



FOREWORD

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2011.50 Ranger

Workshop Manual

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VEHICLE APPLICATION: 2011.50 Ranger

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DESCRIPTION AND OPERATION

About This Manual

Introduction

This manual covers diagnosis and testing and repair procedures.

This manual is structured into groups and sections, with specific system sections collected together under their relevant group.

A group covers a specific portion of the vehicle. The manual is divided into five groups, General Information, Chassis, Powertrain, Electrical and Body and Paint. The number of the group is the first number of a section number.

Within Etis, the navigation tree will list the groups. After selecting a group the navigation tree will then list the sections within that group. Each section has a contents list detailing Specifications, Description and Operation, Diagnosis and Testing, General Procedures, Disassembly and Assembly, Removal and Installation.

If components need to be removed or disassembled in sequence, the sequence will be identified numerically in a graphic and the corresponding text will be numbered accordingly.

All left-hand and right-hand references to the vehicle are taken from a position sitting in the driver seat looking forward.

All left-hand and right-hand references to the engine are taken from a position at the flywheel looking towards the front camshaft pulley.

How to Use This Manual - Repair Procedures

This manual has been written in a format that is designed to meet the needs of technicians worldwide. The objective is to use common formats and include similar content in each manual.

This manual provides general descriptions for accomplishing diagnosis and testing, service and repair work with tested, effective techniques. Following them will help assure reliability.

Special Tools

The special tool(s) table provided at the beginning of each procedure shows all special tools required to carry out a repair. Where possible, illustrations

are provided to assist in identifying the special tool required.


Important Safety Instructions

Appropriate service methods and correct repair procedures are essential for the safe, reliable operation of all motor vehicles as well as the personal safety of the individual carrying out the work.

This manual cannot possibly anticipate all such variations and provide advice or cautions as to each. Anyone who departs from the instructions provided in this manual must first establish that he compromises neither his personal safety nor the vehicle integrity by his choice of methods, tools or components.

Warnings, Cautions and Notes in This Manual

 **WARNING: Warnings are used to indicate that failure to follow a procedure correctly may result in personal injury.**

 **CAUTION: Cautions are used to indicate that failure to follow a procedure correctly may result in damage to the vehicle or equipment being used.**

NOTE: Notes are used to provide additional essential information required to carry out a complete and satisfactory repair.

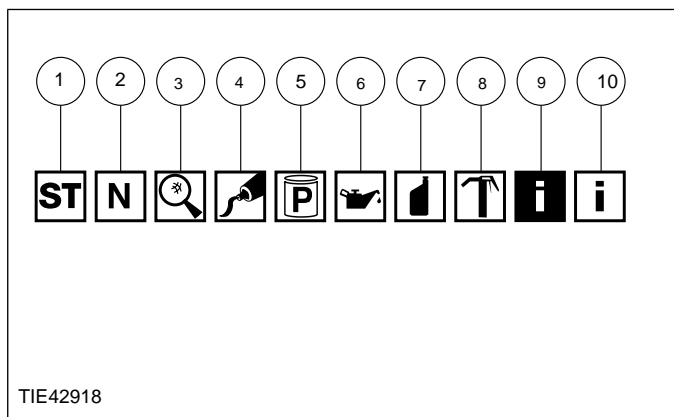
A warning, caution or note is placed at the beginning of a series of steps if it applies to multiple steps. If the warning, caution or note only applies to one step, it is placed at the beginning of the specific step (after the step number).

Overview Procedures

Overview procedures contain an exploded view illustration(s). The numbered sequence within the illustration(s) indicate the order to be followed when removing/disassembling or when installing/assembling a component. Additional information, symbol(s) or a torque figure, may also be shown alongside the component.

There are ten symbols used to give additional information when removing/disassembling or when installing/assembling a component.

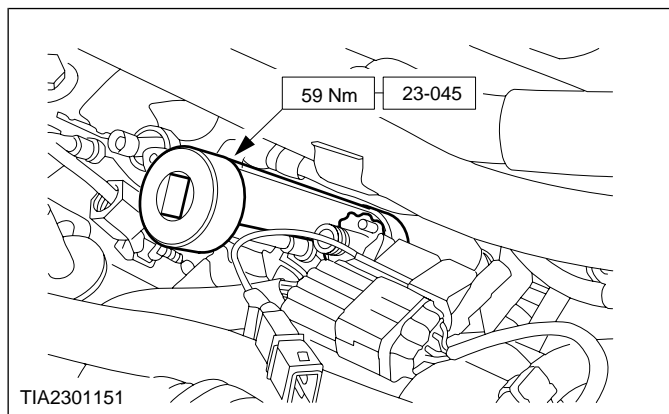
DESCRIPTION AND OPERATION



Item	Designation	Description
1	Special tool	A special tool is required for this component. There will also be a removal or installation tool symbol alongside the special tool symbol.
2	Install new component	Discard the old component and install a new component.
3	Inspect	Check the component for damage.
4	Apply sealant	Apply sealant to the component as specified in the materials table.
5	Apply petroleum jelly	Apply petroleum jelly to the component as specified in the materials table.
6	Apply oil	Apply oil to the component as specified in the materials table.
7	Apply fluid	Apply fluid to the component as specified in the materials table.
8	Apply grease	Apply grease to the component as specified in the materials table.
9	Removal or Disassembly detail	Go to the removal or disassembly detail for additional information to remove or disassemble a component
10	Installation or Assembly detail	Go to the installation or assembly detail for additional information to install or assemble a component

Special Tools and Torque Figures

Any requirement for special tools will picture the tool, showing it in use and with its tool number shown. Torque settings will be given at the relevant point in the procedure.



DESCRIPTION AND OPERATION

Trustmark Authoring Standards (TAS) Procedures

NOTE: TAS style procedures can be identified by steps that have no accompanying step text and the magenta color of the electrical connectors and fasteners such as nuts, bolts, clamps or clips.

A TAS removal and installation procedure uses a sequence of color illustrations to indicate the order to be followed when removing/disassembling or installing/assembling a component.

Types of self-locking nuts and bolts

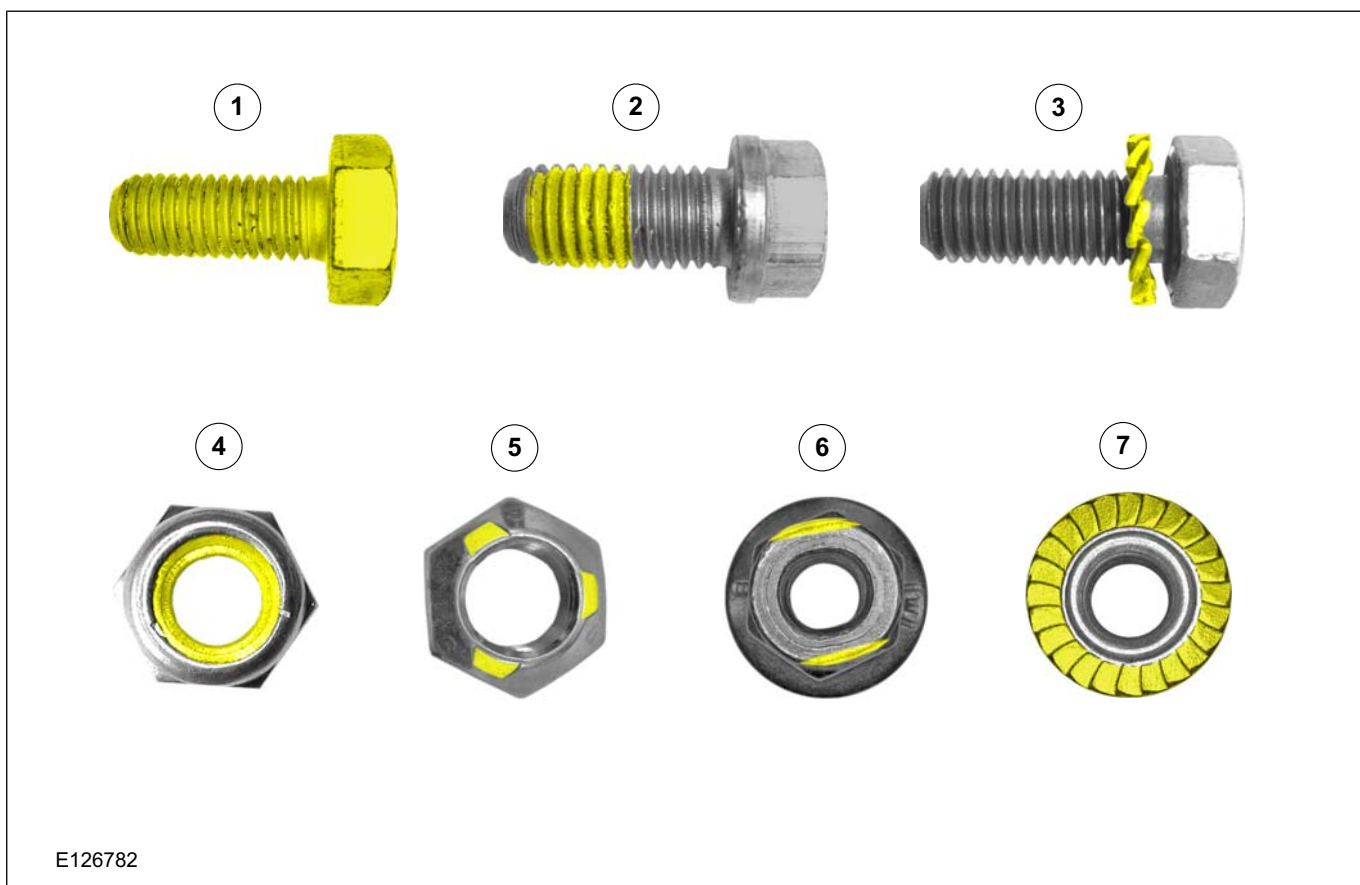
NOTE: There are more types of self-locking fasteners available than shown in following illustration.

Many of the TAS procedures will have the installation information within the removal steps. These procedures will have the following note at the beginning of the procedure:

NOTE: Removal steps in this procedure may contain installation details.

Reuse of fasteners and seals and gaskets

The following list details the general policy for the reuse of fasteners and seals and gaskets.



E126782

Item	Description
1	Completely coated self-locking bolt
2	Partially coated self-locking bolt
3	Self-locking bolt with a locking washer
4	Self-locking nut with a plastic locking insert
5	Self-locking nut with thread deformation (3 dents)
6	Self-locking nut with thread deformation (squeeze of thread to oval shape)
7	Self-locking nut with integrated locking ring

- All types of seals and gaskets must be discarded and new seals and gaskets installed unless otherwise stated within the procedure.
- Nuts and bolts with a chemical coating for locking and/or sealing and/or antiseize must be discarded unless the procedure advises to reapply the coating with a specified material.
- Nuts and bolts with a mechanical locking such as thread inserts, thread deformation or locking washers must be discarded and new nuts and bolts installed unless otherwise stated within the procedure.
- Torque to yield bolts must be discarded and new torque to yield bolts installed unless

DESCRIPTION AND OPERATION

otherwise stated within the procedure, recognizable by a tightening torque with more than one stage together with a torque angle.

Specification procedures will contain all technical data that are not part of a repair procedure.

Reuse of exterior trim parts

All type of glued exterior trim parts or parts fastened with adhesive tape must be discarded and new parts installed unless otherwise stated within the procedure.

TAS Graphics

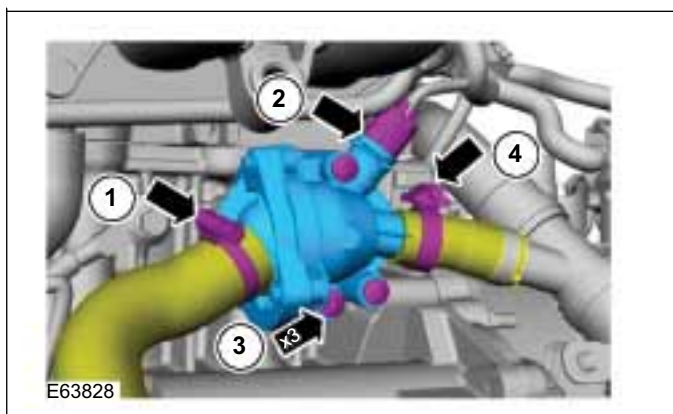
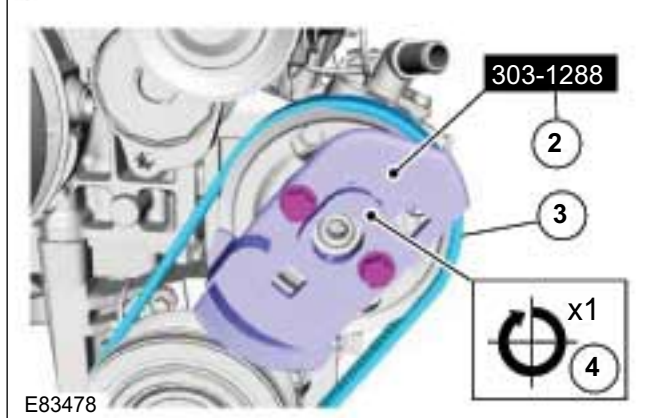
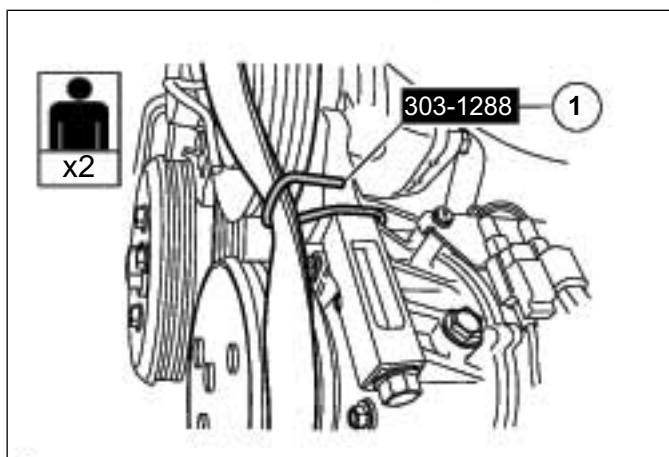
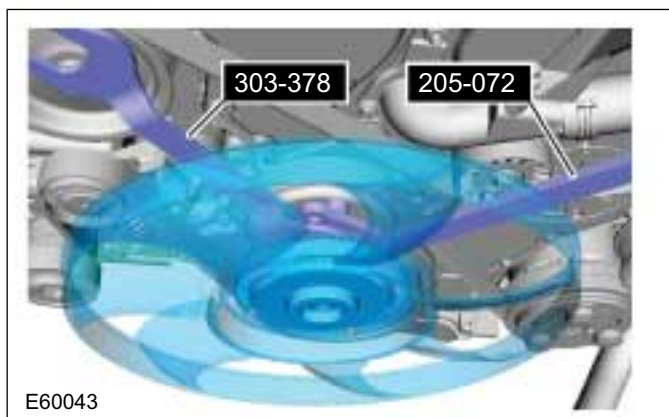
Colors used in the graphic are as follows:

- Blue - Indicates the target item, item to be removed/installed or disassembled/assembled
- Green and Brown - Indicates a secondary item that needs to be detached, removed/installed or disassembled/assembled prior to the target item
- Yellow - Component that is touched or affected in a way but remains in the vehicle. It may be detached, attached, moved, modified, checked, adjusted etc.
- Magenta - Indicates electrical connectors and fasteners such as nuts, bolts, clamps or clips
- Pale Blue - is for the special tool(s) and general equipment

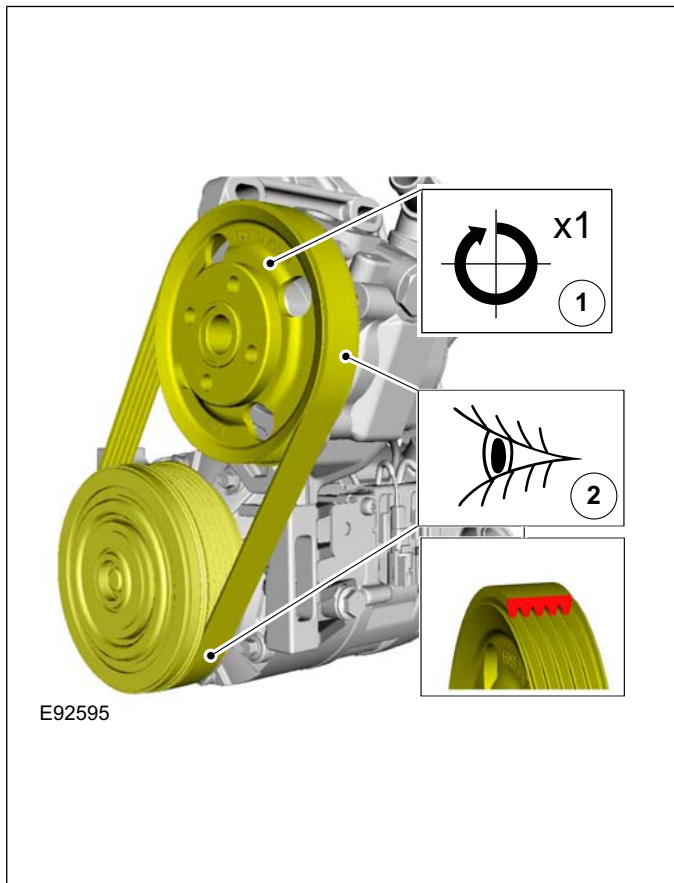
One illustration may have multiple steps assigned to it.

Numbered pointers are used to indicate the number of electrical connectors and fasteners such as nuts, bolts, clamps or clips.

Items in the illustration can be transparent or use cutouts to show hidden detail(s).



DESCRIPTION AND OPERATION



TAS Symbols

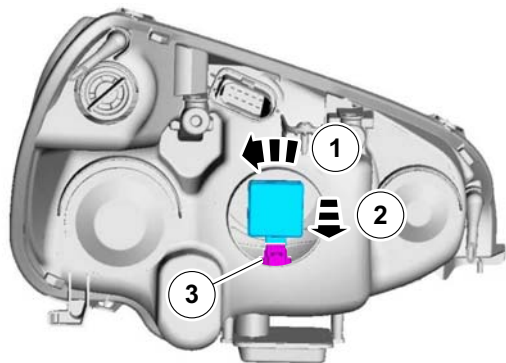
Symbols are used inside the graphics and in the text area to enhance the information display. The following paragraphs describe the various types and categories of symbols.

Prohibition symbols advise on prohibited actions to either avoid damage or health and safety related risks.



DESCRIPTION AND OPERATION

Health and Safety symbols recommend the use of particular protection equipment to avoid or at least reduce the risk or severity of possible injuries.

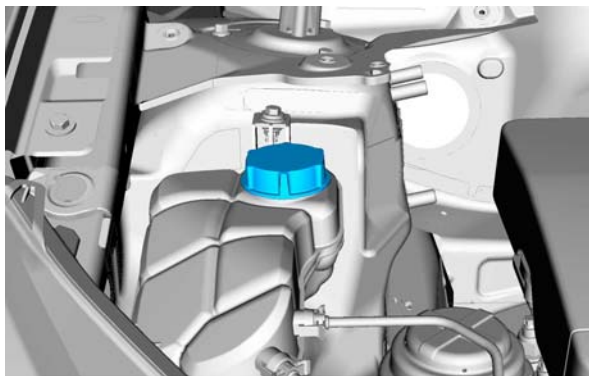


E85027

Warning symbols are used to indicate potential risks resulting from a certain component or area.



DESCRIPTION AND OPERATION



E85028

Instruction symbols are used to apply sealer, lubricant, weight, tape or cleaning detergent to a component.





DESCRIPTION AND OPERATION

E84834

Location symbols are used to show the location of a component or system within the vehicle.

E84835

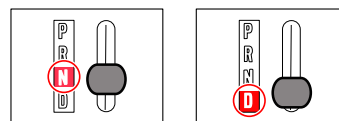
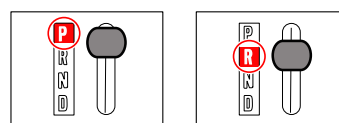
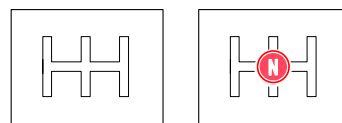
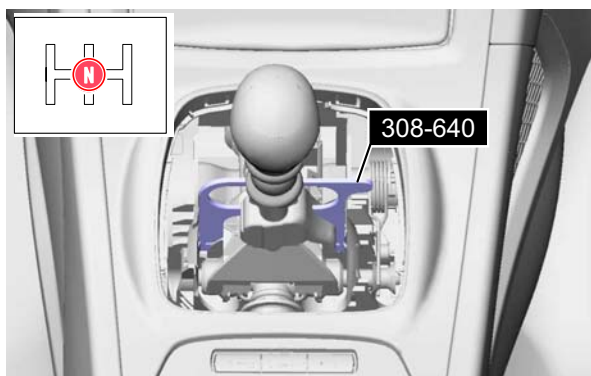




DESCRIPTION AND OPERATION

Gearshift lever or selector lever position symbols are used to show which gearshift lever or selector

lever position is to be set.



E84836

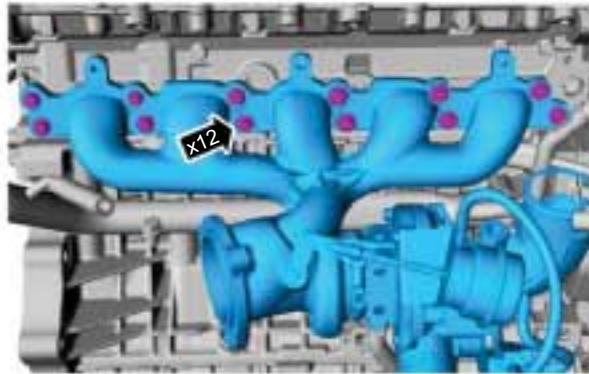
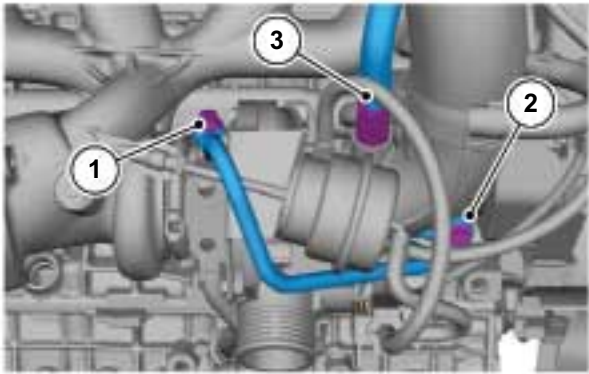
Pointer symbols are used to draw the attention to components and give special instructions such as a required sequence or number of components. The number of components is reflected by the value inside the luty arrow. A sequence number is

located inside the circle. Numbers inside circles are also used to allocate special information such as tightening torques or chemicals to a particular component.





DESCRIPTION AND OPERATION

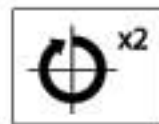
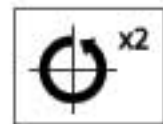
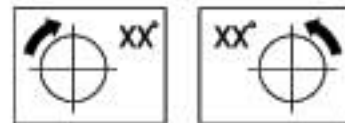
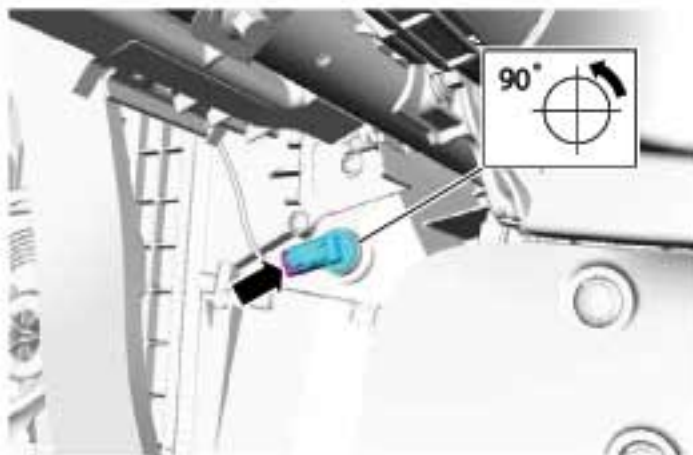


TO BE UPDATED LATER

E84837

Movement arrows are used to show three dimensional or rotational movements. These

movements can include specific values inside the symbol if required.



E84838



DESCRIPTION AND OPERATION

Standard tool symbols recommend the use of certain standard tools. These tools can include

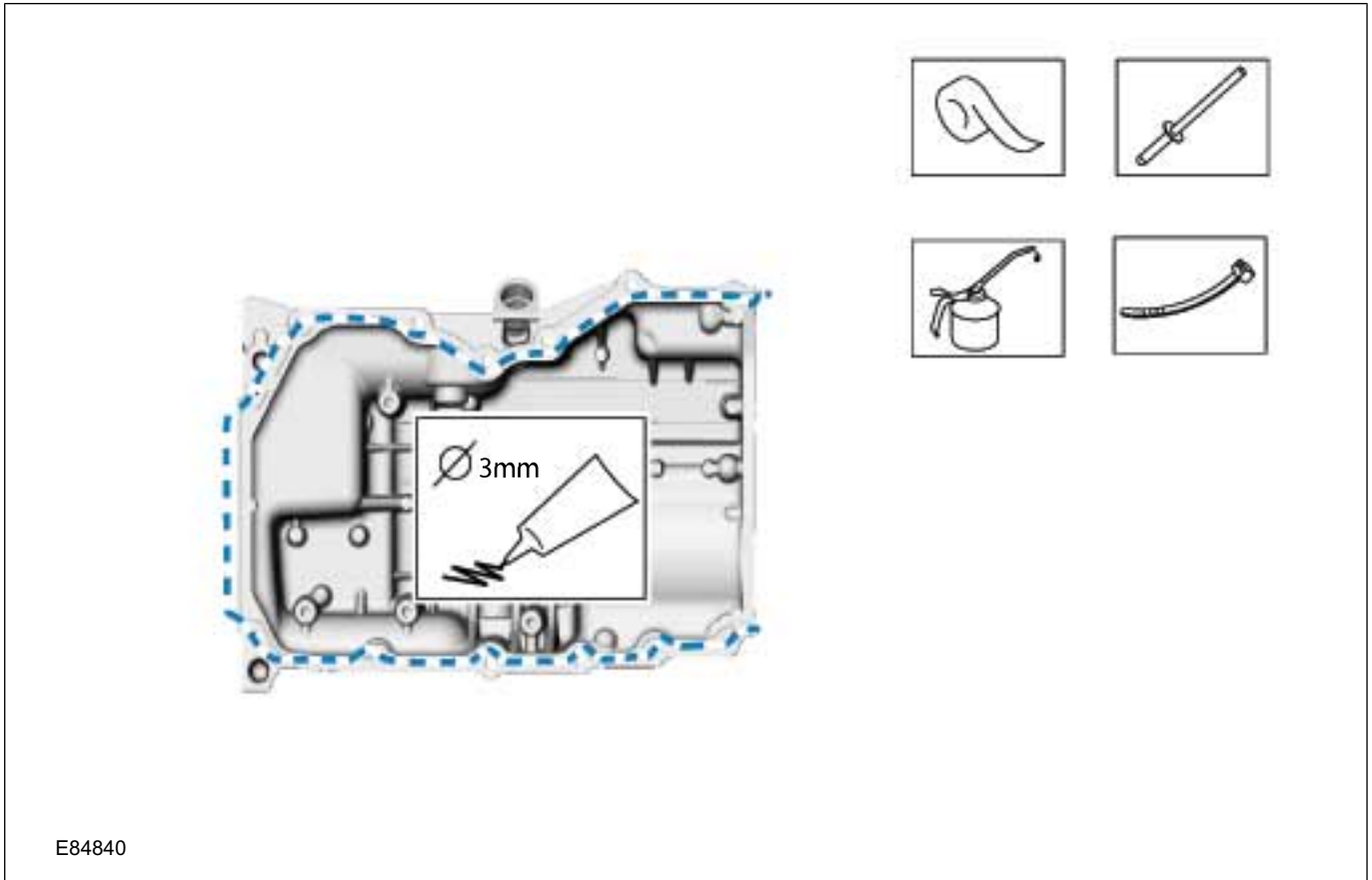
dimension values if required.

E84839

The following graphic illustrates a set of symbols that are used to provide detailed information on where to apply a material.



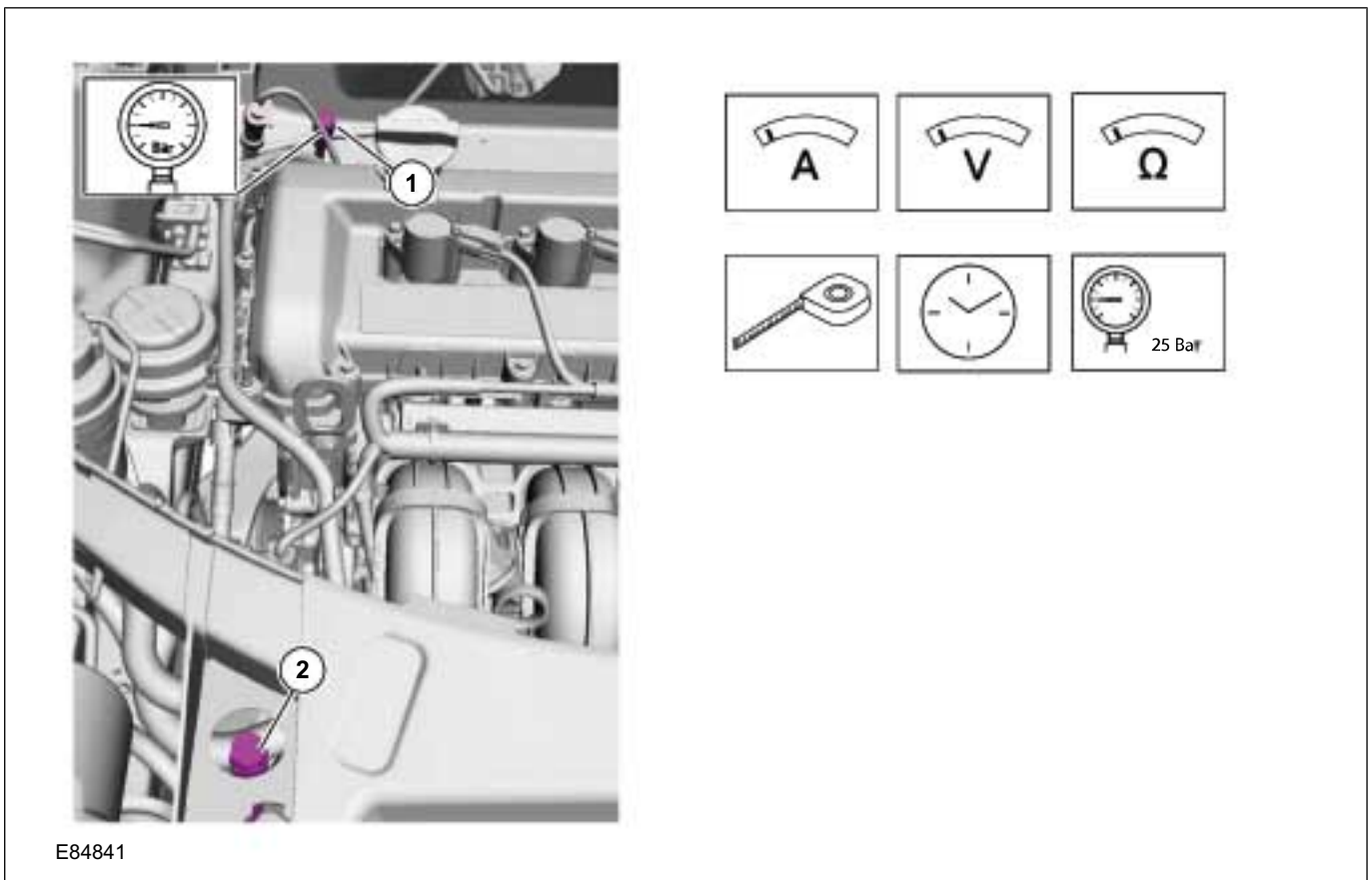
DESCRIPTION AND OPERATION



E84840

Measurement symbols provide detailed information on where to carry out a specific measurement.

These symbols can include specific values if required.



E84841



DESCRIPTION AND OPERATION

Special Tools and Torque Figure(s)

Special tools will be shown with the tool number in the illustration. The special tool number(s), general equipment, material(s) and torque figure(s) used for the procedure step will be shown in the text column.

How to Use This Manual - Diagnosis and Testing procedures

This manual covers diagnosis and testing, service and repair procedures.

This manual is structured into groups and sections, with specific system sections collected together under their relevant group.

A group covers a specific portion of the vehicle. The manual is divided into five groups, General Information, Chassis, Powertrain, Electrical and Body and Paint. The number of the group is the first number of a section number.

Pages at the start of the manual list all sections available. Each section has a contents list detailing Specifications, Description and Operation, Diagnosis and Testing, In Vehicle Repairs, Disassembly and Assembly, Removal and Installation.

If components need to be removed or disassembled in sequence, the sequence will be identified numerically in a graphic and the corresponding text will be numbered accordingly.

All left and right-hand references to the vehicle are taken from a position sitting in the driver seat looking forward.

All left and right-hand references to the engine are taken from a position at the flywheel looking towards the front camshaft pulley.

Where appropriate, instructions will be given for the use of the diagnostic tool.

Inspection and Verification

Visual Inspection Charts, Symptom Charts and other information charts (such as diagnostic routines) or supplement test procedures with technical specifications will navigate the user to a specific test procedure.

Symptom Chart

The symptom chart indicates symptoms, sources and actions to address a condition.

Pinpoint Tests

For electrical systems, pinpoint test steps are used to identify the source of a concern in a logical, step-by-step manner. Pinpoint tests have two columns: CONDITIONS and DETAILS/RESULTS/ACTIONS.

The CONDITIONS column is used exclusively for graphics and icons (with or without captions) and the DETAILS/RESULTS/ACTIONS column provides direction to another test step or specific corrective actions.

The boxed numbers indicate the order in which the described action is to be performed.

Component Tests

A component test is used when a component is tested in multiple pinpoint tests, or if a procedure is too complicated to be formatted within a single page of the pinpoint test.

Graphics

Test graphics show the measurement or test to be performed in a test step.

A representative tester graphic is used for voltmeters and ohmmeters.

If multiple measurements are made in a single graphic, the test leads are drawn with a solid line until the test lead splits to indicate the multiple measurements, at which point dashed lines are used.

Breakout box-type testers are represented by a double circle test pin. Test pins are labeled with the pin number.