# 300 Series OEM Engines

JOHN DEERE

## TECHNICAL MANUAL

300 Series OEM
Engines

TM1190 (01DEC84) English

**John Deere Engine Works**
**TM1190 (01DEC84)**

LITHO IN U.S.A.
ENGLISH

# 300 SERIES OEM ENGINES

**Technical Manual**
**TM-1190 (Dec-84)**

## SECTIONAL CONTENTS OF THIS MANUAL



*The specifications and design information contained in this manual were correct at the time it was printed. It is John Deere's Policy to continually improve and update our machines. Therefore, the specifications and design information are subject to change without notice. Wherever applicable, specifications and design information are in accordance with SAE and ICED standards.*



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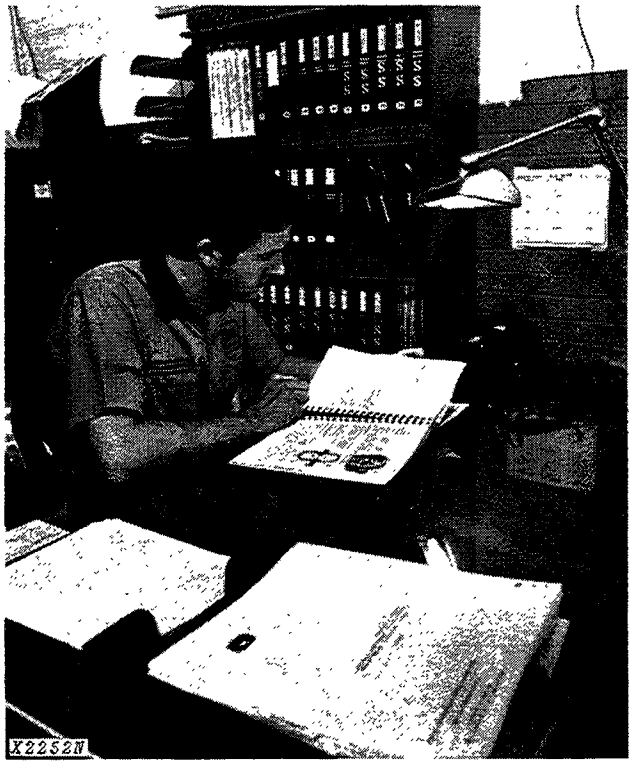
# INTRODUCTION






*Use FOS Manuals for Reference*


*Use Technical Manuals for Actual Service*

This technical manual is part of a twin concept of service:

The two kinds of manuals work as a team to give you both the general background and technical details of shop service.

**•FOS Manuals—for reference**

*Fundamentals of Service (FOS) Manuals* cover basic theory of operation, *fundamentals* of trouble shooting, *general* maintenance, and *basic* types of failures and their causes. FOS Manuals are for training new personnel and for reference by experienced service technicians.


When a service technician should refer to a FOS Manual for more information, a FOS symbol like the one at the left is used in the TM to identify the reference.

**•Technical Manuals—for actual service**

*Technical Manuals are concise* service guides for a *specific* machine. Technical manuals are on-the-job guides containing only the vital information needed by an experienced service technician.

This technical manual was planned and written for you—an experienced service technician. Keep it in a permanent binder in the shop where it is handy. Refer to it whenever in doubt about correct service procedures or specifications.

Some features of this manual:

- Inside front cover - "Table of Contents".
- Section I - Contents
- Sections 4 through 40 - Removal, repair, testing (components removed), installation, and adjustment.
- Section 90 - Detailed explanation of system operation, diagnosis, visual inspection, testing, and adjustments.
- Specifications grouped and illustrated at the end of each section.

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## SECTION AND GROUP CONTENTS OF THIS MANUAL



## OEM ENGINES SERVICED BY THIS TECHNICAL MANUAL

**3-164D**
**3-179D**
**4-219D**
**4-239D**
**4-239T**
**4-276D**
**4-276T**
**6-329D**
**6-359D**
**6-359T**
**6-414D**
**6-414T**

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## Accessible Hardware Torque Values

The table below gives correct torque values for various bolts and cap screws. The table lists torques in the U.S. unit of measure (lb-ft), SI metrics (Nm) and conventional metrics (kg/m). Most hardware used is high-strength (note dashes on hex. heads).

The types of bolts and cap screws are identified by head markings as follows:

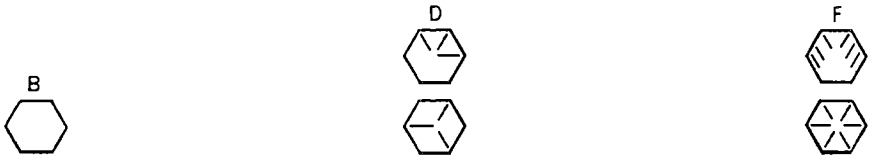
Plain Head: regular machine bolts and cap screws.

3-Dash Head: tempered steel high-strength bolts and cap screws.

6-Dash Head: tempered steel extra high-strength bolts and cap screws.

Machine bolts and cap screws 7/8-inch (22.2 mm) and larger are sometimes formed hot rather than cold, which accounts for the lower torque.

RECOMMENDED TORQUE - COARSE AND FINE THREADS




| BOLT DIAMETER | PLAIN HEAD | | | THREE DASHES | | | SIX DASHES | | |
|---|---|---|---|---|---|---|---|---|---|
| | LB-FT | Nm | Kg-m | LB-FT | Nm | Kg-m | LB-FT | Nm | Kg-m |
| 1/4 | NOT USED | NOT USED | NOT USED | 10 | 14 | 1 | 14 | 19 | 2 |
| 5/16 | NOT USED | NOT USED | NOT USED | 20 | 27 | 3 | 30 | 41 | 4 |
| 3/8 | NOT USED | NOT USED | NOT USED | 35 | 47 | 5 | 50 | 68 | 7 |
| 7/16 | 35 | 47 | 5 | 55 | 75 | 8 | 80 | 108 | 11 |
| 1/2 | 55 | 75 | 8 | 85 | 115 | 12 | 120 | 163 | 17 |
| 9/16 | 75 | 102 | 10 | 130 | 176 | 18 | 175 | 237 | 24 |
| 5/8 | 105 | 142 | 15 | 170 | 230 | 24 | 240 | 325 | 33 |
| 3/4 | 185 | 251 | 26 | 300 | 407 | 42 | 425 | 576 | 59 |
| 7/8 | 160 | 217 | 22 | 445 | 603 | 62 | 685 | 929 | 95 |
| 1 | 250 | 339 | 35 | 670 | 908 | 93 | 1030 | 1396 | 142 |
| 1-1/8 | 330 | 447 | 46 | 910 | 1234 | 126 | 1460 | 1979 | 202 |
| 1-1/4 | 480 | 651 | 66 | 1250 | 1695 | 173 | 2060 | 2793 | 285 |

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# ALPHABETICAL INDEX



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## T



## V



## W





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# Section 4
# ENGINE

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# Group 0400
# REMOVAL AND INSTALLATION

## GENERAL INFORMATION

Learn principles of operation of engines from "Basic Engine" in Fundamentals of Service Manual 30 - ENGINES.



### Design Characteristics

The 3-164D, 3-179D, 4-219D, 4-239D, 4-276D, 6-329D, 6-359D, and 6-414D engines have:

1. Internal combustion
2. Four strokes per cycle
3. In-line type cylinder block
4. Diesel fueling
5. Valves in cylinder head
6. Natural aspiration
7. Liquid coolant
8. Pressure lubrication

The 4-239T, 4-276T, 6-359T, and 6-414T engines have:

1. Internal combustion
2. Four strokes per cycle
3. In-line type cylinder block
4. Diesel fueling
5. Valves in cylinder head
6. Turbocharger
7. Liquid coolant
8. Pressure lubrication

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## Front Reference

The water pump (Fig. 1) end is the "front' of the engine.

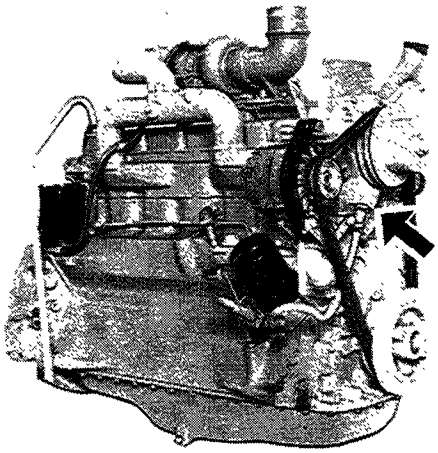

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Fig. 1-Water Pump

## Direction of Crankshaft Rotation

The crankshaft turns clockwise when viewed from the water pump end.

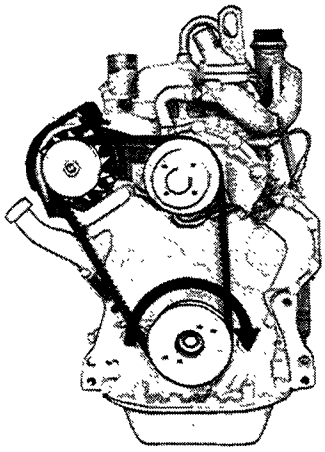

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Fig. 2-Crankshaft Rotation

## Firing Order

3-164 and 3-179 Engine

Firing order is:

1-2-3

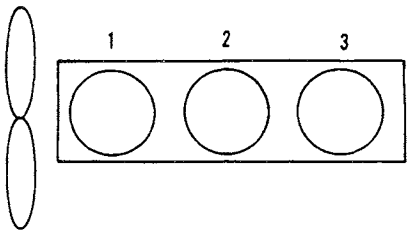


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Fig. 3-Cylinder Arrangement

4-219, 4-239, and 4-276 Engines

Firing order is:

1-3-4-2

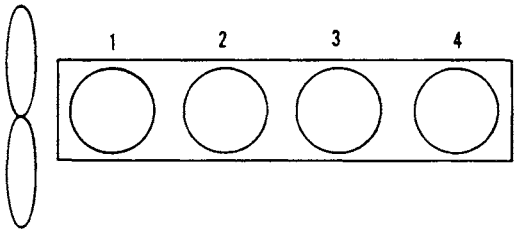


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*Fig. 4-Cylinder Arrangement*

6-329, 6-359, and 6-414 Engines

Firing order is:

1-5-3-6-2-4

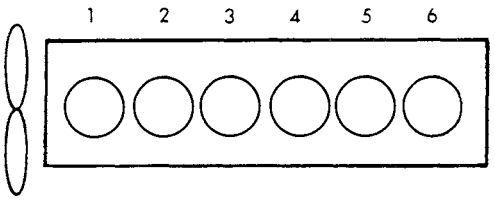


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*Fig. 5-Cylinder Arrangement*

## REMOVAL

Disconnect battery negative (−) cable. Disconnect battery positive (+) cable from starting motor.

Remove engine side shields (2, Fig. 6) (Group 1910).

Remove muffler.

Remove hood (1, Fig. 6) (Group 1910).

**CAUTION: Do not drain cooling system until upper radiator tank feels cool.**

Drain engine cooling system.

Drain engine oil.

Disconnect fuel inlet line at fuel transfer pump.

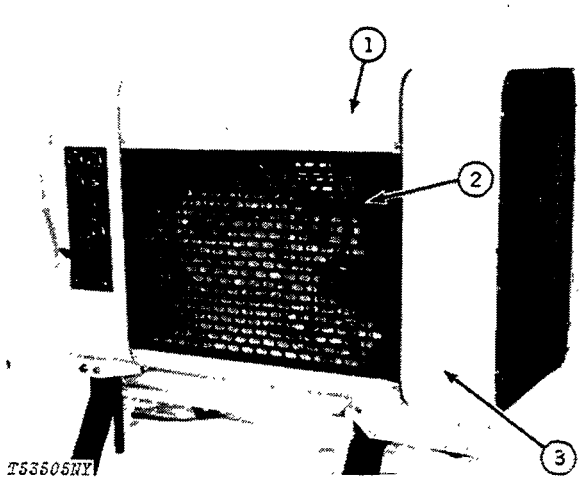


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*Fig. 6-Engine Enclosure*

Disconnect tachometer drive cable (3, Fig. 7) from flywheel housing.

Disconnect air cleaner hose on right side of engine.

Remove rear panel (1, Fig. 7) with air cleaner (2) attached.

Remove front shroud (3, Fig. 6).

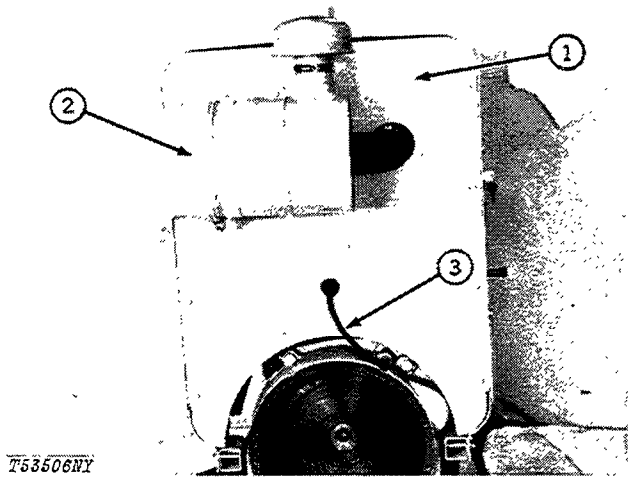


*Fig. 7-Engine Enclosure Rear Panel*

Disconnect speed control cable (1, Fig. 8) and bracket (2).

*NOTE: Tag wires and terminals for reassembly.*

Disconnect fuel shut-off wiring (3, Fig. 8) from fuel injection pump (4).

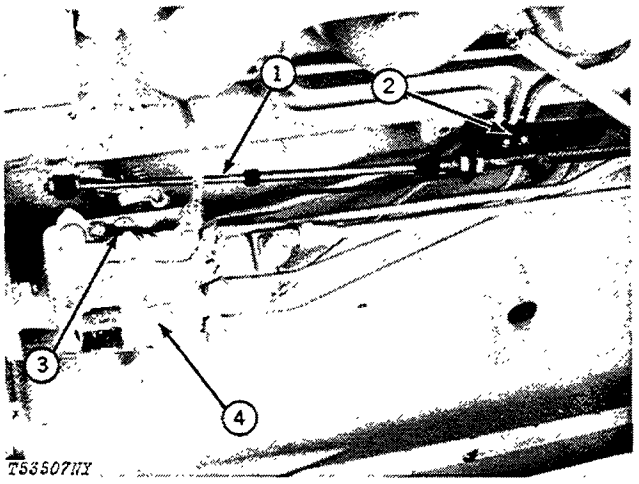


*Fig. 8-Speed Control Cable and Fuel Shut-Off Wiring*

*Disconnect alternator wiring (1, Fig. 9) from alternator.*

*Disconnect solenoid wiring (2, Fig. 9) from solenoid.*

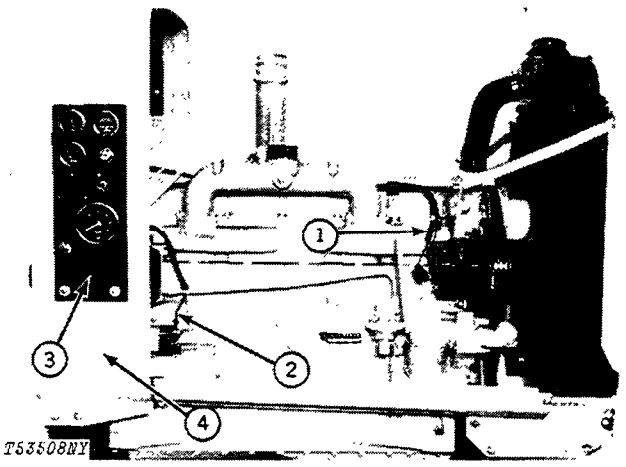


*Fig. 9-Solenoid and Alternator Wiring*

Disconnect temperature sending unit (1, Fig. 10) from rear of cylinder head.

Disconnect oil pressure hose (2, Fig. 10) from rear of cylinder block.

Remove rear shroud (4, Fig. 9) with instrument panel (3) attached.

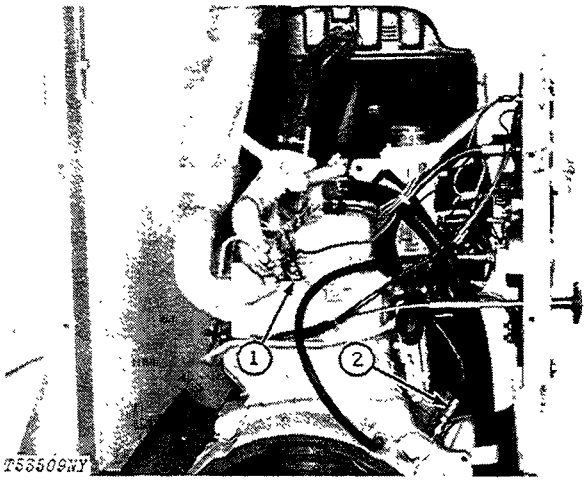


*Fig. 10-Oil Pressure Hose and Temperature Sending Unit*

Attach hoist with D01043AA Load-Positioning Sling (1, Fig. 11) to engine lifting eyes (2).

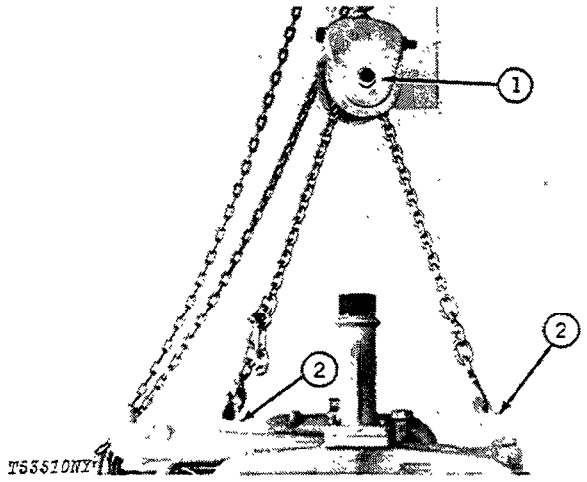


*Fig. 11-D-01043AA Load Positioning Sling Attached*

Remove engine mounting hardware (1, Fig. 12) at four corners of engine.

Raise hoist to remove engine.

Cap or plug air inlet tube, fuel inlet fitting, and exhaust manifold tube. Steam-clean engine thoroughly.

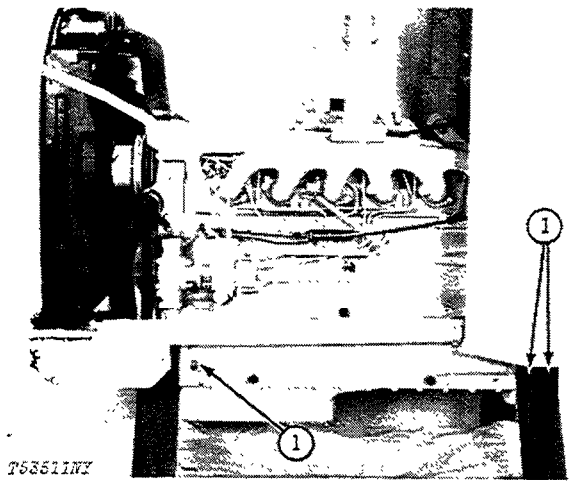


*Fig. 12-Engine Mounting Hardware*

## INSTALLATION

### Mounting Engine in D01003AA Stand

Attach hoist with D01043AA Load-Positioning Sling (1, Fig. 11) to engine lifting eyes (2).

Lift engine into position on D01003AA Engine Stand. Refer to Fig. 13 to mount three or four cylinder engine. Refer to Fig. 14 to mount six cylinder engine.

4

Adjust engine stand rods and install cap screws holding rod brackets to engine.

**⚠ CAUTION: Tighten all engine stand mounting hardware securely before removing hoist.**

Check that all engine stand mounting hardware is tight.

Remove hoist and sling (1, Fig. 11) from engine.

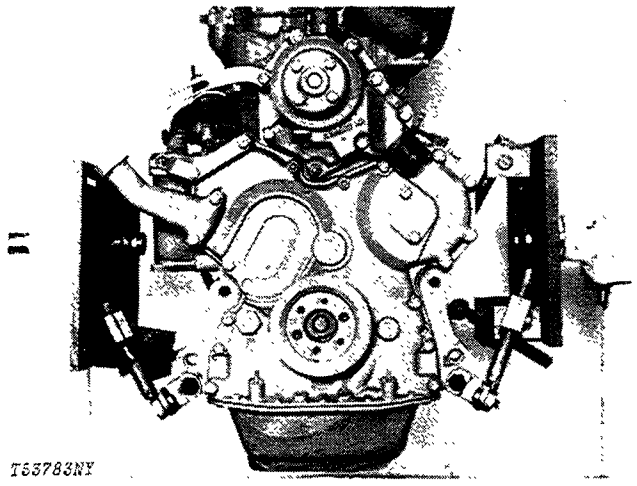


*Fig. 13-Three or Four Cylinder Engine Mounted in D01003AA Engine Stand*

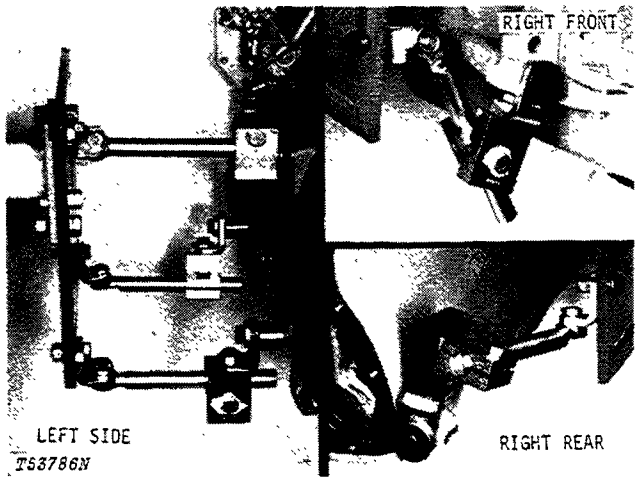


*Fig. 14-Six Cylinder Engine Mounting Points*

## Mounting Engine in Enclosure

Attach hoist with D01043AA Load-Positioning Sling (1, Fig. 11) to engine lifting eyes (2).

Lift engine into position on enclosure mounting skid. Install engine mounting hardware (1, Fig. 12) at lower four corners of engine.

Remove load-positioning sling and hoist from engine.

Install rear shroud (4, Fig. 9) with instrument panel (3) attached.

Connect oil pressure hose (2, Fig. 10) to rear of cylinder block.

Connect temperature sending unit (1, Fig. 10) to rear of cylinder head.

Connect solenoid wiring (2, Fig. 9).

Connect alternator wiring (1, Fig. 9).

Connect fuel shut-off wiring (3, Fig. 8) to fuel injection pump (4).

Connect speed control cable (1, Fig. 8) and install bracket (2).

Install front shroud (3, Fig. 6).

Install rear panel (1, Fig. 7) with air cleaner (2) attached.

Connect air cleaner hose to intake tube on right side of engine.

Connect tachometer drive cable (3, Fig. 7) to flywheel housing.

Connect fuel inlet line to fuel transfer pump.

Fill crankcase to correct level using proper oil.

Fill radiator to correct level using proper coolant.

Install hood (1, Fig. 6).

Install muffler.

Install engine side shields (2, Fig. 6).

Connect battery positive (+) cable to starter.

Connect battery negative (−) cable to battery.

Adjust speed control linkage if necessary (Group 0515).



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