CRANKSHAFT VR38 4.1L
INSTALLATION MANUAL

NAME OF PRODUCT	CRANKSHAFT VR38 4.1L
PART NUMBER	23006-AN006
APPLICATION	NISSAN GT-R R35
ENGINE	VR38DETT
YEAR	R35 2007 -
REMARKS	※ **This kit was designed on a JDM vehicle and has not yet been tested in other markets.** • This product was designed exclusively for vehicles with HKS 4.1L Kit

REVISION OF MANUAL

Rev. Number	Date	Manual Number	Details
3-3.01	2012/09	E13411-N49010	1st Edition

NOTICE

This manual assumes that you have and know how to use the tools and equipment necessary to safely perform service operations on your vehicle. This manual assumes that you are familiar with typical automotive systems and basic service and repair procedures. Do not attempt to carry out the operations shown in this manual unless these assumptions are correct. Always have access to a factory service manual. To avoid injury, follow the safety precautions contained in the factory service manual.

PRODUCT FEATURES

- This product was developed to improve engine output to a higher range, and for race use on a closed course, where this kit is highly effective. When the engine output is improved, water temperature and oil temperature will rise, and insufficient oil pressure will occur. Always maintain them for the optimal engine performance.
- To use this product on public roads, follow the necessary procedures and regulations for modified vehicles.

ATTENTION

- This manual indicates items you need to pay attention to in order to install this product safely and lists precautions to avoid any possible damage and/or accidents.
- This product is an automobile part. Do not use for any other purposes.
- HKS will not be responsible for any damage caused by incorrect installation and/or use, or use after modification and/or dismantling of this product.
- This product was designed based on installation onto a specific factory vehicle.
- The specifications of this product are subject to change without notice.
- The instructions are subject to change without notice. Make sure to refer to the most recent instructions.

SAFETY PRECAUTIONS

WARNING

- To prevent explosion and/or fires, always:
  - Work on the vehicle in a well-ventilated area.
  - Handle any flammable objects with care.
- To prevent electrical damage/burns/fires, always:
  - Disconnect the negative terminal of the battery before beginning installation.
  - When disconnecting connectors, take extra care to avoid breaking the connectors.
- Before jacking up the vehicle, always use wheel blocks and position the jack correctly. Also, do not start working under the vehicle without using jack stands.
  - Positioning the jack incorrectly imbalances the vehicle and may damage the vehicle body.
  - Incorrect use of jack stands may result in the vehicle falling causing serious injury or possibly death.

CAUTION

- Do not misuse this product.
  - Misuse of this product may lead to engine damage.
  - Misuse of this product may lead to loss of its original function.
- Prior to installation, make sure the engine bay temperature has cooled to approximately 40℃/104°F
  - Failure to let the engine cool down properly can lead to severe burns.
- Insert clean rags into open piping to prevent contaminants from entering the pipes.
  - If neglected, contaminants in the piping can lead to engine damage.

- Make sure that all of the parts listed in the Parts List are included in the kit.
- Reference the factory service manual when removing factory parts.
- Be careful when handling this product; avoid dropping or subjecting it to excessive impacts. Failure to do so may result in product damage or improper installation.
- Use the proper tools when tightening nuts and bolts. If over-tightened, the bolts may become damaged.
- Keep the removed factory parts in a safe place for ease of reinstallation at a later date (if necessary). It is recommended to mark the positions of the removed factory parts.
- When refilling oil, make sure to use the appropriate type of oil.

PARTS LIST

NO.	DESCRIPTIONS	QT	IMAGE	REMARKS
1	Crankshaft	1		Only for vehicles with HKS 4.1L kit
2	Installation Manual	1		

SPECIFICATIONS

		Factory	HKS
Crank Shaft	Stroke (mm)	88.4	95.5
	Main Journal Diameter (mm)	65	65
	Pin Journal Diameter (mm)	56	56

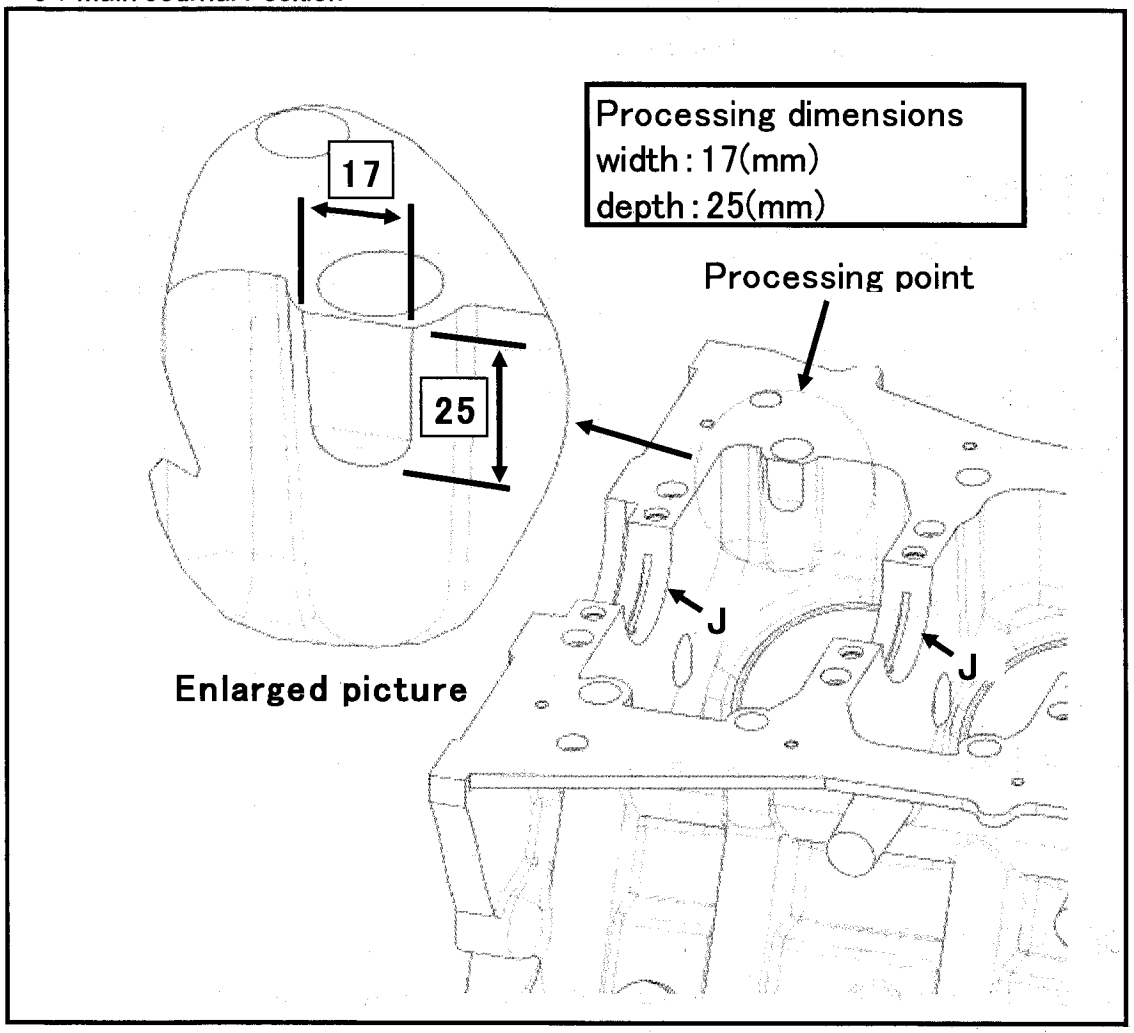
IMPORTANT NOTICE

- Make sure not to damage the cylinder wall and crankshaft pin resulting from an interference of the connecting rod big end.
- Make sure not to drop connecting rod bearing and to scratch the surface.
- Make sure not to drop main bearing, and scratch the surface.

CYLINDER BLOCK MODIFICATION

1. Modifying the Cylinder Block
   Modify the cylinder block using an electric tool such as a Belton referring to a diagram below.
   Clean the cylinder block after modification. Make sure to remove all debris from the cylinder block.

J : Main Journal Position



INSTALLATION

1. **Removal of Factory Parts**
   Reference the vehicle's factory service manual when removing the factory parts.

2. **Crank Metal Oil Clearance**
   The crank shaft was designed referring to the factory standard dimensions.
   Crank metal size must be selected in accordance with each factory standard dimensions.

2-1. Check the outer diameter of the crank journal referring to lower classification marks on the side of the front weight. Or, measure the outer diameter using a micro meter.

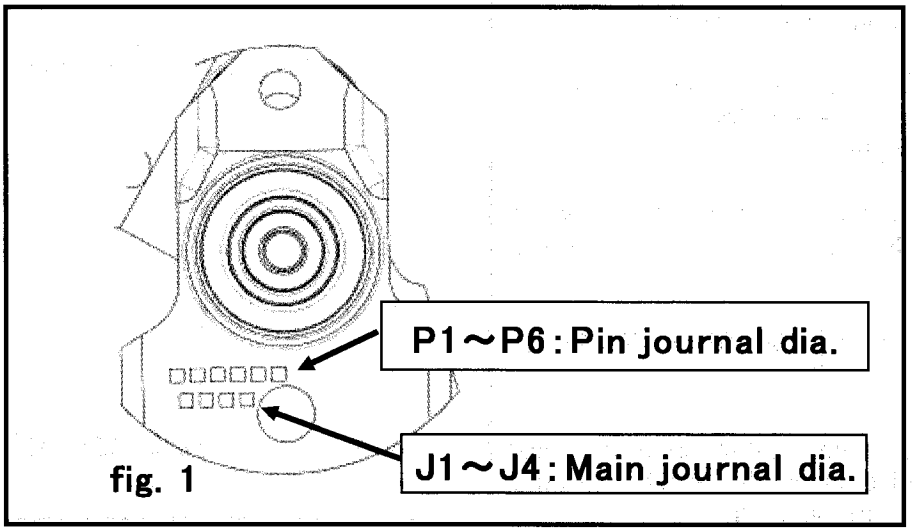


fig. 1

● Refer to the installation manual of HKS VR38 DETT Connecting Rod Set (P/N 23004-AN005) as well.

2-2. Check the inner diameter of the bearing housing. The grade is marked on the cylinder block as shown in Figure 2. The table below shows the bearing housing grade of each mark. Or measure the inner diameter using a cylinder gauge.

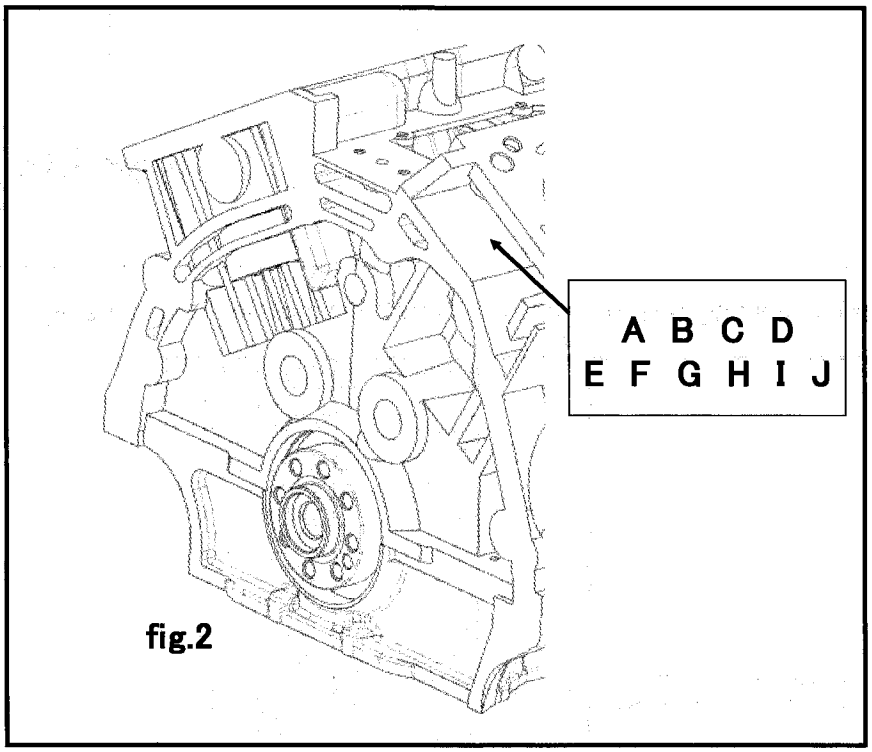


fig.2

A : Bearing housing grade No.1
B : Bearing housing grade No.2
C : Bearing housing grade No.3
D : Bearing housing grade No,4

2-3. When installing the bearing cap and tightening bolts, refer to "3. Installation of Crankshaft". Replace the bearing cap bolt with a new one.

2-4. When measuring the inner diameter of the bearing housing, measure the diameter in a circle shown in Figure 3.

2-5. If the measured value is out of the standard range, the cylinder block must be replace with a new one.

Standard Range (mm)	69.993 ~ 70.017

2-6. Select the main bearing that the inner diameter of the main bearing assembled with the cylinder block is within the designated oil clearance range.

●Oil Clearance Designated Range

Designated Range(mm)	0.035 ~ 0.045

Limit Value (mm)	0.065

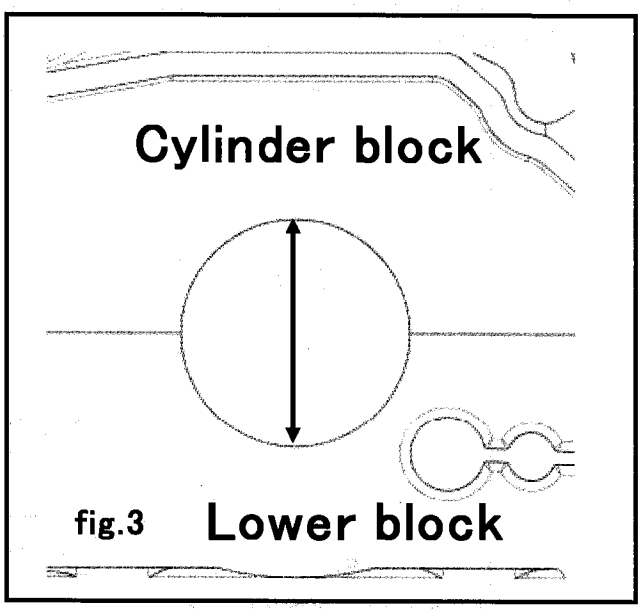


fig.3

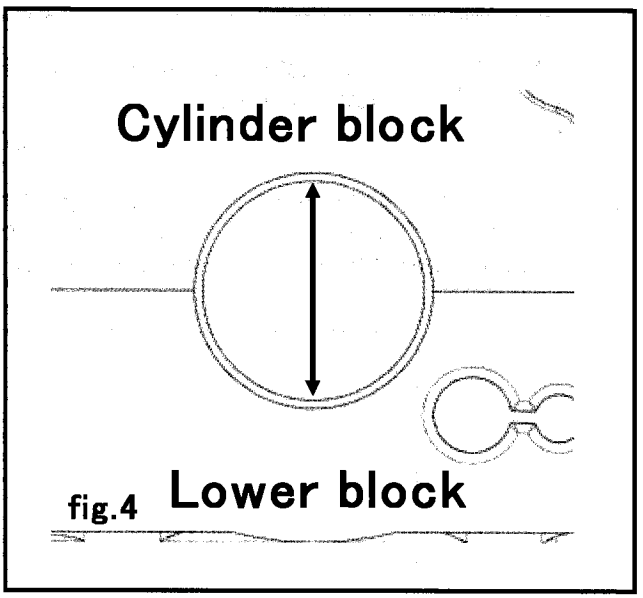


fig.4

(Oil clearance) = (Main bearing inner diameter) – (Crankshaft main journal diameter)

Table .1

Main bearing housing inner diameter grade (Without bearing)	Standard	Grade No. A	69.993 – 64.994
		Grade No. B	69.994 – 69.995
		Grade No. C	69.995 – 69.996
		Grade No. D	69.996 – 69.997
		Grade No. E	69.997 – 69.998
		Grade No. F	69.998 – 69.999
		Grade No. G	69.999 – 70.000
		Grade No. H	70.000 – 70.001
		Grade No. J	70.001 – 70.002
		Grade No. K	70.002 – 70.003
		Grade No. L	70.003 – 70.004
		Grade No. M	70.005 – 70.006
		Grade No. N	70.006 – 70.007
		Grade No. P	70.007 – 70.008
		Grade No. R	70.008 – 70.009
		Grade No. S	70.009 – 70.010
		Grade No. T	70.010 – 70.011
		Grade No. U	70.011 – 70.012
		Grade No. V	70.012 – 70.013
		Grade No. W	70.013 – 70.014
		Grade No. X	70.014 – 70.015
		Grade No. Y	70.015 – 70.016
		Grade No. 4	70.016 – 70.017
		Grade No. 7	70.017 – 70.018

Table .2

Main Journal diameter. "Dm" grade	Standard	Grade No. A	64.975 – 64.974
		Grade No. B	64.974 – 64.973
		Grade No. C	64.973 – 64.972
		Grade No. D	64.972 – 64.971
		Grade No. E	64.971 – 64.970
		Grade No. F	64.970 – 64.969
		Grade No. G	64.969 – 64.968
		Grade No. H	64.968 – 64.967
		Grade No. J	64.967 – 64.966
		Grade No. K	64.966 – 64.965
		Grade No. L	64.965 – 64.964
		Grade No. M	64.964 – 64.963
		Grade No. N	64.963 – 64.962
		Grade No. P	64.962 – 64.961
		Grade No. R	64.961 – 64.960
		Grade No. S	64.960 – 64.959
		Grade No. T	64.959 – 64.958
		Grade No. U	64.958 – 64.957
		Grade No. V	64.957 – 64.956
		Grade No. W	64.956 – 64.955
		Grade No. X	64.955 – 64.954
		Grade No. Y	64.954 – 64.953
		Grade No. 4	64.953 – 64.952
		Grade No. 7	64.952 – 64.951
Pin Journal diameter. "Dp"	Standard	Grade No. A	55.961 – 55.960
		Grade No. B	55.960 – 55.959
		Grade No. C	55.959 – 55.958
		Grade No. D	55.958 – 55.957
		Grade No. E	55.957 – 55.956
		Grade No. F	55.956 – 55.955
		Grade No. G	55.955 – 55.954
		Grade No. H	55.954 – 55.953
		Grade No. J	55.953 – 55.952
		Grade No. K	55.952 – 55.951
		Grade No. L	55.951 – 55.950
		Grade No. M	55.950 – 55.949
		Grade No. N	55.949 – 55.948
		Grade No. P	55.948 – 55.947
		Grade No. R	55.947 – 55.946
		Grade No. S	55.946 – 55.945
		Grade No. T	55.945 – 55.944
		Grade No. U	55.944 – 55.943

CAUTION

- The optimal performance cannot be guaranteed and oil film cannot function to prevent the engine from being damaged if the oil clearance is not within the designated range.
- As exception, the oil clearance can be adjusted depending on the type of the race. Using this product for racing may shorten the product life.
- For vehicles with much mileage or old model, re-measure each bore size.

Table .3

Grade number		Thickness mm	Indification color
0		2.500 – 2.503	Black
1		2.503 – 2.506	Brown
2		2.506 – 2.509	Green
3		2.509 – 2.512	Yellow
4		2.512 – 2.515	Blue
5		2.515 – 2.518	Pink
6		2.518 – 2.521	Purple
7		2.521 – 2.524	White
01	UPR	2.503 – 2.506	Brown
	LWR	2.500 – 2.503	Black
12	UPR	2.506 – 2.509	Green
	LWR	2.503 – 2.506	Brown
23	UPR	2.509 – 2.512	Yellow
	LWR	2.506 – 2.509	Green
34	UPR	2.512 – 2.515	Blue
	LWR	2.509 – 2.512	Yellow
45	UPR	2.515 – 2.518	Pink
	LWR	2.512 – 2.515	Blue
56	UPR	2.518 – 2.521	Purple
	LWR	2.515 – 2.518	Pink
67	UPR	2.521 – 2.524	White
	LWR	2.518 – 2.521	Purple

3. Installation of Crankshaft

3-1. Install both upper and lower main bearings to the cylinder block and bearing cap. (Fig.5)
Make sure to remove dust, dirt, and oil on each portion where each metal of the cylinder block and bearing cap is installed. Also, make sure to clean the back side of each main bearing.

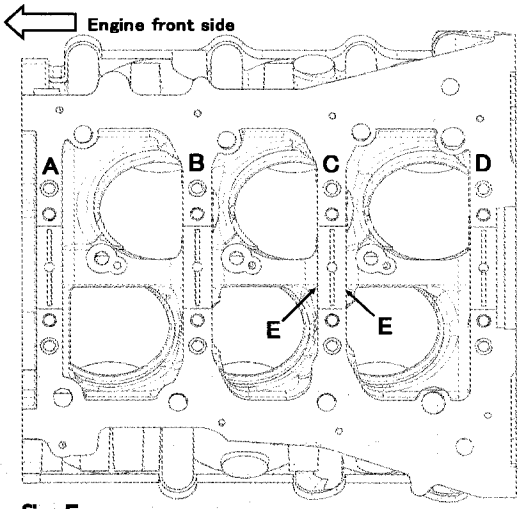


fig.5

A : No.1 journal housing
B : No.2 journal housing
C : No.3 journal housing
D : No.4 journal housing
E : Thrust bearing installation position

3-2. After aligning the stoppers and oil hole positions of the main bearings, install the main bearings to cylinder block. (Fig.6)

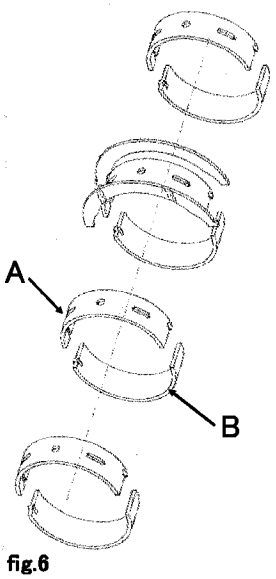


fig.6

CAUTION

- Make sure that the stoppers and oil holes positions of the main bearings are aligned properly. Failure to do so may cause damage to the engine.
- Refer to the factory service manual along with this manual for installation.

3-3. Apply engine oil to the inner side of each main bearing that was installed to the cylinder block; then, install the crankshaft.

3-4. Install the bearing caps after applying engine oil to the inner side of each bearing cap that was installed to the cylinder block.

3-5. Apply engine oil to the threads and seating surface. Install the bolts in numerical order indicated in Figure 7.

3-6. Tighten the bolts using a torque wrench as instructed below:
- No.17 – 24: Tighten in numerical order to the designated tightening torque.

Designated Tightening Torque	25N·m (2.6 kgf·m)

3-7. Repeat the procedure 3-6.

3-8. Tighten the bolts using a torque wrench as instructed below:
- No.1 – 16: Tighten in numerical order to the designated tightening torque.

Designated Tightening Torque	44.2N·m (4.5 kgf·m)

3-9. Tighten the bolts using an angle wrench as instructed below:
- No.1 – 16: Tighten in numerical order to the designated angle.

Designated Angle	90°

3-10. After tightening the bolts, make sure the crankshaft is rotated smoothly.

3-11. Check the crankshaft endplay.

Crankshaft End Play	Standard (mm)	0.10 – 0.25
	Limit (mm)	0.30

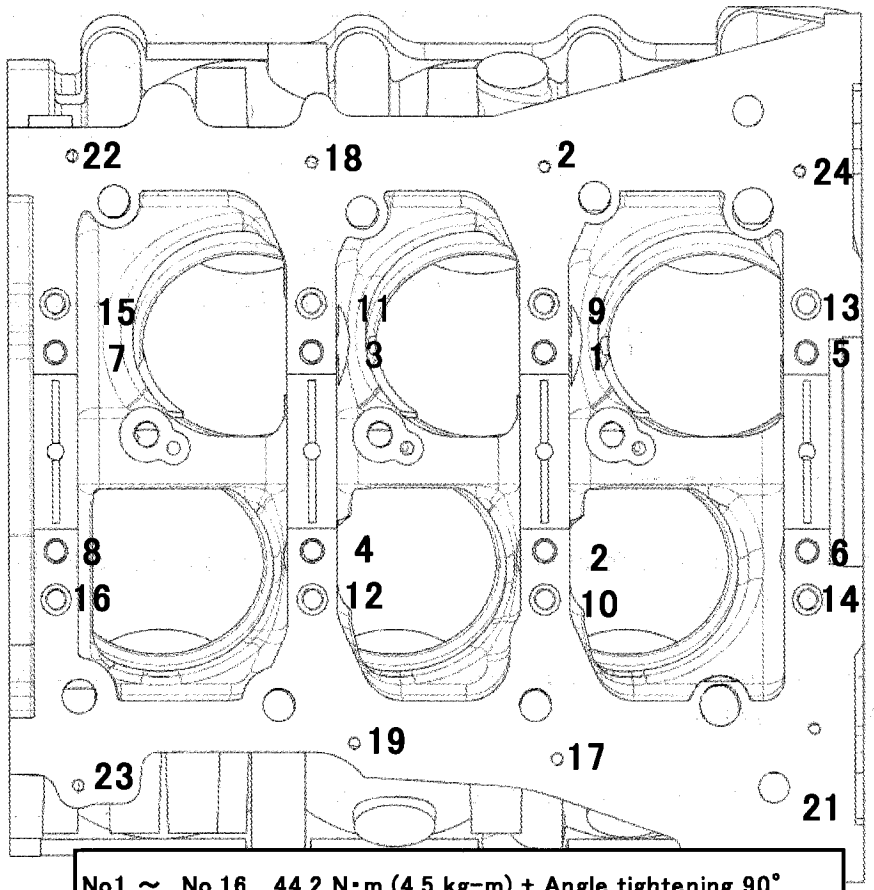


fig.7 No1 ~ No.16 44.2 N·m (4.5 kg-m) + Angle tightening 90°
No.17 ~ No.24 25.0 N·m (2.6 kg-m)

4. Assembly

When assembling the crankshaft, make sure rotate the oil jet in the direction of an arrow in Figure 8 until the oil jet is fixed.
Make sure that the oil jet does not come in contact with a piston.

Oil Jet Tightening Torque: 27.0N·m (2.8 kgf·m)

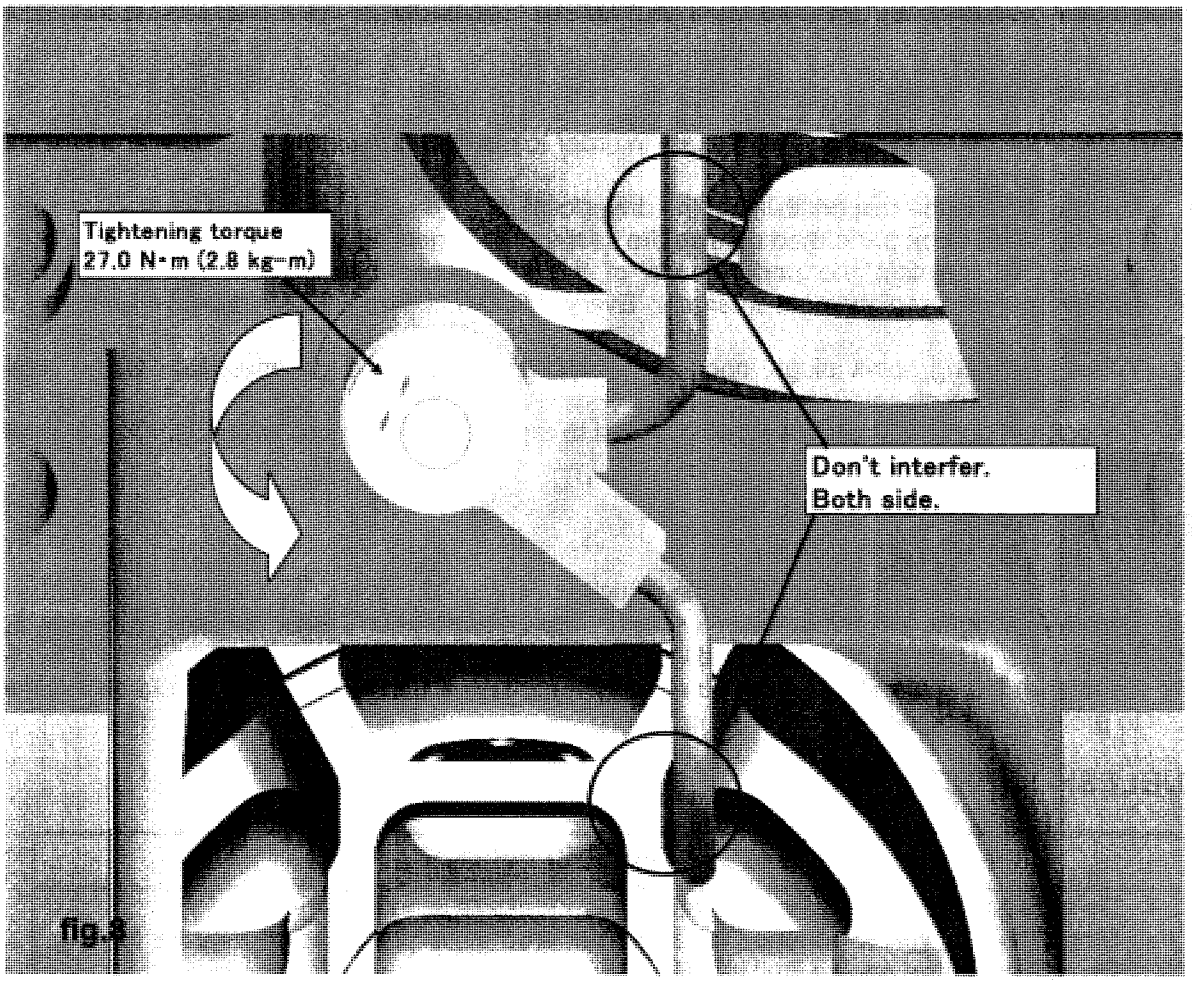


fig.8

Confirm After Installation

(1) Check the following before starting the engine:
- Make sure pipes and hoses are routed and connected correctly.
- Make sure hoses are not twisted or bent.
- Make sure the negative cable terminal is securely attached to the battery.
- Make sure the engine oil level is between H - L.
- Make sure all bolts and nuts are tightened.
- Make sure all installed components do not come in contact with any other parts.

(2) Start the engine and check the following:
- Make sure air is not leaking.
- Make sure oil, coolant, and/or fuel are not leaking.
- Make sure air, oil, and/or coolant are not leaking after revving the engine 2-3 times while in neutral.
- Make sure the installed parts do not come in contact with any other parts.
- Make sure the installed parts are performing properly. (Confirm visually and use the proper tools.)

(3) Stop the engine and check the following:

※ Do not raise the engine RPM right after the engine is started. (Let it idle.)

- Make sure all bolts and nuts are tightened.
- Make sure all installed components do not come in contact with any other parts.
- Make sure all installed parts are properly secured.
- Make sure the engine oil level is between H - L.
- Make sure air is not leaking.
- Make sure oil, coolant, and/or fuel are not leaking.

※Reinstall all necessary factory parts removed before installation.

MAINTENANCE

Proper maintenance of this product is necessary in order to maintain the safety, reliability, and function of this product.

- Maintenance is the responsibility of the driver/owner.
- If work needs to be performed outside the scope of this manual, consult a professional.
- In order to maintain the performance of the kit, routine filter replacement is necessary. (Recommended replacement intervals: Every 3,000-5,000km/2,000-3,200miles or every 3-6 months.)
- When upgrading spark plugs, choose the appropriate heat range applicable to the engine. Consult a professional for more details.
- For optimal performance, it is recommended to replace the engine oil every 3,000km or every 6 months.

ATTENTION

- Idling must be done before driving the vehicle.
- Before the engine bay temperature warm up, rapid acceleration and/or revving the engine 2-3 times while in neutral must be avoided.
  Even after the engine bay temperature has warmed up, excessive revving should be avoided to protect the engine.

TROUBLESHOOTING

WARNING
• Do not start the engine when oil and/or water leakage is noticed. • Stop driving if you experience an abnormal drop in oil pressure; oil may be leaking. Do not restart the engine if oil is leaking. - Explain the source of the leak to a professional and have the repairs performed by a professional. - If oil leakage is serious, ask a professional how to temporarily repair and conduct the repair by yourself to prevent further damage. - Always follow the instructions given by a professional. If neglected, oil leakage can lead to a vehicle fire.

- If the vehicle gets damaged, have the repairs performed by a professional.
- If you experience any abnormal noises, scents, or vibrations from the vehicle while driving, reference the factory service manual.

FOR SUBSEQUENT OWVERS

- If this product is re-sold, please give this Instruction Manual to the new owner.
- Consult a professional when removing this product from the vehicle.