value is greater than that in database; while <100% indicates the measured value is less than that in database.

BOSCH		0445120293
		# 20
TEST	R	100%
	L	100% 

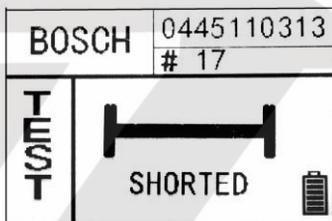
Solenoid is normal

BOSCH		0445120293
		# 20
TEST	R	88%
	L	92% 

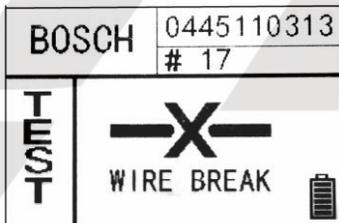
The tested results differ slightly from database values, which indicate

that the solenoid has minor damage.

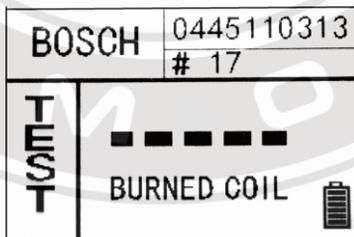
The device will display the followings symbols to indicate the apparent fault being detected for the target solenoid.



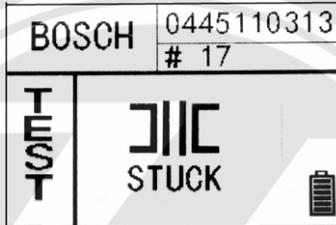
Solenoid shorted



Solenoid wire broken



Solenoid coil burned



Solenoid valve stuck

Tips to judge the faults of measured solenoid

"R"	"L"	Faults
>200%	0	Coil broken wire
<0.04 Ohm	0	Coil short circuit
<80%	<80%	Coil partial burned
100%	>130%	Solenoid core gets struck



If the measured values are inconsistent for repeated tests, then the contacts between the probes or clamps of the Diagnoser cable and the solenoid terminals should be reconfirmed to ensure secure contacts.



The choices of manufacturer and part number on the Solenoid Diagnoser have to be matched with the target component to ensure the correctness of the test results.



The measured results are different for solenoid on injector or pump as assemblies, or solenoid alone, which is removed from the assemble, especially the inductance. Unless mentioned specially, all factory pre-installed data in the database are those measured from injector or pump assembly, User may add new data for the solenoid alone as needed

3.2. Add New Solenoid into Database

Connect the target solenoid to the SD-3000 Solenoid Diagnoser.

3.2.1. Choose Target Manufacturer

- Set operational mode as “**TEST**” .
- Under "**TEST**" mode, press **【◀】** / **【▶】** key to choose target manufacturer.
- Once the target manufacturer being determined, press **【MODE】** to switch to "**NEW**" mode, which should be displayed on LCD screen.
- The part sequential number should jump to the current maximum sequential number+1. The first character of the part number is displayed as "0".

BOSCH		0	
		# 32	
NEW	R	0%	
	L	0%	

“NEW” mode, sequential “#32” = maximum sequential number+1

3.2.2. Setup a New Part Number

Two ways to setup a new part number, either created a brand new number or edited from an existing part number in database

1) Input a brand new part number

- Choose the target manufacturer under "TEST" mode. Then switch to "NEW" mode.
- Under "NEW" mode, press **【◀】** or **【▶】** immediately by a single shot to alter the function of keys, **【◀】 / 【▶】** and **【▲】 / 【▼】**, to part number editing.
- The flicking cursor under first character "0" should appear.
 - **【◀】 / 【▶】** to move the cursor.
 - **【▲】 / 【▼】** to select characters, namely 10 digits "0-9", 26 capital letters and a symbol "-".

BOSCH		12345
		# 32
NEW	R	18%
	L	26%
		

Set a brand new part number. Then test a solenoid.

2) Editing an exist part number

- Choose the target manufacturer under "TEST" mode. Then switch to "NEW" mode.
- Under "NEW" mode, press **▲** / **▼** to choose the part number in database similar to the target. The sequential # of the target part number appears on the screen.
- Once a part number is chosen, press **◀** or **▶** a single stroke, then the function of the keys, **◀** / **▶** and **▲** / **▼**, is altered to part number editing. The sequential # of the target part number will be changed to that for the new part, i.e. the current maximum part sequential #+1.
- Pressing **▲** / **▼** to select characters for each cursor position, and **◀** / **▶** to move cursor position.

3.2.3. Data Sampling and Result Saving

- After completion of the part number editing, press **START** to trigger data sampling. The actual measured results of resistance and inductance should be displayed on the LCD screen after "R" and "L" respectively. To ensure the correctness of the test results, the user may press **START** repeatedly to measure the solenoid a few times, and choose a more reliable results. If the measurement varies significantly, then the contacts of the device and the solenoid terminals should be double checked.

BOSCH		1445120293
		# 32
NEW	R	19%
	L	26% 

Solenoid sampling is success. The new part number is obtained from editing existing part number 0445120293, sequential #20. The "R" and "L" values are the actual measured results.

- After data sampling, the part number may be changed if necessary.
- Press **【SAVE】** to save the data, including test results of resistance and inductance plus the part number, of the newly added solenoid in to database. Once the data being saved successfully, the values of "R" and "L" should be all "0s".

BOSCH		1445120293
		# 32
NEW	R	0%
	L	0% 

New solenoid data have been saved in to database successfully.

3.2.4. Verification of the newly added data

- Connect the newly added component to Solenoid Diagnoser.
- Switch to "TEST" mode. Choose the target manufacturer. Choose the newly added part number.
- Pres **【START】** to trigger a measurement. In case the relative values of "R" or "L" are far away from the 100%, the contacts of

Solenoid Diagnoser probes and the terminals of the new component should be double checked to ensure the secure contacts. If the test results are still not "100%", then the data in database need to be modified by the "EDIT" mode operation, of which the procedure will be described later in this manual.

- Once the newly saved data in database are well matched with the verification test results, the new data in the database should be treated as reliable reference for testing the same component later.

BOSCH		1445120293
		# 32
TEST	R	100%
	L	100% 

The newly added component has been verified.



Database alternation. No alternation is allowed for the factory pre-installed data in database. The user added data to the database are able to be changed. However, the new data will cover the previous ones irreversibly and may not be recovered. Therefore, it should pay careful attention to alter the data in database.



Verification after adding new data into database. The verification is absolutely necessary to ensure the correctness of the new data after new component being added into database.

3.3. Editing Solenoid Data

The user added solenoid data may be modified as following:

- Set "TEST" mode by pressing **【MODE】**.
- Press **【◀】 / 【▶】** to choose target manufacturer.
- Press **【MODE】** again to switch to "EDIT" mode.
- Press **【▲】 / 【▼】** to choose the target part number. The "R" and "L" values on the LCD screen are the respective database values for current chosen solenoid.
- Once the target part number is determined, press **【◀】** or **【▶】** a single stroke, and then alter the function of **【◀】 / 【▶】** and **【▲】 / 【▼】** to part number editing. The sequential # for the target part keeps the same.

BOSCH		1445120293
		# 20
E D I T	R	19%
	L	26% 

"EDIT" mode displays database values for the current solenoid chosen, and the cursor at the first character position

-
- Press **【◀】 / 【▶】** to move the cursor position and **【▲】 / 【▼】** to select the character for the current cursor position.
 - In case only the part number needs to be modified, then press **【SAVE】** to save the newly edited part number to database, after completion of part number editing.
 - In case the measured results of "R" / "L" should be modified also, the target solenoid needs to be connected to the device. Then press **【START】** to trigger a measurement, the actual measured values of "R" and "L" will be displayed on the LCD screen. The user may measure the solenoid a few times to ensure the correctness of measurement. If the measured results are not stable, the contacts between the solenoid terminals and the harness probes should be re-checked, then test again.
 - Once the test results are satisfied, press **【SAVE】** to save both the newly edited part number and newly measured "R" / "L" results in to database.
 - Once the data are saved successfully, the values of "R" and "L" should be all "0s".



"EDIT" Mode. Initially all data in database are factory pre-installed, which are not user editable. Therefore, initially only "TEST" and "NEW" two modes available by pressing **【MODE】** . After new data have been added into database by user, the "EDIT" mode may be appeared to perform solenoid data modification for the manufacturer with user added data.



Choose "Manufacturer". In order to complete the operation for "EDIT" or "NEW" modes, the first step should be choose manufacturer under "TEST" mode. And then switch to "EDIT" or "NEW" mode to do the rest steps.



Function altering for [◀]/[▶] and [▲]/[▼].
The initial function of [▲] / [▼] are still part number selection under "EDIT" or "NEW" modes, the same as in "TEST" mode. So that the first step is to choose the target part number after switched to "EDIT" or "NEW" modes. Once the target part number is determined, the function of [◀] / [▶] and [▲] / [▼] should to be altered to part number editing by pressing [◀] or [▶] a single shot.

3.4. Battery Management

SD-3000 Solenoid Diagnoser is designed to measure solenoid resistance as low as 0.2 ohm, for which is a relatively power hungry test. In order to extend battery life, the following ways are adopted

- In case no key operation exceeds 30 seconds, the LCD back light will be shut off automatically. Any key stroke after will re-ignite the LCD back light. The content of the LCD screen will be no effect during the LCD back light Off - On process.



In case no key operation exceeds 30 seconds, the LCD back light will be shut off automatically. Any key stroke later will re-ignite the LCD back light.

- In case no key operation exceeds 3 minutes, the power of the instrument will be turned OFF automatically. The user should manually turn OFF and ON by using the power switch to re-power the instrument.



In case no key operation exceeds 3 minutes, the power of the instrument will be turned OFF automatically. The user should manually turn OFF and ON by the power switch to re-power the instrument.

- After the instrument is turned ON, the remaining energy of the battery will be checked periodically and the result is displayed at the low right corner. Once the battery is exhausted and not able to do the required measurement, the LCD screen will show a sign of "**CHANGE BATTERY**" and the instrument will not respond to any key stroke. After new battery being replaced, the instrument should be functioned normal again.

BOSCH		0445110134
		# 31
TEST	CHANGE BATTERY	
		

Battery has been exhausted.

4. Package List

Solenoid Diagnoser	SD-3000	1 unit
Main harness	One end is 2-pin quick connector to connect the instrument The other end splits to 7 different connectors	1 set
Battery*	AA	2 pcs
User's manual	V4.2	1 copy

Note: Due to the regulation of airline transportation, batteries are not allowed to include in the package. In such case, the package will not have the two AA batteries.

The contents should be checked carefully after opening the product package first time. You may need to contact Injectronix or the representative immediately with evidence if there are any parts missing or damaged, or wrong part in the package.

5. Warranty

- Injectronix will replace free of charge any SD-3000 Solenoid Diagnoser , which fails in use within a time period of one (1) year from the date of delivery due to faulty material or workmanship, as determined by Injectronix.
- This warranty does not cover any coincidental or consequential damages of the SD-3000 Solenoid Diagnoser.
- During the warranty period, Injectronix is not liable for any losses or damages of any kind resulting from the improper use of this product, and user charges for the repair cost.
- After the warranty period, user charges for the repair cost.
- Injectronix provides life-long technical support by telephone for the SD-3000 Diagnoser free of charge.

Appendix I: Trouble Shooting

Problems	Solution
No display on the LCD screen or no response to key operation.	<ol style="list-style-type: none"><li data-bbox="402 360 804 386">1. Check if the battery is installed.<li data-bbox="402 392 905 418">2. Check 【POWER】 switch is turned on.<li data-bbox="402 423 880 450">3. Check and secure battery connection.
Inconsistent measurement results	Check and secure the contacts of Solenoid Diagnoser and the solenoid terminals.
The device is soaked into water.	<ol style="list-style-type: none"><li data-bbox="402 540 870 567">1. Turn off the 【POWER】 immediately.<li data-bbox="402 572 785 625">2. Remove the batteries from its compartment.<li data-bbox="402 630 926 683">3. Dry the device in nature convection, don't use electrical blower.

Appendix II: Factory Pre-installed Data

Tables of Factory Pre-Installed Data in Database

	On Solenoid Diagnoser LCD			Applications
	Maker	#	Part Number	
CR PUMP	BOSCH	1	CP1S	0445020002
	BOSCH	2	CP1H	0445010182
	BOSCH	3	CP3	0445020007
	DENSO	1	HPO1	094000-039
	DELPHI	1	CRSP	R90442170A
	SIEMENS	1	DCP-INLET	5WS40094, DCP(INLET)
	SIEMENS	2	DCP-OUTLET	5WS40094, DCP(OUTLET)
CR INJECTOR	BOSCH	4	CR12-0	LD CR INJECTOR
	BOSCH	5	CR12-1	LD CR INJECTOR
	BOSCH	6	CR13A	LD CR INJECTOR
	BOSCH	7	CRIN1	HD CR INJECTOR
	BOSCH	8	CRIN2	HD CR INJECTOR
	BOSCH	9	0445110291	LD CR INJECTOR
	BOSCH	10	0445110333	LD CR INJECTOR
	BOSCH	11	0445120078	HD CR INJECTOR
	BOSCH	12	0445120224	HD CR INJECTOR
	BOSCH	22	0445110313	LD CR INJECTOR

	On Solenoid Diagnoser LCD			Applications
	Maker	#	Part Number	
CR INJECTOR	BOSCH	23	0445120227	HD CR INJECTOR
	BOSCH	24	0445120086	HD CR INJECTOR
	BOSCH	25	0445120293	HD CR INJECTOR
	BOSCH	26	0445120292	HD CR INJECTOR
	BOSCH	27	0445120123	HD CR INJECTOR
	BOSCH	28	0445120265	HD CR INJECTOR
	BOSCH	29	0445120120	HD CR INJECTOR
	BOSCH	30	0445120304	HD CR INJECTOR
	BOSCH	31	0445120121	HD CR INJECTOR
	BOSCH	32	0445120213	HD CR INJECTOR
	BOSCH	33	0445120170	HD CR INJECTOR
	BOSCH	34	0445110356	HD CR INJECTOR
	BOSCH	35	B445110713	HD CR INJECTOR
	BOSCH	36	0445110134	HD CR INJECTOR
	DELPHI	2	EJBR05301D	LD CR INJECTOR
	DELPHI	3	EJBR04901D	LD CR INJECTOR
	DENSO	2	05H00336	HD CR INJECTOR
	DENSO	3	9880/479	HD CR INJECTOR
	DENSO	4	5941	HD CR INJECTOR
	DENSO	5	5474	HD CR INJECTOR

	On Solenoid Diagnoser LCD			Applications
	Maker	#	Part Number	
CR INJECTOR	DENSO	6	5394	HD CR INJECTOR
	DENSO	7	5801	HD CR INJECTOR
	DENSO	8	7060	HD CR INJECTOR
	DENSO	9	8903	HD CR INJECTOR
	DENSO	10	5471	HD CR INJECTOR
	DENSO	11	5511-4152	HD CR INJECTOR
	CUMMINS	3	4327072	ISL CR INJECTOR
	CUMMINS	4	4307475	ISG CR INJECTOR
EUI	BOSCH	13	EUI-JDP	John Deer, JDP59517
	BOSCH	14	EUI-VOLVO	Volvo D12A, 0414702007
	BOSCH	15	EUI-Audi	VW B417010340
	BOSCH	16	EUI-VW	0414720404
	BOSCH	17	EUICURS0R8	Cursor 80986441002
	CUMMINS	1	EUI-N14	3411761X
	CUMMINS	2	EUI-M11	4061851
	CAT	1	EUI-3176A	10R0968
	CAT	2	EUI-3176C	OR9594XC8
	CAT	3	EUI-3500	10R1279
	CAT	4	EUI-3406E	1189035
DELPHI	4	LANDROVER	BEBE2A01001	

	On Solenoid Diagnoser LCD			Applications
	Maker	#	Part Number	
EUI	DELPHI	5	EUI-E1	20440388
	DELPHI	6	EUI-E3-PCV	(PCV) 76269502
	DELPHI	7	EUI-E3-NCV	E3(NCV) 76269502
	DDC	1	EUI-S60N2	5234970X
	DDC	2	EUI-S60N3	414703002
	DDC	3	EUI-S92	
	SCANIA	1	0414701008	DC/DSC
EUP	BOSCH	18	OM900	
	BOSCH	19	OM460	MTU/DDC S20000050706301
	BOSCH	20	Deutz1013	0414750004
	BOSCH	21	Deutz2015	0414755016
	USER2	1	WP20-50104	Wit EUP Pump
HEUI	CAT	5	HEUI-3076	Ford 7.3L, CAT3076 AA1821836
	CAT	6	HEUI-3408	3408/3412, 04108174-752604
	CAT	6	INJ-C7-C9	238-8091
	CAT	8	PUMP-C7-C9	C7/C9 High Pressure Pump
	FORD	1	HEUI-6L	Ford 6.0L W23537000
Gas	GAS	1	06A906031AS	Audi Injector