

# DEASO SPARK PLUG CATALOG





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## **IDENTIFYING DENSO PLUGS**

## Iridium Plugs / Platinum Plugs / Normal Plugs

F	K	20	Н	R	R		
S	XU	22		PR	-A	9	
	KJ	20		CR	-L	11	
		Ŷ	Ţ				
Type of precious metal	Thread Diameter and Hex Size	Heat Range	Reach	Shape (Type)	Shape (Type)	Gap	
<ul> <li>D 0.7 mm diameter iridium with 0.7 mm needle type platinum</li> <li>F 0.55 mm diameter iridium with 0.7 mm needle type platinum</li> <li>P 1.1 mm diameter platinum tip</li> <li>S 0.7 mm diameter iridium with platinum tip</li> <li>S 0.55 mm diameter iridium with platinum tip</li> <li>S 0.55 mm diameter iridium with platinum tip</li> <li>E 0.55 mm diameter iridium with platinum tip</li> <li>E 0.7 mm diameter iridium with platinum tip</li> <li>E 0.7 mm diameter iridium with platinum tip</li> </ul>	C	B         K         K         K         K         N	<ul> <li>A</li></ul>	<ul> <li>A Double ground electrodes W22EA</li> <li>AY Double ground electrodes with bent shape J16AY</li> <li>B Triple ground electrodes W22EB</li> <li>BG Triple ground electrodes (shroud) SK20BGR11</li> <li>C Shroud 1.5mm SXU22HCR11</li> <li>D 4 ground electrodes W27EDR</li> <li>D Projected (1.5 mm projection, spark position 3.5 mm) XU22HDR9</li> <li>K Projected (1 mm projection) W16EKR-S11</li> <li>LM Compact type (Hex 20.6 mm) W14LM-U</li> <li>M Shortened insulator head length W27EDR-C</li> <li>M Compact type (Hex 19.0 mm) W20M-U</li> <li>P Projected (1.5 mm projection) W16EP-U</li> <li>Q Projected 2mm, Spark position 3.5mm</li> <li>R SKohm resistor K16R-U</li> <li>S Iridium on a single side K120SR11</li> <li>T Double ground electrodes K16TR11</li> <li>TM. Double ground electrodes K22TNR-S</li> <li>X Fully projected (2.5 mm Projection) W16EX-U</li> </ul>	<ul> <li>-A ··· Special specification SK16PR-A11</li> <li>-B ··· Special specification K16PSR-B8</li> <li>-C ··· Cut-back ground electrode W27EMR-C</li> <li>-CY · Special specification FC16HR-CY9</li> <li>-D ··· Copper-core Ground DK20PR-D13</li> <li>-E ··· Special specification SK16PR-E11</li> <li>-F ··· Special specification J17SK16PR-F11</li> <li>-G ··· Grease applied on to threads, for CNG SK20R8-G</li> <li>-GL · Platinum center electrode X22EPR-GL</li> <li>-L ··· Heat resistant ground electrode K20PR-L11</li> <li>-L ··· Heat resistant ground electrode K20PR-L1</li> <li>-L ··· Bartacted insulator for motorcycles W20FP-LL</li> <li>-L ··· Larger ground electrode SK20PR-M11S</li> <li>-N ··· For Yamaha and Kawasaki U27ESR-N</li> <li>-P ··· Double Platinum Ground Electrode SK20R-P11</li> <li>-G ··· Special specification FC16HR-Q8</li> <li>-R ··· 10K ohm resistor K22PR-UR</li> <li>-S ··· Stainless gasket U27FERSS</li> <li>-T ··· For LPG SX20HR8-T</li> <li>-T ··· Special specification FK20HBR11-T</li> <li>-TP ··· Taper-cut, single-side platinum plug K16PR-U</li> <li>-T ··· Special specification FK20HR8-T</li> </ul>	50.5 mm (020') 80.8 mm (032') 90.9 mm (035') 101.0 mm (040') 111.1 mm (044') 131.3 mm (050') 141.5 mm (060') <none> Cars: 0.8 mm M/C: 0.7 mm <exceptions> P16R, PQ16R, PQ20R are 1.1 mm</exceptions></none>	

## IRIDIUM POWER Series (Power, Tough, Plus) & T\_T

l l	U		2	27		Α
VF	КН		2	20		
High Performance Plug	Thread Diameter, Reach, and Hex Size		Heat	Range		Shape (Type)
<ul> <li>I 0.4 mm diameter iridium <power></power></li> <li>V 0.4 mm diameter iridium with platinum tip <tough></tough></li> <li>VF 0.4 mm diameter iridium with 0.7 mm needle type platinum tip <tough></tough></li> <li>VD 0.7 mm diameter iridium with 0.7 mm needle type platinum tip <tough></tough></li> <li>P 1.1 mm platinum center electrode</li> <li>VS 0.7 mm diameter iridium with platinum tip <tough></tough></li> </ul>	<thread diameter="" hex="" reach="" size="" ×=""> (mm) K ···· 14 × 19.0 × 16.0 (New Triple Electrodes) KB··· 14 × 20.5 (Shroud 1.5) × 16.0 (Wew Triple Electrodes) KD··· 14 × 20.5 (Shroud 1.5) × 16.0 KH·· 14 × 26.5 × 16.0 (New Triple Electrodes) Q ···· 14 × 19.0 × 16.0 (New Triple Electrodes) Q ···· 14 × 19.0 × 20.6 WF··· 14 × 12.7 × 20.6 WF··· 14 × 12.7 × 20.6 (Compact Insulator) T ···· 14 × 17.5 (Taper Seat) × 16.0 T F···· 14 × 11.2 (Taper Seat) × 16.0 T ···· 14 × 25.0 (Taper Seat) × 16.0 T ···· 14 × 25.0 (Taper Seat) × 16.0 T ···· 14 × 25.0 (Taper Seat) × 16.0 XU··· 12 × 19.0 × 16.0 XU··· 12 × 26.5 × 14.0 XUH ··· 12 × 26.5 × 14.0 XEBH ··· 12 × 26.5 × 14.0 XEH ··· 12 × 26.5 × 14.0 XEH ··· 12 × 28 (Shroud 1.5) × 14.0 X ···· 12 × 19.0 × 18.0 XG···· 12 × 21.8 (Shroud 1.5) × 14.0 U ···· 10 × 19.0 (Half Thread) × 16.0 NH···· 10 × 19.0 (Half Thread) × 16.0 NH···· 10 × 19.0 (Half Thread) × 13.0</thread>	DENSO 16 20 22 24 27 29 31 32 34 35	NGK 5 6 7 8 9 9.5 10 10.5 11 11.5	CHAMPION 12,11 10,9 8,7 6,63,61 4,59 57 55 53 53	BOSCH 8 7,6 5 4 3 2	<ul> <li>A Slant electrode, No U-Groove, No taper cut</li> <li>B Projected insulator (1.5 mm)</li> <li>C No U-Groove</li> <li>D No U-Groove</li> <li>E Shroud: 2 mm</li> <li>ES. Stainless steel gasket</li> <li>F Special specification</li> <li>G Stainless steel gasket, Terminal one type</li> <li>I Spark position: 4 mm Projected insulator (1.5 mm)</li> <li>J Spark position: 5 mm</li> <li>K Spark position: 5 mm</li> <li>T For LPG applications<plus></plus></li> <li>TT TI series</li> <li>Y 0.8 mm gap</li> <li>Z Taper cut</li> </ul>

# MOTORSPORTS Supported by DENSO

## **TOYOTA GAZOO** Racing - WEC



# TGR TEAM SARD - SUPER GT





## YOSHIMURA SERT Motul - 2021 FIM ENDURANCE WORLD CHAMPIONSHIP



## Be sure to read this Catalogue & Website

IN NO EVENT SHALL DENSO BE LIABLE FOR ANY LOSSES, EXPENSES OR DAMAGES WHATSOEVER RESULTING FROM ANY OF THE FOLLOWINGS;

- FAILURE TO COMPLY WITH THE WARNING OR PRECAUTIONS DESCRIBED IN THIS CATALOGUE AND WEBSITE,
- ANY USES OTHER THAN THE APPLICABLE USE DESCRIBED IN THIS CATALOGUE AND WEBSITE, and ANY TROUBLE NOT ATTRIBUTABLE TO DENSO SPARK PLUGS.
- %"Spark plugs" means any type of DENSO's spark plugs, including but not limited to Iridium Power, Iridium TT, Iridium Racing, Iridium Plus, and Iridium Tough, Iridium Long Life, Double Platinum, U-Groove, Resistor, Standard, Nickel TT, Platinum TT, Two-Tops.

## 1 WARNING (Prohibited Usage)

Never use DENSO spark plugs in the engines for any aircraft, including airplanes, helicopters, gliders and drones. The DENSO spark plugs sold are not designed and manufactured for any aircraft: use may result in a plane crash or other accidents due to engine malfunction.



Never use DENSO spark plugs, listed in this catalogue, in the engines for generator and gas heat pump air conditioning system. The DENSO spark plugs we sell are not designed and manufactured for such use, so that such use may result in accidents, including power generation stop or heat generation stop.

A separate catalogue for DENSO spark plug specifically designed for generators (gas engines) is available. Please contact your DENSO representative for more information.

Never use DENSO spark plugs for gas burner ignition. The DENSO spark plugs we sell are not designed and manufactured for such use, so that such use may result in ignition failure or equipment damage due to overheating.

## 

Be sure to turn off the engine and disconnect the battery before replacing or adjusting the plugs. Failure to heed this warning may result in a fire, an electric shock and/or bodily harm.

## Spark Plug Handing Precautions

- Always refer to the vehicle manufacturer's repair manual for specific installation procedures.
- Carefully read the instructions and precautions on the package, catalogue and website.
- Do not drop spark plugs. This may cause the spark plug to crack internally or the gap to be narrowed, preventing it from functioning correctly.
- If Spark Plug needs to be gapped, bend from the back of the ground strap with appropriate tools. Do not physically adjust gap using the center electrode as leverage. Check gaps with care, not to damage the center electrode. Gap to the vehicle specific manufacturer's recommendation unless otherwise recommended.

## Modified Vehicles and Tuning Precautions

- DENSO will not bear any responsibility whatsoever for any trouble arising from mechanically or electronically modified engines or vehicles.
- It is the user's judgement and responsibility to check the specifications required for modified engines, which includes and not limited to, gapping, heat ranges, reach, projection, and/or clearances with valves and/or pistons.

## 🚹 Catalogue & Website Precautions

Precautions for cross reference and product tables showing other manufacturer's spark plugs:

- Use for reference only. Table does not guarantee the performance of spark plugs when installed in the vehicles if plug was specified using cross references. Always check the applications section for DENSO recommended plugs.
- The spark plug specifications (construction, material, etc.) differ from one manufacturer to another.
- Select a suitable type of spark plug from the vehicle application table. If not listed on the table, please check with your DENSO Representative.
- The contents of the catalogue and website are updated on a regular basis, but they cannot account for daily dynamic changes such as new applications and or OE supersessions. If there is an issue with the information, please contact your DENSO Representative for further assistance.
- Consumption tax and installation fees are not included in the price of the product.
- Some spark plugs on this catalogue and website are manufacturer's genuine parts that listed for reference and cannot be directly sold. Please contact your DENSO representative for further assistance.
- The appearance and specifications of the product are subject to change without prior notice.
- The images of spark plugs indicated in the catalogue and website are conceptual diagrams, and sometimes differ from the actual products.

# Precautions for selecting spark plugs.

When selecting an appropriate type of spark plug, check the vehicle manual, the maintenance manual and the application table in this catalog, and select spark plugs with the correct dimensions and heat range.

#### Know-how concerning spark plug selection

#### Normal vehicle

- Basically, use a spark plug that has a standard heat range. Note, however, if this type of spark plug is used for traveling at low speed or traveling over short distances, resulting in the occurrence of carbon fouling, it is recommended that you use spark plugs that have a low heat range.
- Do not use a non-resistor type plug in an engine for which a resistor type plug is specified. This may result in engine trouble due to noise accompanying the spark discharge.
- If you install extended type spark plugs (J, QJ, KJ, PKJ, SKJ, VKJ, TJ, etc.) in a non-desiganated engine, they may interfere with the valves and pistons, causing damage to the engine and the spark plugs.

### Tuned or modified vehicle

- In the case of a tuned or modified vehicle which has a modified engine, or one which uses a muffler, ignition coil, plug cords, turbo unit or commercially available electronic ignition system, or a NOS (\*) for example, it is necessary to increase the heat range of the plugs to a value that matches the tuning level. If you do not select the plugs correctly, trouble such as carbon fouling / oil fouling or pre-ignition (a naturally occurring phenomenon in which combustion occurs prior to the emission of a spark from the plug) will occur, which may result in a breakdown of the vehicle.
- (\*) NOS: A device which injects nitrous oxide together with gasoline into the air intake in order to increase the engine power When using a tuned vehicle or a modified vehicle, select a heat range using your own judgment and at your own
- responsibility.

#### When using Iridium Racing plugs

- Iridium Racing plugs are intended for racing and also for tuning up. Set the heat range of the plugs to match the tuning level, based on the heat range of the standard plugs or Iridium Power plugs.
- Generally, a plug that protrudes into the combustion chamber has superior ignition performance, resulting in improved engine performance. On the other hand, this type of plug is liable to be exposed to the high-temperature combustion gas, and also the length of the grounding electrode increases, reducing the heat resistance and durability of the plug. For this reason, the higher the tuning level becomes, the greater is the necessity to use a type of plug that has a recessed electrode.
- Generally, when the tuning level rises, the necessity of using high heat range plugs increases.
- When using Iridium Racing plugs, select them according to your judgment and at your own responsibility.

### 

If you use a plug fitted with a terminal nut when the terminal nut is loose, the engine is likely to malfunction. If the part No. of the plug includes the notation "R" alongside "Terminal shape" or "NUT," and the plug is used with the terminal nut fitted, securely tighten the nut using pliers, or the like. In the case of a plug whose part No. includes the notation "RC" alongside "Terminal shape" or "NUT," the terminal nut is crimped and will not work loose under normal applications. However, if vibration of the engine and/or the plug cord is severe, the nut may on rare occasions become loose. Keep this possibility in mind, and periodically inspect the nut. If it is loose, re-tighten it securely.

#### S: Solid (integrated type)



R: Nut type (no crimping)



The terminal can be easily removed.

RC: Nut type (with crimping)



You can remove the terminal nuts using pliers, or the like.





Terminal nuts are not provided.





## Precautions to observe when installing the spark plugs

#### Recommended torque and angle of rotation

It is necessary to install the plugs in the engine using the correct torque. Note that if the torque is too low, the plugs are liable to work loose due to leakage of combustion gas or vibration, resulting in possible damage to the engine and the plugs. Conversely, if the torque is too high, the crimping between the insulator and the housing is liable to become loose, causing the integrity of the seal to be impaired or the mounting screw thread to break.

When carrying out this work, take Use the correct wrench that Before installing the plug, clean the matches the hex part of the plug. steps to ensure that oil, dust and mounting seat on the engine side, Take care not to damage the foreign objects in the vicinity of the check that there is a casket, and insulator. cylinder head do not enter the then insert the plug into the mounting seat. enaine. When carrying out this work, hold Next, using a plug wrench, tighten the plug vertically, the plug to the recommended torque and then lightly or the recommended angle indicated tighten it by hand in the table below. or by using a plug wrench.

If you tighten the plug to a greater rotation angle or torque than that indicated in the table below, the engine may become damaged or the screw thread of the plug may break, so be careful.

Do not apply screw thread lubricant to the plug since it may make you overtighten the plug and damage the threaded part of the plug. However, screw thread lubricant is already applied to some plugs for LPG engines. In such a case, tighten the plug according to the maintenance manual.

If you apply the plug wrench obliquely, an unreasonable force may be applied to the insulator, causing it to crack, as indicated in the figure below. For this reason, be careful not to hold the wrench obliquely.

Thread Size	Applicable Models	Recommended	Recommended Tightening Angle			
Thread Size	Applicable Models	Torque	New Plug	Previously Used		
M 8	All Types	8 -10N∙m	About 1/3 turn	About 1/12 turn		
M10	Types other than the ones shown below	10-15N∙m	About 1/3 turn	About 1/12 turn		
M10	UFE, IUH, VUH, VNH Types	10-15N∙m	About 2/3 turn	About 1/12 turn		
M10	Stainless Gasket Type (*1)	10-15N⋅m	About 3/4 turn	About 1/12 turn		
M12	All Types	15-20N⋅m	About 1/3 turn	About 1/12 turn		
M14	Types other than the ones shown below	20-30N⋅m	About 1/2 turn	About 1/12 turn		
M14	Stainless Gasket Type (*2)	20-30N∙m	About 2/3 turn	About 1/12 turn		
M18	All Types	30-40N∙m	About 1/4 turn	About 1/12 turn		
M14 Taper seat	All Ty	10-20N⋅m	About 1/16 turn	About 1/16 turn		
M14 (Gas)	If the cylinder head material is cast iron	20N•m	-	-		
M14 (Gas)	If the cylinder head material is aluminum	N∙m	-	-		
M18 (Gas)	If the cylinder head material is cast iron	30N•m	-	-		

(\*1) VUH27ES, U24FER9S

(\*2) IK16G, IK20G, IK22G, K20PR-U8S, K20PR-U9S, KJ20DR-M11S, PK22PR-L11S, SK20PR-N9S, SK22PR-M11S, SKJ20DR-M11S, VK16G, VK20G, VK22G

#### Cracking of the insulator

The plugs of recent engines are installed in deep plug holes, so it may be difficult to notice whether or not you are holding the wrench obliquely when installing or removing the plugs. However, if you turn the wrench in this condition, the head of the insulator may stick , causing an unreasonable force to be applied to it. As a result, the insulator is liable to crack.

\*However, the mode of occurrence differs according to the construction and dimensions of the plug holes in the engine, and also the type of wrench used.



## Regarding the spark plug replacement timing

The electrode progressively wears, causing the spark gap to increase, along with the increasing number of spark discharges. When the gap exceeds a certain limit, the sparking performance deteriorates, which may prevent stable ignition of the gas mixture. When this happens, the horsepower of the engine falls, the fuel economy deteriorates and also the quality of the exhaust gas is adversely affected, so it is necessary to replace the plugs. The table below shows our recommended plug replacement timing as a rough guide to the economic life of the plugs. The economic life may be reduced depending upon the vehicle running condition\* and the sparking characteristics\*.

#### Rough guide to the recommended replacement interval (economic life) for conventional spark plugs

(economic life) for conventional	l spark plugs	(economic life) for platinum plugs, Iridium Tough and Iridium Plus plug					
Automobile	15,000 to 20,000km	Automobile	up to100,000km *1				
Motorcycle	3,000 to 5,000km	Motorcycle	There are no settings.				

1: The small engine vehicle, a tuned vehicle or a vehicle that uses a simultaneous ignition coil is often used at high speed. This may cause the life of the plugs to be reduced.

Rough guide to the recommended replacement interval

#### Rough guide to the recommended replacement interval

(economic life) of NI-11 plugs	
Automobile	15,000 to 20,000km
Motorcycle	There are no settings.

\*Factors which shorten life

Running condition: High-speed running, high-load running, hill climbing, extended idling (taxi), etc.

- Ignition characteristics: Simultaneous ignition, positive discharge, use of high-energy coil, etc.
- \*Use the genuine plug for special applications such as ambulances, patrol cars, etc.

#### Simultaneous ignition system

A simultaneous ignition system is an ignition system in which two plug cords are connected to one coil, as shown in the figure. A normal coil consists of a single coil which provides a high voltage to one plug. Generally, it employs a negative discharge that results in relatively low wear. In contrast, a simultaneous ignition system uses a single coil which must be capable of supplying high voltage to two plugs. A negative discharge occurs at one plug and a positive discharge occurs at the other plug, resulting in the generation of wasteful fire that is unrelated to combustion. For this reason, the electrode at which a positive discharge occurs tends to wear markedly.



## Adjustment of the plug gap

If the center electrode becomes rounded or the grounding electrode wears unevenly, replace the plug with a new one. Do not adjust the gap of a plug that has a thin electrode, such as a platinum plug or an iridium plug, because this may result in damage to the center electrode.

# BASIC INFORMATION FOR PLUG (1)

### The role of spark plugs

#### DENSO spark plugs ignite your engine.

Gasoline engines generate power from the precision-timing combustion of a fuel-air mixture of gasoline and oxygen. However, gasoline itself is relatively difficult to ignite with the precision timing required for combustion of the fuel-air mixture, even at high temperatures. The role of the spark plug is to create a spark which ignites the fuel. Since the spark plug ignites combustion, the performance of the plug determines the performance of the entire engine. The engine is often likened to the "heart of a vehicle," and spark plugs have the significant role as the "heart of the engine."



# 2 Spark and Ignition

# Generate a strong spark from an electrical discharge between electrodes

When high voltage produced by the ignition system is discharged between the center electrode and ground electrode of the spark plug, the natural insulation between the two electrodes breaks down, current flows as a result of the discharge phenomenon, and an electrical spark is generated.

The energy from this spark triggers the igniting and combustion of the compressed air-fuel mixture. The duration of this discharge is extremely brief (about 1/1,000 of a second) and is extraordinarily complex.



The role of the spark plug is to reliably generate a strong spark between electrodes precisely at each specific moment to create the trigger for combustion of the gaseous mixture.

# The spark plug generates a flame kernel from a spark which then ignites the fuel

Igniting the fuel with an electrical spark occurs because fuel particles situated between the electrodes are activated by the discharge spark to trigger a chemical reaction (oxidation), the reaction generates heat, and a flame kernel is formed. This heat ignites the surrounding air-fuel mixture until a flame core is formed that spreads combustion throughout the chamber. However, the electrodes themselves absorb heat which can extinguish the flame kernel, called the "quenching effect." If the quenching effect between the electrodes is greater than the heat generated by the flame kernel, the flame is extinguished and combustion stops.

If the plug gap is wide, the flame kernel will be larger and the quenching effect is reduced, so reliable ignition can be expected. But if the gap is too wide, a large discharge voltage becomes necessary, the limits of coil performance are exceeded, and discharge becomes impossible.



1 Center Electrode2 Ground Electrode3 Flame kernel4 Heat absorption5 Flame propagation

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## How to Choose a Plug

Various circumstances such as engine conditions and driving conditions are rough measures for choosing a plug. For example, if strenuous driving is continued for a long time using normal plugs, the plug will overheat. This is why the idea of a regular plug for a regular car doesn't work. What's important is to inspect the condition of your current plugs, and then choose a plug accordingly.

Heat Range	Application
31	To prevent plug overheat
27	
24	Standard Plugs
22	
20	To prevent carbon fouling/ oil fouling
	Low ← → High Level of Tuning

#### The heat range will change with the seasons.

When the air temperature is high, as in the summer, the inlet air temperature becomes higher, increasing the load on the engine. In times like this, it's better to choose a plug with a higher heat range.

#### The more horsepower is increased, the higher the required heat range.

If the horsepower has been increased through tuning, the increase in explosive power leads to an increase in combustion chamber temperature, making preignition more likely; in such cases it is necessary to choose a plug with a higher heat range and a higher level of heat resistance.

### **Glossary of spark plug terms**

### What is a spark plug's heat range ?

### Spark plug heat dispersal

The degree to which a spark plug disperses the heat it receives is called its "heat range". Spark plugs with a high degree of heat dispersal are called high heat range (cold type) and those with a low degree of heat dispersal are called low heat range (hot type).



### The relationship between the spark plug temperature and vehicle speed and heat range

There are restrictions on the temperatures at which spark plugs can be used: the lower limit is the self-cleaning temperature and the upper limit is the pre-ignition temperature. A spark plug only functions completely when its center electrode temperature is between these temperatures of about 500C and 950C.



3 Low heat range (hot type) spark plugs 4 Standard spark plugs 5 High heat range (cold type) spark plugs T: Spark plug temperature (°C) S: Vehicle speed

### Low heat range and high heat range

Low heat range plugs have long insulator leg sections and the surface area affected by the flame and the gas pocket capacity are large. Also, since the heat release path from the insulator leg section to the housing is long, heat dispersal is low and the temperature of the center electrode rises easily.

On the other hand, high heat range plugs have short insulator legs and the surface area affected by the flame and the gas pocket capacity are small.

Also since the heat release path from the insulator leg section to the housing is short, heat dispersal is high and the temperature of the center electrode does not rise easily.





# BASIC INFORMATION FOR PLUG (2)

04

## Failure Modes of Spark Plugs

Condition	Normal	Carbon fouling	Oil fouling
Appearance			
	When using unleaded gasoline, the base of the insulator often becomes white or gray. The electrode may become slightly burned. When using leaded gasoline, the base of the insulator becomes light brown.	Dried carbon is deposited, covering the insulation base and electrode area.	The base of the insulator and electrode become shiny black, covered with oil or gasoline.
Engine	The engine runs in excellent condition when starting or driving, both at high or low speeds.	Engine startability worsens and "misses" at low speeds. If not corrected, the engine may die often and have poor acceleration. (Nearly 90% of engine trouble from spark plugs is caused by carbon fouling or oil fouling.)	Engine startability worsens and "misses" at low speeds. If not corrected, the engine may die often and have poor acceleration. (Nearly 90% of engine trouble from spark plugs is caused by carbon fouling or oil fouling.)
Causes		<ol> <li>Inappropriate thermal value</li> <li>Engine idling for a long time, or driving in low temperatures</li> <li>Rich air-fuel mixture</li> <li>Clogged air filter</li> <li>Delay in ignition timing</li> </ol>	<ol> <li>Oil leakage into the combustion chamber due to frictional wear of the piston rings, valve guides, or cylinder wall.</li> <li>Rich air-fuel mixture</li> </ol>
Solve the problem		<ol> <li>or 2: Use a spark plug with a thermal value that is one level lower, or adjust engine idling</li> <li>to 5: Perform complete readjustment and tune-up</li> </ol>	<ol> <li>Spark plugs may become wet until the oil flow control becomes normal during pre-conditioning runs with a new engine or an engine immediately after an overhaul. In such cases, simply clean the plug and reinstall it. In other cases, the engine basically requires a complete overhaul.</li> <li>Adjust the carburetor.</li> </ol>

Condition	Overheating	Pre-ignition	Insulator breakage			
Appearance						
	The base of the insulator will be burned and become bleach white from the heat. The electrode will also be burned and become white or dark purple. Electrodes will wear out soon.	The electrode will be melted. In extreme cases, the base of the insulator is also melted.	The base of the insulator has a vertical crack. The appearance of the spark plug is similar to problems with overheating or lead fouling.			
Engine	Engine horsepower decreases and speed falls when running continuously at high speeds, driving for a long time uphill, or pulling too great a load.	This is caused by overheating. Temperatures in the combustion chamber increase rapidly, destroying not only the spark plug, but the piston head also.	Engine horsepower decreases and speed falls when running continuously at high speeds, driving for a long time uphill, or pulling too great a load.			
Causes	<ol> <li>Inappropriate thermal value of plug</li> <li>Use of low octane gasoline</li> <li>Ignition timing set too early</li> <li>Inappropriate cooling</li> <li>Poor air-fuel mixture</li> </ol>	<ol> <li>Inappropriate thermal value of plug</li> <li>Use of low octane gasoline</li> <li>Ignition timing set too early</li> <li>Inappropriate cooling</li> <li>Poor air-fuel mixture</li> </ol>	<ol> <li>Inappropriate thermal value of plug</li> <li>Ignition timing set too early</li> <li>Inappropriate cooling</li> <li>Poor air-fuel mixture</li> </ol>			
Solve the problem	<ol> <li>Use a spark plug with a higher thermal value</li> <li>Use higher octane gasoline</li> <li>Adjust the ignition timing</li> <li>Check the cooling system</li> <li>Adjust the carburetor</li> </ol>	<ol> <li>Use a spark plug with a higher thermal value</li> <li>Use higher octane gasoline</li> <li>Adjust the ignition timing</li> <li>Check the cooling system</li> <li>Adjust the carburetor</li> </ol>	<ol> <li>Use a spark plug with a higher thermal value</li> <li>Adjust the ignition timing</li> <li>Check the cooling system</li> <li>Adjust the carburetor</li> </ol>			

# The plugs configuration







If you find any counterfeit parts, please contact us at "info@japia.or.jp"

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# Comparison Between Genuine **DENSO and Fake Spark Plugs**

## **Appearance**

Compare a potential counterfeit and a genuine DENSO Spark Plug side by side.



Insulator Counterfeit spark plugs have an irregular insulator shape The shape should be uniform.



**Ground electrode** The width of the ground electrode is usually inconsistent on counterfeit products.





A scratch test materials used in counterfeit products.



electrode chip Counterfeit spark plugs are prone to have cheaper or fake material coatings.

Ground



**Center electrode** Look out for poor quality welding.



Why Power Drops and Melting Occurs

Branding Counterfeit spark plugs lack precision when embossing the DENSO logo and often display spelling mistakes.

## **Problems Caused by Fake Spark Plugs**



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# SPARK UP with the Twin Tip Range.

These spark plugs feature a 'twin tip' – a thin centre and a protruding ground electrode – to give you more sparks and enhanced ignitability! With an overall increased performance at a lower cost, experience a smooth and superior ride anytime, anywhere.



DENSO

www.denso.com.sg

# REVOLUTION

The Revolutionary Nickel TT Spark Plug from Japan with advanced Twin Tip technology!

# SPARK UP. More Savings.

This spark plug features a 'twin tip' – a thin centre and a protruding ground electrode both 1.5mm in diameter – which enhances the ignitability of your car. The faster you start your car, the more petrol you save!

With better performance at a lower cost, experience a smooth and superior ride anytime, anywhere.





www.denso.com.sg



# Recommended for anyone who wants a better Nickel spark plug

### 1 Boosting flying sparks and ignitability Thin center electrode (1.5mm) Double Needle structure (a first with nickel)

Utilizes nickel alloy featuring new materials

### 2 Model consolidation : Model 290 - Model 16

### High ignitability nickel plug impact of thin diameter on both sides of electrode

#### Nickel spark plug High ignitability nickel spark plug (Ni-TT plug) Anti-incendiary action Anti-incendiary action Chilled Chilled Large New nickel alloy Smal Thin diameter for center electrode Space Φ2.5 7 th 1 Thin diameter for ground electrode Large m lame developmen Chilled Small Chilled Flame kernel 1msec (Afterdischarge) 3msec 8msec

A new nickel alloy achieves thin diameter on both sides of the electrode, improving combustion by boosting flame development

## Reasons why the Ni-TT plug can cover for other Nickel plugs



The Ni-TT plug can cover for other standard plugs thanks to its superior ignitability (flame kernel spreads easily).

## Improves speed and output

#### 1.1% improvement in torque boosts horsepower by 1.1\*1 7 Long

Improving engine torque means greater dynamism! Standard plug Facilitates smooth driving even when subjected to a load--such as people or baggage--on top.



## Improved fuel efficiency

#### Improves fuel efficiency by 1.2%! The more you drive, the more economical it is!

Fuel efficiency is boosted by reliable ignitability. Fuel consumption is lowered, and the vehicle can run longer on the same amount of fuel. Vehicle:1.5*l*, 4-cylinder Driving conditions:10.15 mode





\* All data indicated is provided by DENSO. All references to standard plugs refer to DENSO products



ТҮРЕ	DIA (mm)	REACH (mm)	HEX (mm)	GAP	PROJECTION (mm)	SPARK POSITION (mm)	TERMINAL SHAPE	RESISTOR (kΩ)	TT PLUG DENSO P/N	
K16TT	14	19	16	1.0	1.5	3	S	5	267700-7431	
K20TT	14	19	16	1.0	1.5	3	S	5	267700-7441	
KH16TT	12	26.5	16	1.0	1.5	3	S	5	267700-7451	
KH20TT	12	26.5	16	1.0	1.5	3	S	5	267700-7460	
Q16TT	14	19	16	1.0	1.5	3	S	5	267700-7471	
<b>Q20TT</b>	14	19	16	1.0	1.5	3	S	5	267700-7481	
W16TT	14	19	20.6	0.8	1.5	3	RC	5	267700-6301	
W20TT	14	19	20.6	0.8	1.5	3	RC	5	267700-6311	
W22TT	14	19	20.6	0.8	1.5	3	RC	5	267700-7510	
WF20TT	14	12.7	20.6	0.8	1.5	3	RC	5	267700-7500	
T16TT	14	17.5	16	1.0	1.5	3	S	5	267700-7820	
T20TT	14	17.5	16	1.0	1.5	3	S	5	267700-7830	
TV16TT	14	25	16	1.0	1.5	3	S	5	267700-7490	
XU22TT	12	19	16	0.8	1.3	2.8	S	5	267700-7080	
XUH22TT	12	26.5	16	0.8	1.5	3	S	5	267700-7090	
XUH20TTI	12	26.5	16	0.8	1.5	4	S	5	267700-8290	

DENSO

# REVOLUTION

The Revolutionary Platinum TT Spark Plug from Japan with advanced Twin Tip technology!

# SPARK UP. Xtra Boost.

This spark plug features a 'twin tip' – a thin centre and a protruding ground electrode both 1.1mm in diameter – which enhances your engine's efficiency and extends the spark plug's shelf life.

With improved performance at a lower cost, experience a smooth and superior ride anytime, anywhere.











**1** DENSO Unique "Twin-Tip" Structure 2 1.1mm platinum center electrode **3 360 Laser welding** 

## **High Ignitability Platinum Plug**



Thinner center electrode with Platinum

Chilled

Platinum TT

Chilled

**Reduced quenching results in** larger flame

Faster flame propagation for more complete combustion

(engine :1.8L)

+1.5%UP

15.90

better

15.80

15.70

DENSO's revolutionary Twin-Tip design is a combination of highly durable precious metals-Platinum and Titanium. The center electrode is created using an extremely durable platinum alloy that allows for the reduction of the tip size to 1.1mm in diameter, while maintaining the life of the plug. The Titanium-enhanced alloy on the ground electrode also increases durability, which is critical to minimize tip erosion and achieve the new Twin-Tip design.



Superior ignitability of the DENSO Platinum TT means more efficient combustion, which yields better engine performance in terms of power and fuel economy. Better mileage, more power, and faster starts, all while reducing carbon emissions are what places the platinum TT heads above the competition. Top performance, total value.

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Туре	DIA (mm)	REACH (mm)	HEX (mm)	GAP (mm)	PROJECTION (mm)	SPARK POSITION (mm)	GROUND ELECTRODE HEIGHT (mm)	TERMINAL SHAPE	RESISTOR (kΩ)	No.	DENSO P/N	
PK16TT	14	19	16	1	1.5	3	6.3	Solid	5	PT03	267700-6320	
PK20TT	14	19	16	1	1.5	3	6.3	Solid	5	PT04	267700-6330	
PK22TT	14	19	16	1	1.5	3	6.3	Solid	5	PT14	267700-7790	
PKH16TT	14	26.5	16	1	1.5	3	6.3	Solid	5	PT05	267700-6340	
PKH20TT	14	26.5	16	1	1.5	3	6.3	Solid	5	PT06	267700-6350	
PQ16TT	14	19	16	1	1.5	3	6.3	Solid	5	PT07	267700-6360	
PQ20TT	14	19	16	1	1.5	3	6.3	Solid	5	PT08	267700-6370	
PW16TT	14	19	20.6	1	1.5	3	6.3	Solid	5	PT01	267700-6380	
PW20TT	14	19	20.6	1	1.5	3	6.3	Solid	5	PT02	267700-6390	
PT16TT	14	17.5	16	1	1.5	3	6.3	Solid	5	PT11	267700-7200	
PT20TT	14	17.5	16	1	1.5	3	6.3	Solid	5	PT12	267700-7210	
PTF16TT	14	11.2	16	1	1.5	3	6.3	Solid	5	PT09	267700-7240	
PTF20TT	14	11.2	16	1	1.5	3	6.3	Solid	5	PT10	267700-7250	
PTV16TT	14	25	16	1	1.5	3	6.3	Solid	5	PT13	267700-7220	

# REVOLUTION

The Revolutionary Iridium TT Spark Plug from Japan with advanced Twin Tip technology!

# SPARK UP. Full Throttle.

This spark plug features a 'twin tip' – a thin centre of 0.4mm and a protruding ground electrode of 0.7mm in diameter – which boosts your car's horsepower and torque.

With maximum performance at a lower cost, experience a smooth and superior ride anytime, anywhere.





DENSO

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 $\phi$  0.4mm DOUBLE NEEDLE

Definition of the world's finest diameter (so of March 2021)

with an iridium center electrode

The Finest TT plug with improved Acceleration Economical and long lasting!

# **0.4 mm iridium alloy & 0.7 mm platinum needle alloy** achieve high performance & high durability

DENSO has started to sell IRIDIUM TT spark plugs having a  $\phi$ 0.4 mm iridium alloy center electrode and a 0.7 mm needle-type platinum alloy ground electrode.

The quenching effect has been decreased by forming the electrode into a double needle shape. As a result, the flame kernel rapidly develops and the engine's power is drawn out to its maximum potential.



#### Built-in, Highly Reliable Resistor

All specification types include an embedded, highly reliable, monolithic resistor to eliminate electromagnetic noise interference from all kinds of electronic devices.

#### 360° Laser Welding

The iridium tip is mounted with an "All-around Laser Welding" method that insures high reliability and durability even under the most severe driving conditions.



#### Φ 0.7mm Needle-Shaped Platinum Ground Electrode

In order to maximally prevent quenching effect, the ground electrode needs to be made as small as possible. Traditional ground electrodes could not be made too small without reducing grounding strength or increasing electrode wear. However, we've managed to attach a fine 0.7mm-diameter platinum electrode using a  $360^{\circ}$  laser welding technique.

#### 2 φ0.4mm Ultra-fine Iridium Center Electrode

Using DENSO's exclusive iridium alloy having a very high melting point, the tip of the center electrode can be shaped very thin and fine, reducing spark voltage requirements and greatly improving ignitability.



DENSO AUSTRALIA CHINA INDIA INDONESIA KOREA MALAYSIA PHILIPPINES SAUDIARABIA SINGAPORE TAIWAN THAILAND VIETNAM JAPAN & USA CYCLE ENGINE REFERENCE NUMBER 23

#### Flame Growth

The photograph shows flame reflected by the variation in density. Fig. 1 shows the results of studying the influence of electrode shape on flame growth, using the Iridium Spark Plug and IRIDIUM TT.

The photographs indicate that, in the case of the Iridium Spark Plug, the size reduction of the gap (from 1.1 mm to 0.6 mm) interfered with flame growth, while in the case of IRIDIUM TT, flame growth was ample and greater than that of the Iridium Spark Plug in spite of the narrowed spark gap (0.6 mm). These observations show that, as the results of the ignition/firing simulation indicated, a fine ground electrode can reduce required voltage because it enables the spark gap to be narrower, while realizing higher ignitability than the Iridium Spark Plug.



Fig.1 Electrode Shape's Effect to Flame Growth

#### Higher Ignitability

Fig. 3 shows the results of evaluating how the

miniaturized-portion protrusion direction may influence the ignitability of an engine. The evaluation checked idle speed at equal throttle opening with the ISC (idle speed control) turned off. A higher idle speed represents higher ignitability. This figure shows the results of evaluating IRIDIUM TT. This figure shows that IRIDIUM TT are superior to the Iridium Spark Plugs in ignitability.



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#### Fig.3 Influence of Miniaturized-Portion Protrusion to Ignitability

#### Advantages of Fine Ground Electrodes

To lower the required voltage and improve firing performance. The most advanced technology in the world has been employed to enable use of electrode, at 0.4 mm in diameter, in the IRIDIUM TT.

The smaller the electrode the more concentrated the electric potential at the tip of the electrode and the stronger the electric field that affects required voltage and the lower the required voltage. As a result, combustion is good for all types of driving, the engine starts easily, and acceleration improves. The above shows the strength of electrical field in case certain voltage changes on Iridium plug and IRIDIUM TT. The more electrical field strength is getting high, the more it becomes easy to fire with low voltage.

\*1 FEM(Finite Element Method analysis): General method to measure electrical field strength.



Fig.2 Electric Field Analysis (FEM)

#### Better fuel efficiency

Fig. 4 shows the results of the examination of combustion variation and fuel consumption, using a 1,800-cc, four-cylinder engine. The evaluation was conducted by turning on the ISC and setting the average engine speed to 800 rpm (idling). The previously specified Type-1 of the IRIDIUM TT was used in this examination. Pmi COV (coefficient of variation) in the diagraph shows fluctuation in IMEP (indicated mean effective pressure). As this figure shows, IRIDIUM TT can reduce the Pmi COV approximately 3.1% and accordingly reduce fuel consumption by 2.4%, compared with the Iridium Spark Plug. These advantages are achieved because the miniaturization of the ground electrode enables better ignitability, improving combustion efficiency. Because the IRIDIUM TT is low in combustion variation and enables a reduction in idling speed, further improvement can be expected in fuel efficiency.



PART CROSS SMALL MOTOR NUMBER REFERENCE ENGINE CYCLE



Туре	Spec	DIA (mm)	REACH (mm)	HEX (mm)	GAP	PROJECION	SPARK POSITION E	Ground Electrode Height	TERMINAL SHAPE	RESISTOR	No.	DENSO P/N
IK16TT	ISO	14	19	16	1	1.5	3	6.2	Solid	5	IT01	267700-8450
IK20TT	ISO	14	19	16	1	1.5	3	6.2	Solid	5	IT02	267700-8530
IKH16TT	ISO	14	26.5	16	1	1.5	3	6.2	Solid	5	IT03	267700-8460
IKH20TT	ISO	14	26.5	16	1	1.5	3	6.2	Solid	5	IT04	267700-8470
IKBH20TT	NEW 3 ELECTRODE	14	26.5	16	1	2.5	4	7.2	Solid	5	IT05	267700-8480
IQ16TT	JIS	14	19	16	1	1.5	3	6.2	Solid	5	IT06	267700-8190
IQ20TT	JIS	14	19	16	1	1.5	3	6.2	Solid	5	IT07	267700-8200
IW16TT		14	19	20.6	1	1.5	3	6.2	Solid	5	IT08	267700-8210
IW20TT		14	19	20.6	1	1.5	3	6.2	Solid	5	IT09	267700-8220
IXEH20ETT	SHROUD 2mm	12	26.5	14	1	2.5 (+shroud 2mm)	4 (+shroud 2mm)	7.1 (+shroud 2mm)	Solid	5	IT10	267700-8490
IXEH20TT		12	26.5	14	1	2.5	4	7.1	Solid	5	IT11	267700-8500
IXEH22TT		12	26.5	14	1	2.5	4	7.1	Solid	5	IT12	267700-8510
IT16TT	TAPER SEAT	14	17.5	16	1	1.5	3	6.2	Solid	5	IT13	267700-8230
IT20TT	TAPER SEAT	14	17.5	16	1	1.5	3	6.2	Solid	5	IT14	267700-8520
ITF16TT	TAPER SEAT	14	11.2	16	1	1.5	3	6.2	Solid	5	IT15	267700-8260
ITF20TT	TAPER SEAT	14	11.2	16	1	1.5	3	6.2	Solid	5	IT16	267700-8270
ITL16TT	TAPER SEAT (INSULATOR Length 56mm)	14	25	16	1	1.5	3	6.2	Solid	5	IT17	267700-8280
ITV16TT	TAPER SEAT (INSULATOR Length 50mm)	14	25	16	1	1.5	3	6.2	Solid	5	IT18	267700-8240
ITV20TT	TAPER SEAT (INSULATOR Length 50mm)	14	25	16	1	1.5	3	6.2	Solid	5	IT19	267700-8250



IXEH20TT

IXEH22TT























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# Cross Reference

NGK Ni/Pt/lr	NGK TYPE				DENSO	NG Ni/P
	B5EB11	W16TT	PW16TT	IW16TT	W16EKR-S11	
	B6EB	<b>W20TT</b>	PW20TT	IW20TT	W20EKR-S11	
	B6EB11	<b>W20TT</b>	PW20TT	IW20TT	W20EKR-S11	
	B6EB-L11	<b>W20TT</b>	PW20TT	IW20TT	W20EKR-S11	
	B6EFS	T20TT	PT20TT	IT20TT	T20EP-U	
	B7EB	W22TT	—	—	W22EKR-S11	
	B7EB11	<b>W22TT</b>	—	—	W22EKR-S11	
	BCP4ES	Q16TT	PQ16TT	IQ16TT	Q14R-U11	
	BCP4ES11	Q16TT	PQ16TT	IQ16TT	Q14R-U11	
	BCP5E	Q16TT	PQ16TT	IQ16TT	Q16P-U11	
	BCP5E11	Q16TT	PQ16TT	IQ16TT	Q16P-U11	
	BCP5ES	Q16TT	PQ16TT	IQ16TT	Q16-U	
	BCP5ES11	Q16TT	PQ16TT	IQ16TT	Q16-U11	
	BCP5ET	K20TT	PK20TT	IK20TT	K20PBR	
	BCP5EY11	Q16TT	PQ16TT	IQ16TT	Q16-U11	
	BCP6E	<b>Q20TT</b>	PQ20TT	IQ20TT	Q20P-U	
	BCP6E11	<b>Q20TT</b>	PQ20TT	IQ20TT	Q20P-U11	
	BCP6ES	<b>Q20TT</b>	PQ20TT	IQ20TT	Q20-U	
	BCP6ES11	<b>Q20TT</b>	PQ20TT	IQ20TT	Q20-U11	
	BCP6ET	K20TT	PK20TT	IK20TT	K20PBR	
	BCP6EY11	<b>Q20TT</b>	PQ20TT	IQ20TT	Q20-U11	
	BCPR4ES11	Q16TT	PQ16TT	IQ16TT	Q14R-U11	
	BCPR4EY11	Q16TT	PQ16TT	IQ16TT	Q14R-U11	
	BCPR5E	Q16TT	PQ16TT	IQ16TT	Q16PR-U	
	BCPR5E11	Q16TT	PQ16TT	IQ16TT	Q16PR-U11	
	BCPR5ES	Q16TT	PQ16TT	IQ16TT	Q16PR-U	
	BCPR5ES11	Q16TT	PQ16TT	IQ16TT	Q16PR-U11	
Ni	BCPR5ET	K20TT	PK20TT	IK20TT	K20PBR	N
	BCPR5EY	_	PQ16TT	IQ16TT	Q16R-U	
	BCPR5EY11	Q16TT	PQ16TT	IQ16TT	Q16R-U11	
	BCPR5EY-N11	Q16TT	PQ16TT	IQ16TT	Q16PR-U11	
	BCPR5EY-N11	Q16TT	PQ16TT	IQ16TT	Q16R-U11	
	BCPR6E	<b>Q20TT</b>	PQ20TT	IQ20TT	Q20PR-U	
	BCPR6E11	<b>Q20TT</b>	PQ20TT	IQ20TT	Q20PR-U11	
	BCPR6ES	<b>Q20TT</b>	PQ20TT	IQ20TT	Q20PR-U	
	BCPR6ES11	<b>Q20TT</b>	PQ20TT	IQ20TT	Q20PR-U11	
	BCPR6ET	K20TT	PK20TT	IK20TT	K20PBR	
	BCPR6EY	<b>Q20TT</b>	PQ20TT	IQ20TT	Q20R-U	
	BCPR6EY11	<b>Q20TT</b>	PQ20TT	IQ20TT	Q20R-U11	
	BCPR6EY-N11	<b>Q20TT</b>	PQ20TT	IQ20TT	Q20PR-U11	
	BCPR6EY-N11	<b>Q20TT</b>	PQ20TT		Q20R-U11	
	BK5E	K16TT	PK16TT	IK16TT	K16P-U	
	BK5E11	K16TT	PK16TT	IK16TT	K16P-U11	
	BK6E	K20TT	PK20TT	IK20TT	K20P-U	
	BK6E11	K20TT	PK20TT		K20PR-U11	
	BKR4ESA11	_	PK16TT	IK16TT	_	
	BKR5E	K16TT	PK16TT	IK16TT	K16PR-U	
	BKR5E11	K16TT	PK16TT		K16PR-U11	
	BKR5E11	K16TT	PK16TT		K16PR-U11	
	BKR5E-E	K16TT	PK16TT		K16PR-UR	
	BKR5EK	K20TT	PK20TT	IK20TT	K20TXR	
	BKR5EKB11	K16TT	PK16TT	IK16TT	K16TR11	
	BKR5EKC	K16TT	PK16TT		K16TNR-S9	
	BKR5EKU	K20TT	PK20TT	IK20TT	K20TXR	
	BKR5EKUP		PK20TT	IK20TT	K20TXR	
	BKR5EN	K16TT	PK16TT	IK16TT	K16PR-U	

NGK li/Pt/lr	NGK TYPE				DENSO
	BKR5EN11	K16TT	PK16TT	IK16TT	K16PR-L11
	BKR5ES	K16TT	PK16TT	IK16TT	K16PR-U
	BKR5ES-11	K16TT	PK16TT	IK16TT	K16PR-U11
	BKR5ESA-11	K16TT	PK16TT	IK16TT	K16PR-U11
	BKR5EY	K16TT	PK16TT	IK16TT	K16R-U
	BKR5EY11	K16TT	PK16TT	IK16TT	K16R-U11
	BKR5EYA	K16TT	PK16TT	IK16TT	K16R-U
	BKR5EYA11	K16TT	PK16TT	IK16TT	K16R-U11
	BKR5EZ	K16TT	PK16TT	IK16TT	K16PR-U
	BKR6E	K20TT	PK20TT	IK20TT	K20PR-U
	BKR6E	K20TT	PK20TT	IK20TT	K20PR-U
	BKR6E11	K20TT	PK20TT	IK20TT	K20PR-U11
	BKR6E-E	K20TT	PK20TT	IK20TT	K20PR-UR
	BKR6EK	K20TT	PK20TT	IK20TT	K20TXR
	BKR6EKB11	K20TT	PK20TT	IK20TT	K20TR11
	BKR6EKC	<b>K20TT</b>	PK20TT	IK20TT	K20TNR
	BKR6EKC-N11	<b>K20TT</b>	PK20TT	IK20TT	K20TNR
	BKR6EKE	K20TT	PK20TT	IK20TT	K20TXR
	BKR6EKU	<b>K20TT</b>	PK20TT	IK20TT	K20TXR
	BKR6EKUB	<b>K20TT</b>	PK20TT	IK20TT	K20TXR
	BKR6EKUE	K20TT	PK20TT	IK20TT	K20TXR
	BKR6EN	K20TT	PK20TT	IK20TT	K20PR-U
	BKR6EN11	<b>K20TT</b>	PK20TT	IK20TT	K20PR-L11
	BKR6EQU	K20TT	PK20TT	IK20TT	K20TXR
	BKR6EQUA	K20TT	PK20TT	IK20TT	K20TXR
	BKR6EQUB	<b>K20TT</b>	PK20TT	IK20TT	K20TXR
	BKR6EQUP	<b>K20TT</b>	PK20TT	IK20TT	K20TXR
Ni	BKR6EQUPA	K20TT	PK20TT	IK20TT	K20TXR
	BKR6ES	K20TT	PK20TT	IK20TT	K20PR-U
	BKR6ES11	K20TT	PK20TT	IK20TT	K20PR-U11
	BKR6ESZ-10	K20TT	PK20TT	IK20TT	K20PR-U11
	BKR6ETA10	K20TT	PK20TT	IK20TT	K20PBR
	BKR6ETUB	K20TT	PK20TT	IK20TT	K20PBR-S10
	BKR6EY	K20TT	PK20TT	IK20TT	K20R-U
	BKR6EY11	K20TT	PK20TT	IK20TT	K20R-U11
	BKR6EYA	K20TT	PK20TT	IK20TT	K20R-U
	BKR6EYA11	K20TT	PK20TT	IK20TT	K20R-U11
	BKR6EZ	K20TT	PK20TT	IK20TT	K20PR-U
	BKR6EZB	K20TT	PK20TT	IK20TT	K20PR-U
	BKUR5EK9	K16TT	PK16TT	IK16TT IK16TT	K16TNR-S9
	BKUR5ET BKUR5ET10	K16TT K16TT	PK16TT PK16TT	IK16TT	K16TNR-S9 K16TNR-S9
	BKUR5ETC10	K16TT	PK16TT	IK16TT	K16TNR-S9
	BKUR5ETZ10	K16TT	PK16TT	IK16TT	K16TNR-S9
	BKUR6E	K20TT	PK1011 PK20TT	IK20TT	K20PR-SU9
	BKUR6EK	K20TT	PK20TT	IK20TT	K20TNR-S
	BKUR6EK9	K20TT	PK20TT	IK20TT	K20TNR-S9
	BKUR6ET	K20TT	PK20TT	IK20TT	K20PBR-S10
	BKUR6ET10	K20TT	PK20TT	IK20TT	K20PBR-510
	BKUR6ETB	K20TT	PK20TT	IK20TT	K20PBR-510
	BROHIDET B	W16TT	PW16TT	IW16TT	W14EX-U
	BP4EA11	W16TT	PW16TT	IW16TT	W14EX-U11
	BP4EFS	T16TT	PT16TT	IT16TT	T16EPR-U
	BP4ES	W16TT	PW16TT	IW16TT	W14EP-U
	BP4ES	W16TT	PW16TT	IW16TT	W14EX-U
	BP4ES11	W16TT	PW16TT	IW16TT	W14EX-U11

NGK Ni/Pt/Ir	NGK TYPE			IRIDIUM	DENSO	NGK Ni/Pt/Ir	NGK TYPE			IRIDIUM T <sub>×</sub> T.	DENSO
	BP4ES-L11	W16TT	PW16TT	IW16TT	W14EX-U11		BP7ES11	<b>W22TT</b>	—	-	W22EP-U11
	BP4EY	W16TT	PW16TT	IW16TT	W14EX-U		BP7ET	W22TT	_	_	W22EPB
	BP4EY11	W16TT	PW16TT	IW16TT	W14EX-U11		BP7EY	<b>W22TT</b>	_	_	W22EP-U
	BP4FS	—	PTF16TT	ITF16TT	T14PR-U		BPR4EFS	_	PT16TT	IT16TT	-
	BP5E	W16TT	PW16TT	IW16TT	W16EP-U		BPR4ES	W16TT	PW16TT	IW16TT	W14EPR-U
	BP5EA	W16TT	PW16TT	IW16TT	W14EX-U		BPR4ES	W16TT	PW16TT	IW16TT	W14EXR-U
	BP5EA11	W16TT	PW16TT	IW16TT	W14EX-U11		BPR4ES11	W16TT	PW16TT	IW16TT	W14EXR-U11
	BP5EA-L	W16TT	PW16TT	IW16TT	W16EX-U		BPR4ES13	W16TT	PW16TT	IW16TT	W14EXR-U13
	BP5EA-L11	W16TT	PW16TT	IW16TT	W16EX-U11		BPR4ES-L11	W16TT	PW16TT	IW16TT	W14EXR-U11
	BP5EFS	T16TT	PT16TT	IT16TT	T16EPR-U		BPR4EY	W16TT	PW16TT	IW16TT	W14EXR-U
	BP5EFS-13	T16TT	PT16TT	IT16TT	T16EPR-U15		BPR4EY11	W16TT	PW16TT	IW16TT	W14EXR-U11
	BP5EK-A	W16TT	PW16TT	IW16TT	W16ET-S		BPR4FS	—	PTF16TT	ITF16TT	T14PR-U
	BP5EKN	W16TT	PW16TT	IW16TT	W16ET-S		BPR4FS11	—	PTF16TT	ITF16TT	T14PR-U15
	BP5ES	W16TT	PW16TT	IW16TT	W16EP-U		BPR4FS15	—	PTF16TT	ITF16TT	T14PR-U15
	BP5ES	W16TT	PW16TT	IW16TT	W16EX-U		BPR5E	W16TT	PW16TT	IW16TT	W16EPR-U
	BP5ES11	W16TT	PW16TT	IW16TT	W16EP11		BPR5E11	W16TT	PW16TT	IW16TT	W16EPR-U11
	BP5ES11	W16TT	PW16TT	IW16TT	W16EP-U11		BPR5EA	W16TT	PW16TT	IW16TT	W14EXR-U
	BP5ES11	W16TT	PW16TT	IW16TT	W16EX-U11		BPR5EA-11	W16TT	PW16TT	IW16TT	W14EXR-U11
	BP5ES13	W16TT	PW16TT	IW16TT	W16EX-U13		BPR5EA-L	W16TT	PW16TT	IW16TT	W16EXR-U
	BP5ES-A	W16TT	PW16TT	IW16TT	W16EP-U		BPR5EA-L11	W16TT	PW16TT	IW16TT	W16EXR-U11
	BP5ES-A	W16TT	PW16TT	IW16TT	W16EX-U		BPR5EF	T16TT	PT16TT	IT16TT	T16EPR-U
	BP5ESZ	W16TT	PW16TT	IW16TT	W16EP-U		BPR5EFS	T16TT	PT16TT	IT16TT	T16EPR-U
	BP5ET	W16TT	PW16TT	IW16TT	W16EPB10		BPR5EFS13	T16TT	PT16TT	IT16TT	T16EPR-U15
	BP5ET10	W16TT	PW16TT	IW16TT	W16EPB10		BPR5EK-A	W16TT	PW16TT	IW16TT	W16ETR-S
	BP5EY	W16TT	PW16TT	IW16TT	W16EX-U		BPR5EKU	W16TT	PW16TT	IW16TT	W16ETR-S
	BP5EY11	W16TT	PW16TT	IW16TT	W16EX-U11		BPR5ES	W16TT	PW16TT	IW16TT	W16EPR-U
	BP5FS	—	PTF16TT	ITF16TT	T16P-U		BPR5ES	W16TT	PW16TT	IW16TT	W16EXR-U
Ni	BP6E	<b>W20TT</b>	PW20TT	IW20TT	W20EP-U	Ni	BPR5ES11	W16TT	PW16TT	IW16TT	W16EPR11
INI	BP6EA	<b>W20TT</b>	PW20TT	IW20TT	W20EX-U	INI	BPR5ES11	W16TT	PW16TT	IW16TT	W16EXR-U11
	BP6EA11	<b>W20TT</b>	PW20TT	IW20TT	W20EX-U11		BPR5ES13	W16TT	PW16TT	IW16TT	W16EXR-U13
	BP6EFS	T20TT	PT20TT	IT20TT	T20EP-U		BPR5ES-A	W16TT	PW16TT	IW16TT	W16EXR-U
	BP6EFS-13	T20TT	PT20TT	IT20TT	T20EP-U15		BPR5EY	W16TT	PW16TT	IW16TT	W16EXR-U
	BP6EK	<b>W20TT</b>	PW20TT	IW20TT	W20ETR-L		BPR5EY11	W16TT	PW16TT	IW16TT	W16EXR-U11
	BP6EK	<b>W20TT</b>	PW20TT	IW20TT	W20ET-S		BPR5FS	—	PTF16TT	ITF16TT	T16PR-U
	BP6EK-A	<b>W20TT</b>	PW20TT	IW20TT	W20ET-S		BPR5FS11	—	PTF16TT	ITF16TT	T16PR-U11
	BP6EKN	<b>W20TT</b>	PW20TT	IW20TT	W20ETR-L		BPR5FS15	—	PTF16TT	ITF16TT	T16PR-U15
	BP6EK-N	<b>W20TT</b>	PW20TT	IW20TT	W20ET-S		BPR6E	<b>W20TT</b>	PW20TT	IW20TT	W20EPR-U
	BP6ES	<b>W20TT</b>	PW20TT	IW20TT	W20EP		BPR6EFS	<b>T20TT</b>	PT20TT	IT20TT	T20EPR-U
	BP6ES	<b>W20TT</b>	PW20TT	IW20TT	W20EP-U		BPR6EFS13	<b>T20TT</b>	PT20TT	IT20TT	T20EPR-U15
	BP6ES	<b>W20TT</b>	PW20TT	IW20TT	W20EX-U		BPR6EFS15	T20TT	PT20TT	IT20TT	T20EPR-U15
	BP6ES11	W20TT	PW20TT	IW20TT	W20EP11		BPR6EKA	<b>W20TT</b>	PW20TT	IW20TT	W20ET-S
	BP6ES11	W20TT	PW20TT	IW20TT	W20EPR-U11		BPR6EK-N		PW20TT		W20ETR-L
	BP6ES11	W20TT	PW20TT	IW20TT	W20EX-U11		BPR6ES	W20TT	PW20TT	IW20TT	W20EPR-U
	BP6ES13	W20TT	PW20TT	IW20TT	W20EX-U13		BPR6ES	W20TT	PW20TT	IW20TT	W20EXR-U
	BP6ESZ	W20TT	PW20TT	IW20TT	W20EP-U		BPR6ES11		PW20TT		W20EPR11
	BP6ET	W20TT	PW20TT	IW20TT	W20EPB		BPR6ES11	W20TT	PW20TT	IW20TT	W20EPR-U11
	BP6EY	W20TT	PW20TT	IW20TT	W20EX-U		BPR6ES11	W20TT	PW20TT	IW20TT	W20EXR-U11
	BP6EY11	W20TT	PW20TT		W20EX-U11		BPR6ES-13		PW20TT		W20EXR-U13
	BP6FS	—	PTF20TT	ITF20TT	T20P-U		BPR6EY		PW20TT		W20EXR-U
	BP6HS	WF20TT	—	-	W20FP-U		BPR6EY11		PW20TT		W20EXR-U11
	BP6HS10	WF20TT	_	-	W20FP-U10		BPR6EYZ	W20TT	PW20TT		W20EXR-U
	BP6HSA	WF20TT	_	-	W20FR-L		BPR6FS	—	PTF20TT	ITF20TT	T20PR-U
	BP7E	W22TT	_	-	W22EP-U		BPR6HS	WF20TT	—	—	W20FPR-U
	BP7EK-N	W22TT	_	-	W22ETR-L		BPR6HS10		_	-	W20FPR-U10
	BP7ES	W22TT	_	-	W22EP-U		BPR6HSA	WF20TT	_	-	W20FR-L
	BP7ES11	W22TT	—	-	W22EP11		BPR7E	<b>W22TT</b>	—	-	W22EPR-U

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NGK	NI

## **Cross Reference**

NGK Ni/Pt/Ir	NGK TYPE				DENSO	NGK Ni/Pt/Ir	NGK TYPE				DENSO
	BPR7EK-N	W22TT	—	-	W22ETR-L8		TR4-2	T16TT	PT16TT	IT16TT	T16EPR-U
	BPR7ES	W22TT	—	-	W22EPR-U		TR5	T20TT	PT20TT	IT20TT	T20EPR-U
	BPR7ES11	W22TT	_	_	W22EPR-U11		TR5-1	T20TT	PT20TT	IT20TT	T20EPR-U
	BPR7EY	W22TT	—	_	W22EPR-U		TR55	T20TT	PT20TT	IT20TT	T20EPR-U15
	BPR7EY-11	W22TT	—	_	W22EPR-U11		TR5A10	TV16TT	PTV16TT	ITV16TT	T16VR-U10
	BR5EF	T16TT	PT16TT	IT16TT	T16EPR-U		TR5A13	TV16TT	PTV16TT	ITV16TT	T16VR-U10
	BR6EB11	W20TT	PW20TT	IW20TT	W20EKR-S11		TR5B13	TV16TT	PTV16TT	ITV16TT	T16VR-U10
	BR6EBL	W20TT	PW20TT	IW20TT	W20EKR-S11		TR6	T20TT	PT20TT	IT20TT	T20EPR-U
	BR6EB-L11	W20TT	PW20TT	IW20TT	W20EKR-S11		TR6B10	_	PTV20TT	ITV20TT	_
	BR6HSA	WF20TT	_	_	W20FR-L		TR6B13	_	PTV20TT	ITV20TT	_
	BU6EA11	W20TT	PW20TT	IW20TT	W20EP-S11		UR4	_	PTF16TT	ITF16TT	T16PR-U
	BU6EFSZ	T20TT	PT20TT	IT20TT	T20EP-U		UR40	_	PTF16TT	ITF16TT	T16PR-U15
	BU7EA11	W22TT	_	_	W22EP-S11		UR45	_	PTF16TT	ITF16TT	T16PR-U15
	BUR5EB11	W16TT	PW16TT	IW16TT	W16EKR-S11		UR5	_	PTF20TT	ITF20TT	T20PR-U
	BUR5ET	W20TT	PW20TT	IW20TT	W20EPBR-S		UR5	_	PTF20TT	ITF20TT	T20PR-U11
	BUR5ET10	W20TT	PW20TT	IW20TT	W20EPBR-S		UR55	_	PTF20TT	ITF20TT	T20PR-U15
	BUR5ETB-10	W20TT	PW20TT	IW20TT	W20EPBR-S		ZF6A11	Q20TT	PQ20TT	IQ20TT	QJ20CR11
	BUR6EA11	W20TT	PW20TT	IW20TT	W20EPR-S11		ZFR5A11	Q16TT	PQ16TT	IQ16TT	QJ16CR11
	BUR6EB11	W20TT	PW20TT	IW20TT	W20EKR-S11		ZFR5C11G	K16TT	PK16TT	IK16TT	KJ16CR-L11
	BUR6EFSZ	T20TT	PT20TT	IT20TT	T20EPR-U	Ni	ZFR5F	K16TT	PK16TT	IK16TT	KJ16CR
	BUR6ET	W20TT	PW20TT	IW20TT	W20EPBR-S		ZFR5F11	K16TT	PK16TT	IK16TT	KJ16CR-L11
	BUR7EA11	W22TT	-	_	W22EP-S11		ZFR5F11	K16TT	PK16TT	IK16TT	KJ16CR11
	DCP7E	XU22TT			XU22EP-U		ZFR5F11	K16TT	PK16TT	IK16TT	KJ16CR-U11
	DCP72	XU22TT			XU22EPR-U		ZFR5J11	K16TT	PK16TT	IK16TT	KJ16CR-L11
	DCPR7EA9	XU22TT			XU22PR9		ZFR5J11 ZFR5N11	K16TT	PK16TT	IK16TT	KJ16CR-L11
	DCPR7E-N	XU22TT	_		XU22EPR-U		ZFR6A11	Q20TT	PQ20TT	IQ20TT	QJ20CR11
	DCPR7E-N10				XU22EPR-U		ZFR6F11	K20TT	PK20TT	IK20TT	KJ20CR-L11
Ni	FR4	K16TT	PK16TT	IK16TT	K16PR-U		ZFR6F11	K20TT	PK20TT	IK20TT	KJ20CR11
	FR45	K16TT	PK16TT	IK16TT	K16PR-U11		ZFR6F11	K20TT	PK20TT	IK20TT	KJ20CR-U11
	FR5	K20TT	PK20TT	IK20TT	K20PR-U		ZFR6J11	K20TT	PK20TT	IK20TT	KJ20CR-L11
	FR5-1	K20TT	PK20TT	IK20TT	KJ20CR-L11		ZFR6K11	K20TT	PK20TT	IK20TT	KJ20DR-M11
	FR5EI	K16TT	PK16TT	IK16TT	K16PSR-B8		ZFR6S-Q	K20TT	PK20TT	IK20TT	K20PBR-S10
	GR4	W16TT	PW16TT	IW16TT	W14EXR-U		ZFR6U11	K20TT	PK20TT		KJ20CR-L11
	GR45				W14EXR-U11		ZFR6U9		PK20TT	IK20TT	KJ20CR-11
	GR5	<b>W16TT</b>	PW16TT	IW16TT	W16EXR-U		ZG5A	W16TT	PW16TT	IW16TT	J16CR-U
	LFR5A11				K16HPR-U11		ZGR5A	W16TT	PW16TT	IW16TT	J16CR-U
	LFR5B				K16HPR-U11		ZGR5C	W16TT	PW16TT	IW16TT	J16CR-U
	LFR6A11	KH20TT	PKH20TT	IKH20TT	K20HR-U11		ZGR5E	W16TT	PW16TT	IW16TT	J16CR-U
	LFR6C11	KH20TT	PKH20TT	IKH20TT	K20HR-U11		ZKR7A	XU22TT	—	-	XU22EPR-U
		XUH20TTI	—	-	XU20HR9		BCP5EV	-	PQ16TT	IQ16TT	_
	LKR6D10E	XUH20TTI	—	—	XU20HR9		BCP5EV11	-	PQ16TT	IQ16TT	_
	LKR7B	XUH22TT	—	-	XU22HDR9		BCP5EVX	-	PQ16TT	IQ16TT	_
	LKR7B9	XUH22TT	—	—	XU22HDR9		BCP5EVX11	—	PQ16TT	IQ16TT	-
	LKR7C	XUH22TT	—	-	XU22HR9		BCP6EV	_	PQ20TT	IQ20TT	_
	LZFR5C11	KH16TT	PKH16TT	IKH16TT	K16HPR-U11		BCP6EV11	—	PQ20TT	IQ20TT	—
	LZFR5C11G	KH16TT	PKH16TT	IKH16TT	K16HPR-U11		BCP6EVX	—	PQ20TT	IQ20TT	—
	LZFR6B10E	KH20TT	PKH20TT	IKH20TT	_		BCP6EVX11	_	PQ20TT	IQ20TT	—
	LZKR6B10E	XUH20TTI	—	-	_	Pt	BCPR5EP11	_	PQ16TT	IQ16TT	PQ16R
	LZKR6B-E	XUH20TTI	—	—	_		BCPR5EP13	_	PQ16TT	IQ16TT	PQ16R13
	LZTR4A11	—	—	ITL16TT			BCPR5EP8	-	PQ16TT	IQ16TT	PQ16R8
	LZTR4AGP	—	-	ITL16TT			BCPR5EP-N11	_	PQ16TT	IQ16TT	PQ16R-P11
	LZTR4AIX13	-	-	ITL16TT	ITL16		BCPR5EV	_	PQ16TT	IQ16TT	_
	R5673-6	_	PTF20TT		ITF20		BCPR5EV11	_	PQ16TT	IQ16TT	_
	R5674-6	_		ITF20TT	ITF20		BCPR5EVX	_	PQ16TT	IQ16TT	_
	SR5	T20TT	PT20TT	IT20TT	T20NR-U11		BCPR5EVX11	_	PQ16TT	IQ16TT	_
	TR4	T16TT	PT16TT	IT16TT	T16EPR-U		BCPR6EP11	_	PQ20TT	IQ20TT	PQ20R
L						L					

NGK Ni/Pt/Ir	NGK TYPE				DENSO	NGK Ni/Pt/Ir	NGK TYPE				DENSO
	BCPR6EP13	_	PQ20TT	IQ20TT	PQ20R13		LFR5BP11	—	PKH16TT	TIKH16TT	IKH16
	BCPR6EP8	_	PQ20TT	IQ20TT	PQ20R8		LFR5P11	-	PKH16TT		IKH16
	BCPR6EP-N11	_	PQ20TT	IQ20TT	PQ20R-P11		LFR6AP11	_	PKH20TT		IKH20
	BCPR6EP-N8	_	PQ20TT	IQ20TT	PQ20R-P8		LFR6AP9	_	PKH20TT		IKH20
	BCPR6EV	_	PQ20TT	IQ20TT	-		LFR6AQP	_	PKH20TT		IKH20
	BCPR6EV11		PQ20TT	IQ20TT			LFR6BP11			IKH20TT	IKH20
				IQ20TT			LTR6AP11				ITV20
	BCPR6EVX		PQ20TT		_		-			ITV20TT	
	BCPR6EVX11	_	PQ20TT	IQ20TT	_		PFR5A11	-	PQ16TT	IQ16TT	PQ16R
	BKR5EGP	_	PK16TT	IK16TT	IK16		PFR5B	-	PK16TT	IK16TT	PK16R8
	BKR5EKPB11	_	PK16TT	IK16TT	PK16TR11		PFR5B11	-	PK16TT	IK16TT	PK16PR(-L)11
	BKR5EKPB13	_	PK16TT	IK16TT	PK16TR13		PFR5B11B	-	PK16TT	IK16TT	PK16R11
	BKR5EP11	_	PK16TT	IK16TT	PK16R11		PFR5B11C	-	PK16TT	IK16TT	PK16R11
	BKR5EP8	—	PK16TT	IK16TT	PK16R8		PFR5B9	—	PK16TT	IK16TT	PK16R8
	BKR5EQUPA	-	-	IK16TT	—		PFR5B-D	-	PK20TT	IK20TT	PK16R8
	BKR5EVX	—	PK16TT	IK16TT	—		PFR5C11	—	PK16TT	IK16TT	PK16R11
	BKR5EVX11	—	PK16TT	IK16TT	—		PFR5F11	—	PQ16TT	IQ16TT	PQ16R
	BKR5EVXA	—	PK16TT	IK16TT	-		PFR5G11	—	PK16TT	IK16TT	PK16PR(-L)11
	BKR5EVXA11	—	PK16TT	IK16TT	_		PFR5G11-E	—	PK16TT	IK16TT	PK16PR(-L)11
	BKR5EVXA13	_	PK16TT	IK16TT	_		PFR5G13-E	—	PK16TT	IK16TT	PK16PR-L11
	BKR6EGP	_	PK20TT	IK20TT	IK20		PFR5J11	-	PK16TT	IK16TT	PK16PR-P11
	BKR6EKPA	_	PK20TT	IK20TT	PK20TR11		PFR5K11	_	PQ16TT	IQ16TT	PQ16R
	BKR6EKPB11	_	PK20TT	IK20TT	PK20TR11		PFR5L11	_	PK16TT	IK16TT	PK16PR(-L)11
	BKR6EP11	_	PK20TT	IK20TT	PK20R11		PFR5L13	_	PK16TT	IK16TT	VK16
	BKR6EP13	_	PK20TT	IK20TT	PK20R13		PFR5N11	_	PK16TT	IK16TT	PK16PR(-L)11
	BKR6EP8	_	PK20TT	IK20TT	PK20R8		PFR5P	_	PK16TT	IK16TT	PK16R8
	BKR6EP8	_	PRZUTT	IK20TT	VK20T		PFR5P11	_	PK16TT	IK16TT	PK16PR(-L)11
	-		- DKOOTT				-				
	BKR6EP-N8	_	PK20TT	IK20TT	PK20R-P8		PFR5R11	_	PK16TT	IK16TT	PK16PR(-L)11
Pt	BKR6EVX11	_	PK20TT	IK20TT		Pt	PFR6A11	-	PQ20TT	IQ20TT	PQ20R
	BKR6EVXA11	_	PK20TT	IK20TT	_		PFR6B	-	PK20TT	IK20TT	PK20PR-P8
	BP5EV	_	PW16TT	IW16TT	_		PFR6B11	-	PK20TT	IK20TT	PK20PR11
	BP5EVX	-	PW16TT	IW16TT	_		PFR6B11B	-	PK20TT	IK20TT	PK20R11
	BP5EVX11	—	PW16TT	IW16TT	—		PFR6B9	-	PK20TT	IK20TT	PK20PR-P8
	BP6EV	—	PW20TT	IW20TT	—		PFR6B-D	-	PK20TT	IK20TT	PK20R8
	BP6EVX	—	PW20TT	IW20TT	—		PFR6C11	—	PK20TT	IK20TT	PK20R11
	BP6EVX11	—	PW20TT	IW20TT	—		PFR6E	—	PK20TT	IK20TT	PK20PR-P8
	BPR5EFVX	—	PT16TT	IT16TT	IT16		PFR6G11	-	PK20TT	IK20TT	PK20PR11
	BPR5EGP	_	PW16TT	IW16TT	IW16		PFR6G11	-	PK20TT	IK20TT	PK20PR-L11
	BPR5EP11	—	PW20TT	IW20TT	P16R		PFR6G11-E	—	PK20TT	IK20TT	PK20PR11
	BPR5EP11	—	PW16TT	IW16TT	P16R		PFR6G11-E	—	PK20TT	IK20TT	PK20PR-L11
	BPR5EP13	_	PW16TT	IW16TT	P16R13		PFR6G13	_	PK20TT	IK20TT	PK20PR-L13
	BPR5EV	_	PW16TT	IW16TT	_		PFR6G13E	-	PK20TT	IK20TT	PK20PR-L13
	BPR5EVX	_	PW16TT	IW16TT	_		PFR6H10	_	PQ20TT	IQ20TT	PQ20R
	BPR5EVX11	_	PW16TT		_		PFR6J	_	PK20TT		PK20PR-P8
	BPR6EGP	_	PW20TT		IW20		PFR6J11	_	PK20TT		PK20PR-P11
	BPR6EP11	_	PW20TT		VW20		PFR6J13	_	PK20TT		PK20PR-L13
	BPR6EP8	_	PW20TT	IW20TT	VW20		PFR6K11	_	PQ20TT	IQ20TT	PQ20R
	BPR6EP8		PW20TT PW20TT		VW20 VW20T		PFR6L13	_	PG20TT	IK20TT	PG20h PK20PR-L13
	-				IW201					IK20TT	PK20PR-L13 PK20PR-L11
	BPR6EV	_	IW20TT	IW20TT			PFR6N11	_	PK20TT		
	BPR6EVX	_	IW20TT	IW20TT	IW20		PFR6P11	-	PK20TT		PK20PR(-L)11
	BPR6EVX11	_	IW20TT	IW20TT	IW20		PFR6R11	-	PK20TT	IK20TT	PK20PR-L11
	FR4BP11	_	PK16TT	IK16TT	IK16		PFR6T10	-	PK20TT		PK20PR-L11
	FR5BP11	-	PK16TT	IK16TT	IK16		PFR6T10G	-	PK20TT		PK20PR-L11
	FR5CP	—	PK16TT	IK16TT	IK16		PFR6T-G	—	PK20TT		PK20PR-P8
	FR6BP11	—	PK20TT	IK20TT	IK20		PFR6U11G	—	PK20TT	IK20TT	PK20PR-L11
	LFR5AP11	—	PKH16TT	IKH16TT	IKH16		PFR6V10D	—	PK20TT	IK20TT	VK20T
	LFR5AQP	—	PKH16TT	IKH16TT	IKH16		PFR6X11	—	PK20TT	IK20TT	PK20PR-L11

AUSTRALIA CHINA INDIA INDONESIA KOREA MALAYSIA PHILIPPINES SAUDIARABIA SINGAPORE TAIWAN THAILAND VIETNAM JAPAN & USA CYCLE ENGINE REFERENCE NUMBER

DENSO

ENSO	7	2
D		

# Cross Reference

NGK Ni/Pt/Ir	NGK TYPE				DENSO
	PGR5A	—	PW16TT	IW16TT	P16PR8
	PGR5A11	_	PW16TT	IW16TT	P16PR11
	PGR6A	—	PW20TT	IW20TT	P20PR8
	PGR6A	—	PW20TT	IW20TT	P20R8
	PGR6A	_	PW20TT	IW20TT	P20PR8
	PGR6A	_	PW20TT	IW20TT	P20R8
	PGR6A11	—	PW20TT	IW20TT	<b>VW20</b>
	PGR6A-D	_	PW20TT	IW20TT	<b>VW20</b>
	PGR6B	—	PW20TT	IW20TT	<b>VW20</b>
	PLFR4A11	_	PKH16TT	IKH16TT	VKH16
	PLFR5A11	—	PKH16TT	IKH16TT	VKH16
	PLFR5A11D	_	PKH16TT	IKH16TT	VKH16
	PLFR6A11	_	PKH20TT	IKH20TT	VKH20
	PLFR6A9	_	PKH20TT	IKH20TT	VKH20
	PLTR6A10G	_	PTV20TT	ITV20TT	ITV20
	PLZFR5B-13G	_	PKH16TT	IKH16TT	VKH16
	PLZFR6A-11S	_	PKH20TT	IKH20TT	VKH20
	PLZKAR6A11	_	_	IXEH20TT	FXE20HR11
	PLZTR5A13	_	_	ITL16TT	_
	PTR4B15	_	PT16TT	IT16TT	PT16EPR-L13
	PTR4G15	_	PT16TT	IT16TT	PT16EPR-L13
	PTR5A10	_	PTV16TT	ITV16TT	PT16VR10
	PTR5A13	_	PTV16TT	ITV16TT	PT16VR13
	PTR5C13	_	PT16TT	IT16TT	PT16EPR-L13
	PTR6D13G	_	PT20TT	IT20TT	VT20
	PTR6E13		PT20TT	IT20TT	VT20
	PTR6F13		PT20TT	IT20TT	VT20
Pt	PZFR5E11		PK16TT		
Ρl	-			IK16TT	SKJ16CR-L11
	PZFR5F		PK16TT	IK16TT	PKJ16CR8
	PZFR5F11		PK16TT		SKJ16CR-L11
	PZFR5F13		PK16TT	IK16TT	PKJ16CR-L13
	PZFR5J11		PK16TT	IK16TT	SKJ16CR-L11
	PZFR6E11		PK20TT	IK20TT	PKJ20CR-L11
	PZFR6F11	_	PK20TT		PKJ20CR-L11
	PZFR6J11	_	PK20TT		PKJ20CR-L11
	PZTR5A15	_	PT16TT		PT16EPR-L13
	TR4VX	_	PT16TT		IT16
	TR5-1VX	_	PT20TT	IT20TT	IT20
	TR55-1VX	_	PT20TT	IT20TT	IT20
	TR55VX	—	PT20TT	IT20TT	IT20
	TR5BP12	—	PTV16TT	ITV16TT	ITV16
	TR5VX	—	PT20TT	IT20TT	IT20
	TR6AP13	—	PT20TT	IT20TT	IT20
	TR6AP13E	—	PT20TT	IT20TT	IT20
	TR6GP	—	PT20TT	IT20TT	IT20
	UR45VX	-	PTF16TT	ITF16TT	ITF16
	UR4VX	—	PTF16TT	ITF16TT	ITF16
	UR55VX	—	PTF20TT	ITF20TT	—
	UR5VX	—	PTF20TT	ITF20TT	_
	UR6VX	—	PTF20TT	ITF20TT	_
	YR55VX	—	PTF20TT	ITF20TT	_
	YR5VX	—	PTF20TT	ITF20TT	_
	ZFR5AP	—	PK16TT	IK16TT	IK16
	ZFR5FGP	—	PK16TT	IK16TT	IK16
	ZFR5LP13G	—	PK16TT	IK16TT	_
lr	BCPR5EIX11	—	-	IQ16TT	IQ16

NGK Ni/Pt/Ir	NGK TYPE				DENSO
	BCPR5EIX11P	-	—	IQ16TT	VQ16
	BCPR6EIX11	-	—	IQ20TT	<b>IQ2</b> 0
	BCPR6EIX11P	-	-	IQ20TT	<b>VQ2</b> 0
	BKR4EIX	—	—	IK16TT	IK16
	BKR5EIX	—	—	IK16TT	IK16
	BKR5EIX11	-	_	IK16TT	IK16
	BKR5EIX11P	-	_	IK16TT	VK16
	<b>BKR5EIXP</b>	—	—	IK16TT	VK16
	BKR6EIX	-	_	IK20TT	IK20
	BKR6EIX	-	_	IK20TT	VK20T
	BKR6EIX11	-	—	IK20TT	IK20
	BKR6EIX11P	_	_	IK20TT	VK20
	BPR5EFIX13P	_	_	IT16TT	<b>VT</b> 16
	BPR5EIX	_	_	IW16TT	IW16
	BPR5EIX11	_	_	IW16TT	IW16
	BPR5EIX11-P	_	_	IW16TT	VW16
	BPR5EIX-P	_	_	IW16TT	VW16
	BPR6EFIX10	_	_	IT20TT	IT20
	BPR6EFIX13P	_	_	IT20TT	VT20
	BPR6EIX	_	_	IW20TT	IW20
	BPR6EIX(LPG)	_	_	IW20TT	VW20T
	BPR6EIX11	_	_	IW20TT	IW20
	BPR6EIX11-P	_	_	IW20TT	VW20
	BPR6EIX-P	_		IW20TT	VW20
	DF5A11A	_		IK16TT	FK16PR11
	DF5B11A	_		IKH16TT	FK16HR11
	DF6H11A	_		IXEH20ETT	
	DF6H11A			IXEH20ETT	VFXEH20E
lr	DF6H11B			IXEH20ETT	FXE20HR11
	DF6H11B			IXEH20TT	VFXEH20
	DF7H11B			IXEH20TT	FXE22HR11
	DF7H11B			IXEH22TT	VFXEH22
	DFH6B11A				FK20HBR11
	DFH6B11A			IKBH20TT	
	DILFR5A			IK16TT	VFRBH20
	DILFR5A11			IK16TT	- FK16HR11
	DILFR5A11D			IK16TT	FK16HR11
	DILFR5ATTD				FK16HR11
				IK16TT	
	DILFR6D11			IK20TT	FK20HR11
	DILFR6F11G			IK20TT	_
	DILFR6J11				
	DILKAR6A11			IXEH20TT	
	DILKAR7B11	_	_	IXEH22TT	
	DILKAR7F8	_	_		FC20HPR8
	DILZKAR6A11	_	_		FXE20HE11
	DILZKR7B11	_	_	IXEH22TT	-
	GR4IX	—	—	IW16TT	IW16
	GR5AI10	—	—	IW16TT	IW16
	GR5IX	—	—	IW16TT	IW16
	HAMP-FR5CI11G	—	—	IK16TT	HAMP-IK16F
	HAMP-FR6CI11G	—	—	IK20TT	HAMP-IK20F
	HAMP-FR6DI11G	—	—	IQ20TT	HAMP-IQ20F
	HAMP-ZFR5FI11G	—	—	IK16TT	HAMP-IK16FJ
	HAMP-ZFR6FI11G	_	_	IK20TT	HAMP-IK20FJ
	HAMP-ZFR6KI11G		—	IK20TT	HAMP-IKD20F
	IFR5A11	—	—	IK16TT	SK16R11

NGK i/Pt/Ir	NGK TYPE				DENSO	NGK Ni/Pt/Ir	NGK TYPE				DENSO
	IFR5A-8N		—	IK20TT	SK16R-P8		LFR5AIX11P	—	-	IKH16TT	VKH16
	IFR5D10	-	—	IK16TT	VK16		LFR5ARX-11P	-	—	IKH16TT	VFKH16
	IFR5E11	—	_	IK16TT	SK16PR-A11		LFR6AIX11	—	—	IKH20TT	IKH20
	IFR5G11		_	IK16TT	SK16PR-L11		LFR6AIX11P	_		IKH20TT	VKH20
	IFR5G11K	_	_	IK16TT	SK16PR-L11		LFR6AIX-LPG	-	_	IKH20TT	VKH20T
	IFR5J11	_	_	IK16TT	VK16		LKAR6AIX13P	_	_	IXEH20TT	ZXE20HR13
	IFR5L11	_	_	IK16TT	VK16PRZ11		LTR5BI-13	_	_	ITV16TT	_
	IFR5N	_	_	IK16TT	VK16		LTR5IX11	_	_	ITV16TT	ITV16
	IFR5N10	_	_	IK16TT	VK16		LTR6AI-9	_	_	ITV20TT	ITV20
	IFR6A11	_	_	IK20TT	SK20R11		LTR6BI-13	_		ITV20TT	
	IFR6C	_	_	IK20TT	SK20PR-L9		LTR6BI-9	_		ITV20TT	
	IFR6D10	_		IK20TT	VK20		LTR6BP13	_	_	ITV20TT	ITV20
	IFR6E11	_	_	IK20TT	VK20		LTR6IX11	-		ITV20TT	ITV20
	IFR6J11	-	_	IK20TT	SVK20RZ11		LZFR6AI	-	_	IKH20TT	
	IFR6L11	-	_	IK20TT	VK20PRZ11		LZKAR6AP11	-	-	IXEH20TT	FXE20HR11
	IFR6T11	—	_	IK20TT	SK20R11		SIFR6A11	—	_	IK20TT	VK20
	IGR5B10-D	—	_	IW16TT	VW16		SILFR6A11	—	—	IKH20TT	VKH20
	IGR6A11	—	—	IW20TT	VW20		SILFR6C11	—	—	IKH20TT	VKH20
	IGR6B10-D	-	-	IW20TT	<b>VW20T</b>		SILTR6A7G	-	-	ITV20TT	-
	ILFR5C11	—	_	IKH16TT	SK16HR11		SILZKAR7B11	—	—	IXEH22TT	-
	ILFR6A		_	IKH20TT	VKH20		TR4IX	_	-	IT16TT	IT16
	ILFR6B	_	_	IKH20TT	VKH20		TR5-1IX	-	_	IT20TT	IT20
	ILFR6C	_	_	IKH20TT	VKH20	lr	TR55IX	_	_	IT20TT	IT20
	ILFR6C11	_	_	IKH20TT	SK20HR11		TR5IX	_	_	IT20TT	IT20
	ILFR6D11	_	_	IK20TT	FK20HR11		TR6IX	_	_	IT20TT	IT20
	ILFR6G	_	_	IKH20TT	VKH20		UR45IX	_	_	ITF16TT	ITF16
	ILFR6J11K	_	_		SK20HPR-L11		UR4IX	_		ITF16TT	ITF16
	ILKAR6C10	_		IXEH20TT	VFXEH20		UR55IX	_		ITF20TT	ITF20
lr	ILKAR7B11	_		IXEH22TT	SC20HR11		UR5IX	_		ITF20TT	ITF20
	ILKAR7L11	_		IXEH22TT			UR6IX	_			ITF20
					202002011					ITF20TT	
	ILTR5A13G	_		ITV16TT	_		YR55IX	_		ITF20TT	ITF20
	ILTR5B11	_	_	ITL16TT	_		YR5IX	_	_	ITF20TT	ITF20
	ILTR5C11	-	_	ITL16TT	_		ZFR5FIX11	-	-	IK16TT	IK16
	ILTR5D	—	_	ITV16TT	_		ZFR5FIX11P	-	-	IK16TT	VK16
	ILTR5E11	—	_	ITV16TT	—		ZFR6FIX11	—	—	IK20TT	IK20
	ILTR6A13G	—	—	ITV20TT	—		ZFR6FIX11P	—	—	IK20TT	VK20
	ILTR6A8G	-	-	ITV20TT	_		LPG1	-	-	IK20TT	-
	ILTR6E11	—	_	ITV20TT	—		LPG1	—	—	IK20TT	-
	ILZFR5B	-	_	IKH16TT	VKH16		LPG2	_	I	IW20TT	_
	ILZFR6A11	—	—	IKH20TT	VKH20		LPG2	-	—	IW20TT	-
	ILZFR6C11K	_	_	IKH20TT			LPG3	_	_	IQ20TT	_
	ILZFR6D11	_	_	IKH20TT			LPG4	_	_	ITV16TT	_
	ILZKAR7A	_	_	IXEH22TT			LPG5	_	_	IT20TT	_
	ILZKAR7A10		_		FXE22HR11		LPG5	_		IK20TT	
	ILZKAR7A10			IXEH22TT	_		LPG6 LPG7			IKH20TT	
							LPG/	_			_
	ITR4A15	_		IT16TT	VT16						
	ITR5F13	—	—	IT16TT	VT16						
	ITR6F13	—	—	IT20TT	<b>VT20</b>						
	IZFR5F11	—	—	IK16TT	SKJ16CR-L11						
	IZFR5K11	-	—	IK16TT	SKJ16DR-M11						
	IZFR5L11	_	_		SKJ16CR-L11						
	IZFR6F11	-	—	IK20TT	VKJ20RZ-M11						
	IZFR6H11		—	IK20TT	VK20						
	IZFR6K11	-	—	IK20TT	SKJ20DR-M11						
	IZFR6K13	—	_		SKJ20DR-M13						
	LFR5AIX11	_	_	IKH16TT	IKH16						

DENSO

# High Performance Spark Plug

0:4mm|Iridium only/at DENS0!



with an iridium center electrode

A next-generation plug that draws out engine evolution with a high-performance spark.

# Improved acceleration!

## Revvingup plugperformance with 0.4 mm!



LASER

WELDING

DENSO IRIDIUM POWER



#### Burnished Nickel Ploting The plug housing is plated with bur

The plug housing is plated with burnished nickel, the same as plugs used for racing. It is highly resistant to corrosion and rust even while touring in continually rainy weather and during motocross events. (Low-heat range types excluded)

#### 360° Laser Welding

The process used to mount the iridium tip is a highly reliable "All-around Laser Welding" process that is able to withstand all kinds of driving conditions. (For all plug



In order to improve ignitability, the center electrode protrudes more than with conventional type plugs. This improves both acceleration response time and performance. (Only with: IU31, IU424, IUH27, IX22, IX24, IX27, IUF22, IUF24, IWF22, IWF24, IWF27, IW24, IW27, IW29, IW31, and IW34)



#### 2 0.4 mm Diameter Ultra-fine Iridium Center Electrode

0.4mm IRIDIUM Using a new iridium alloy with a very high melting point, the tip of the electrode can be made very fine. This enables the reduction of

very fine. This enables the reduction of voltage necessary to cause the spark, and greatly improves ignitability. Moreover, the special iridium alloy used was developed by DENSO



#### **3** Taper-cut Ground Electrode

TAPERED CUT TAPERED CUT TAPERED TAPE TAPERED TAPE TAPERED TAPE TAPERED TAPERED

CUT improves fuel ignitability. Also, because of the streamlined, taper-cut shape, the fuel-air mixture spreads more evenly in the gap, resulting in steady, reliable igniting of combustion. (excluding IUF27A, IUF31A, IU24A, IU27A, IU31A, IY24, IY27 & IY31)

#### **4 U-Groove Ground Electrode**

#### The U-shaped encode around electrode electrode insures that the inside surface area is large enough to generate the flame kernel. This shape enables lower voltage needed to cause the spark and results in excellent ignitability without increasing the size of the spark gap. (excluding IUF27A, IUF31A, IU24A and IU31A)

#### **5** Insulator Projection

The projection of the insulator is optimally designed based on each plug's thermal value. This corresponds to requirements unique to thermal value, such as self-cleaning ability at lower thermal values, and heat resistance at higher thermal values. (For all plug types)

## Origin of Iridium: DENSO Iridium

#### A Long Time Ago...



Approximately 50 million years ago an asteroid, some 10km in diameter slammed into what is now Mexico's Yucatan Peninsula near the town of Chicxulub. The resulting dust cloud destroyed most living things and ended the dinosaurs reign on earth. The evidence for this has been known for some time, with the deposits of Iridium-rich clay found at the boundary of Cretaceous and Tertiary deposits (known as the K/T Boundary) all over the world.

On July 2 1992, Alan R. Hildebrand of the Geological Survey of Canada presented a scientific paper to the General Assembly of the Royal Astronomical Society of Canada entitled "The Cretaceous/Tertiary Boundary Impact". Some of his findings are summarized here.

The K/T boundary layer, sometimes known as the iridium bearing clay layer, has a global distribution and consists of at least two layers of impact material.

The upper layer, known as the Fireball layer averages 3mm thickness and represents 1500 cubic kilometers of debris deposited globally with no apparent variation in thickness

The lower layer termed the ejecta layer, averages about 2cm in thickness.

#### A Major Impact on Earth?

Many scientists believe that the enormous impact put enough dust into the upper atmosphere to darken and hence cool the Earth for several years. This was theorized to result in shutting off global photosynthesis, with the resulting collapse of the global food chain. As a result nothing larger than 25 kg survived the boundary.



Iridium is found all over the world in the K/T layer and is not an unknown metal (commodity), however: its ability to be used in a manufacture

type environment is unique. The current products that use Iridium are cellular telephones (Motorola), sunglasses (Oakley), and now spark plugs (DENSO). The reason for only a few companies using this precious metal is its difficulty to be manipulated in a cost-effective manner.

DENSO's experience with Iridium in the development of the complete line of original equipment platinum spark plugs helped in the development of the DENSO Iridium alloy, where the Iridium becomes the primary metal complimented by rhodium (Atomic Symbol: Rh) to increase oxidation wear resistance.

## Ignitability That's a Cut Above

#### With DENSO's very own U-Groove ground electrode for better spark performance.

To increase ignitability, the important point is to let the flame kernel caused by the spark to grow to a large size. Normally, this can be accomplishing by widening the spark gap, however this causes spark voltage to increase, which has the opposite effect. IRIDIUM POWER uses DENSO very own U-Groove ground electrode to realize a superb ignitability while maintaining spark voltage at low levels.

### Improved Horse Power (1)

#### Get more power with an optimal fuel cycle.

IRIDIUM POWER has a low required voltage and a high ignitability, resulting in less misfiring and no spark, the outcome being a dramatic improvement in combustion. Engine output is thus increased. The findings of a bench test using a motorcycle engine to show the improved combustion from

IRIDIUM POWER" is shown on the below. Compared to normal plugs, a 0.5ps (1.4%) improvement is seen in output at 110 km/h.



#### Improved Horse Power (2)

#### The 0.4mm center electrode increases output under various driving conditions.

The power produced by the 0.4mm dia, iridium center electrode is IRIDIUM POWER unmatched by other plugs. The graph below

compares the resulting power when IRIDIUM POWER is installed compared to other high performance plugs. Using a 0.4mm dia. fine center electrode, there is more power compared to 0.8mm and 2.5 mm dia. plugs. This is what makes the difference in acceleration and in vour lap time.





#### Improved Acceleration

#### Increased response and acceleration performance.

IRIDIUM POWER<sup>®</sup> best demonstrates its performance improvement during acceleration. IRIDIUM POWER<sup>®</sup> has a 0.4 mm diameter iridium center electrode and a specially shaped ground electrode. These features combine to achieve higher ignitability and require lower spark voltage than ever before. This enables high-response driving with fewer misfires than under higher required voltage spark conditions, and fewer misfires when ignitability is difficult. As a result, acceleration improves in comparison with normal plugs.

r-cooled, V2 cylinders) full throttle accoloration 50 cc (2-cycle, water-cooled, V2 cylinders) s: Fixed in 6th gear, full throttle acceleration from 50 km/h with automatic driving device Vehicle:



### Improved Fuel Mileage

#### Even during idling ignition is assured, with less fuel consumption.

sults unde

The good ignitability from the fine electrode (0.4 mm) of IRIDIUM POWER draws out much more performance from the

engine. Comparing a normal plug (W20FS-U) with an IRIDIUM POWER® (IWF22) on a 2-cycle 50cc engine, fuel consumption improved from 41.74 km/L → 43.69 km/L, an improvement of about 5%.

Note: Mileage measured using a chassis

dynamo; actual driving resul normal conditions may vary.

Mileage Comparison Test Testing vehicle: Honda DIO (2-cycle, single-cylinder, air-cooled, 50 cc) Testing conditions: speed, 30 km/h; FAV 120 kg; measurement time, 10 minutes; cooling brezez, 30 km/h Fuel average Data: In-Company Comparison W20ES-U(1 41.79 up 41.70 W20FS-U2 IWF22(1 43.30 IWF222 44 07

40.5 41 41.5 42 42.5 43 43.5 44 44.5

DENSO



## IRIDIUM POWER<sup>®</sup> lineup



DENSO

AUSTRALIA

CHINA

INDIA

KOREA INDONESIA

PHILIPPINES MALAYSIA

SINGAPORE SAUDIARABIA

VIETNAM THAILAND TAIWAN

JAPAN

& USA
### IRIDIUM POWER®



DENSO AUSTRALIA CHINA INDIA INDONESIA KOREA MALAYSIA PHILIPPINES SAUDIARABIA SINGAPORE TAIWAN THAILAND VIETNAM JAPAN & USA CYCLE ENGINE REFERENCE NUMBER 35

### **IRIDIUM POWER**<sup>®</sup> Specifications

TYPE	APPLICATION	SPEC	DIA.	REACH	HEX	GAP	PROJECION	SPARH POSITI	GROUND Electrode	TERMINAL SHAPE	No.	IRIDIUM POWER ONE PC BOX	<b>IRIDIUM POWER</b> 2pcs BLISTER PACK
TIFE	APPLICATION	JFLU	(mm)	Υ (mm)	(mm)	(mm)		N (mm)	E HIGHT (mm)		0	DENSO P/N	DENSO P/N
Q16	Automobile	Old JIS (Installing height=K type+2mm)	14	19	16	1.1	1.5	3.0	5.5	S 5	101	067700-8701	100676-3380
220	Automobile	Old JIS (Installing height=K type+2mm)	14	19	16	1.1	1.5	3.0	5.5	S 5	102	067700-8711	100676-3390
Q22	Automobile	Old JIS (Installing height=K type+2mm)	14	19	16	0.8	1.5	3.0	5.2	S 5	l13	067700-8481	100676-3480
Q24	Automobile	Old JIS (Installing height=K type+2mm)	14	19	16	0.8	1.5	3.0	5.2	S 5	114	067700-8491	100676-3490
Q27	Automobile	Old JIS (Installing height=K type+2mm)	14	19	16	0.8	1.5	3.0	5.2	S 5	l15	067700-8502	
Q31	Automobile	Old JIS (Installing height=K type+2mm)	14	19	16	0.8	-0.5	1.0	3.2	S 5	123	067700-9231	
Q34	Automobile	Old JIS (Installing height=K type+2mm)	14	19				1.0		S 5	124	067700-9601	
K16	Automobile		14	19	16	1.1	1.5	3.0	5.5	S 5	103	067700-8681	100676-3360
K20	Automobile		14	19				3.0		S 5	104	067700-8691	100676-3370
K22	Automobile		14	19				3.0		S 5	110	067700-8431	100676-3450
K24	Automobile		14	19				3.0		S 5		067700-8461	100676-3460
K27	Automobile		14					3.0		S 5		067700-8472	100676-3470
K31	Automobile		14					1.0		S 5		067700-9221	
K34	Automobile		14	19				1.0		S 5		067700-9591	
K16G	Automobile	SUS Gasket	14					3.0		S 5		267700-5611	
K20G	Automobile	SUS Gasket	14	19				3.0		S 5		267700-5621	100070 5050
K22G	Automobile	SUS Gasket	14	19				3.0		S 5		267700-5661	100676-5350
K16L	Automobile	EXTENDED	14						7.8			267700-5121	
K20L	Automobile	EXTENDED	14	19					7.8			267700-5131	100070 5100
KH16	Automobile				5 16					S 5		267700-3661	100676-5160
KH20	Automobile				5 16					S 5		267700-3671	100676-5140
KH22	Automobile				5 16					S 5	-	267700-2651	100676-5170
IKH24	Automobile				5 16					S 5		267700-4281	100676-5180
KH27	Automobile				5 16					S 5		267700 4291	100070 0400
	Automobile				20.6							067700-8651	100676-3400
	Automobile				20.6							067700-8661	100676-3410
	Automobile		14		20.6							067700-8671	100676-3420
IW24 IW27	Motorcycle		14		20.6							067700-8891	
	Motorcycle		14		20.6							067700-8901	
IW29 IW31	Racing Kart		14		20.6							067700-8911 067700-8921	
W31	Racing Kart		14 14		20.6							067700-8921	
IW34 IWM24	Racing Kart	Compact insulator bood			20.6							267700-2891	
	Motorcycle Motorcycle	Compact insulator head Compact insulator head	14 14		20.6 20.6					S 5		267700-2891	
WM27		Compact insulator head			20.6								
IWM31 IWF16	Motorcycle Motorcycle	Compact insulator nead			20.6					R 5		267700-2911 267700-5001	
WF20	Motorcycle				20.0					R 5		267700-5011	
WF22	Motorcycle				20.0							067700-9411	
WF24	Motorcycle				20.6							067700-9421	
WF27	Motorcycle				20.0					R 5		067700-9431	
<b>TV</b> 16	Automobile	Taper Seat(Insulator Length 50mm)	14		16					S 5		267700-3701	100676-5200
<b>TV20</b>	Automobile	Taper Seat(Insulator Length 50mm)	14					3.0		S 5		267700-3711	100676-5210
TV22	Automobile	Taper Seat(Insulator Length 50mm)	14					3.0		S 5		267700-2501	100010 0210
TV24	Automobile	Taper Seat(Insulator Length 50mm)	14					1.0		S 5		267700-2511	
TV27	Automobile	Taper Seat(Insulator Length 50mm)	14					1.0		S 5		267700-2521	
TL16	Automobile	Taper Seat(Insulator Length 56mm)		25								267700-4981	
TL20	Automobile	Taper Seat(Insulator Length 56mm)			16					S 5		267700-4991	
T16	Automobile	TAPER SEAT			5 16					S 5		267700-0611	100676-3610
T20	Automobile	TAPER SEAT			5 16					S 5		267700-0621	100676-3620
T22	Automobile	TAPER SEAT			5 16					S 5		267700-0631	
T24	Automobile	TAPER SEAT			5 16					S 5		267700-0641	
T27	Automobile	TAPER SEAT			5 16					S 5		267700-0651	
TF16	Automobile	TAPER SEAT			2 16					S 5		267700-0661	
ITF20	Automobile	TAPER SEAT			2 16					S 5		267700-0671	
TF22	Automobile	TAPER SEAT			2 16					S 5		267700-0681	
ITF24	Automobile	TAPER SEAT			2 16					S 5		267700-0691	
TF27	Automobile	TAPER SEAT			2 16							267700-0701	
XU22	Automobile	- ••		19								067700-8722	100676-3430
XU24	Automobile			19					5.0			067700-8732	100676-3440
IXU27	Motorcycle			19					5.0			067700-8602	100676-3820
XU22I	Automobile			19				3.5		S 5		267700-8431	
XUH22	Automobile				5 16					S 5		267700-6451	
XUH20I	Automobile				5 16							267700-8171	
	Automobile								6.2			267700-7371	

### IRIDIUM POWER®

TYPE	APPLICATION	SPEC	DIA.	REACH	HEX	GAP	PROJECIO	SPARK POSITION	GROUND Electrode Hight	TERMINA SHAPE	RESISTOR	No.	IRIDIUM POWER ONE PC BOX	IRIDIUM POWER 2pcs BLISTER PACK
			(mm)	(mm)	(mm)	(mm)		U (mm)	(mm)	IAL	OR (R)		DENSO P/N	DENSO P/N
IX22	Motorcycle		12	19	18	0.8	0.6	2.0	4.1	R	5	171	067700-9351	
IX24	Motorcycle		12	19	18	0.8	0.6	2.0	4.1	R	5	172	067700-9361	
IX27	Motorcycle		12	19	18	0.8	0.6	2.0	4.1	R	5	173	067700-9371	
IX22B	Motorcycle		12	19	18	0.9	1.5	2.8	5.0	R	5	175	067700-9381	
IX24B	Motorcycle		12	19	18	0.9	1.5	2.8	5.0	R	5	176	067700-9391	
IX27B	Motorcycle		12	19	18	0.9	1.5	2.8	5.0	R	5	177	067700-9401	
IXG24	Motorcycle	SHROUD	12	21.8	18	0.7	0.7	2.0	4.1	R	5	194	267700-2921	
IXG27	Motorcycle	SHROUD	12	21.8	18	0.7	0.7	2.0	4.1	R	5	195	267700-2931	
IU20	Motorcycle		10	19	16	0.9	-0.5	0.7	2.6	R	5	160	267700-5021	
IU22	Motorcycle		10	19	16	0.9	-0.5	0.7	2.6	R	5	161	067700-9262	
IU24	Motorcycle		10	19	16	0.9	-0.5	0.7	2.6	R	5	162	067700-9272	
IU27	Motorcycle		10	19	16	0.9	-0.5	0.7	2.6	R	5	163	067700-9282	
IU31	Motorcycle		10	19	16	0.9	-0.5	0.7	2.6	R	5	164	067700-9292	
IU24A	Motorcycle	SLANT GROUND ELECTRODE	10	19	16	0.9	-0.5	1.0	2.9	R	5	165	067700-9302	
IU27A	Motorcycle	SLANT GROUND ELECTRODE	10	19	16	0.9	-0.5	1.0	2.9	R	5	166	067700-9312	
IU31A	Motorcycle	SLANT GROUND ELECTRODE	10	19	16	0.9	-0.5	1.0	2.9	R	5	167	067700-9321	
IU22D	Motorcycle	NON U-GROOVE	10	19	16	0.9	0.5	2.0	4.0	Т	5	-	267700-0830	
IU24D	Motorcycle	NON U-GROOVE	10	19	16	0.9	0.5	2.0	4.0	Т	5	1103	267700-0840	
IU27D	Motorcycle	NON U-GROOVE	10	19	16	0.9	0.5	2.0	4.0	Т	5	190	267700-0850	
IUH24	Motorcycle	HALF THREAD	10	19	16	0.9	0.6	2.0	3.9	R	5	168	067700-9331	
IUH27	Motorcycle	HALF THREAD	10	19	16	0.9	0.6	2.0	3.9	R	5	169	067700-9341	
IUF22	Motorcycle		10	12.7	16	0.8	0.6	2.0	3.8	R	5	183	067700-9481	
IUF24	Motorcycle		10	12.7	16	0.8	0.6	2.0	3.8	R	5	184	067700-9491	
IUF27A	Motorcycle	SLANT GROUND ELECTRODE	10	12.7	16	0.9	-0.5	1.0	2.9	R	5	185	067700-9701	
IUF31A	Motorcycle	SLANT GROUND ELECTRODE	10	12.7	16	0.9	-0.5	1.0	2.9	R	5	186	067700-9711	
IY24	Motorcycle	HALF THREAD	8	19	13	0.7	0.6	1.4	2.9	R	5	1100	267700-4491	
IY27	Motorcycle	HALF THREAD	8	19	13	0.7	0.6	1.4	2.9	R	5	1101	267700-4501	
IY31	Motorcycle	HALF THREAD	8	19	13	0.7	-0.5	0.5	2.0	R	5	1102	267700-4511	

#### 0.4mm diameter IRIDIUM PLUG

TYPE	APPLICATION	SPEC	DIA.	REACH	HEX	GAP	PROJECION	SPARK POSITION	GROUND ELECTRODE	TERMINAL SHAPE	RESISTOR	No.	IRIDIUM ONE PC BOX	IRIDIUM 2pcs BLISTER PACK
			(mm)	(mm)	(mm)	(mm)	(mm)	Z (mm)	HGL	P				
K24C11	Motorcycle		14	19	16	1.1	1.5	3.0	5.7	S	5	135	067700-9550	
K27C11	Motorcycle		14	19	16	1.1	0.5	2.0	4.7	S	5	136	067700-9520	
XU22C·	Automobile	NON U-GROOVE	12	19	16	0.8	1.3	2.8	4.9	S	5	-	267700-5170	
XU22HPR	Automobile	NON U-GROOVE	12	26.5	16	0.8	1.5	3.0	5.1	S	5	174	267700-7170	
U31D	Motorcycle	NON U-GROOVE	10	19	16	0.9	-0.5	1.0	3.0	Т	5	-	267700-0860	
UH24D	Motorcycle	HALF THREAD	10	19	16	0.9	0.6	2.0	4.0	Т	5	187	067700-9560	
UH27D	Motorcycle	HALF THREAD	10	19	16	0.9	0.6	2.0	4.0	Т	5	188	067700-9570	
UF14-UB	MARINE		10	12.7	16	0.7	0.6	1.6	3.3	S	5	189	267700-0540	
/K16PR-Z11	Motorcycle	GROUND ELEC. Pt.&TAPERCUT	14	19	16	1.1	1.5	3.0	5.7	S	5	V28	267700-1840	
/K20PR-Z11	Motorcycle	GROUND ELEC. Pt.&TAPERCUT	14	19	16	1.1	1.5	3.0	5.7	S	5	V15	267700-1850	
/K22PR-Z11	Motorcycle	GROUND ELEC. Pt.&TAPERCUT	14	19	16	1.1	1.5	3.0	5.7	S	5	V29	267700-1860	
/K24PR-Z11	Motorcycle	GROUND ELEC. Pt.&TAPERCUT	14	19	16	1.1	1.5	3.0	5.7	S	5	V16	267700-1870	
/K27PR-Z11	Motorcycle	GROUND ELEC. Pt.&TAPERCUT	14	19	16	1.1	0.5	2.0	4.7	S	5	V30	267700-2050	
/KJ20RZ-M11	Motorcycle	GROUND ELEC. Pt.&TAPERCUT	14	19	16	1.1	3.0	5.0	7.7	S	5	V33	267700-1970	
SVK20RZ8	Automobile	GROUND ELEC. Pt.&TAPERCUT	14	19	16	0.8	1.5	3.5	5.7	S	5	S18	067700-9740	
SVK20RZ11	Automobile	GROUND ELEC. Pt.&TAPERCUT	14	19	16	1.1	1.5	3.5	6.0	S	5	S52	067700-8620	
/X20BC	Motorcycle	GROUND ELEC. Pt.	12	19	18	0.9	1.5	2.8	5.0	Т	5	V34	067700-9830	
X22BC	Motorcycle	GROUND ELEC. Pt.	12	19	18	0.9	1.5	2.8	5.0	Т	5	V14	067700-9720	
/UH24D·	Motorcycle	HALF THREAD, Ground Elec. Pt.&TAPERCUT	10	19	16	0.9	0.6	2.0	4.0	Т	5	V26	267700-2011	
/UH27D·	Motorcycle	HALF THREAD, Ground Elec. Pt.&TAPERCUT	10	19	16	0.9	0.6	2.0	4.0	Т	5	V27	267700-1931	
/UH24ES	Motorcycle	HALF THREAD, Ground Elec. Pt.&TAPERCUT, SUS GASKET	10	19	16	0.9	0.6	2.0	4.0	Т	5	V57	267700-6130	
/UH27ES	Motorcycle	HALF THREAD, Ground Elec. Pt.&TAPERCUT, SUS GASKET	10	19	16	0.9	0.6	2.0	4.0	Т	5	V42	267700-4770	
/NH24 <b>Z</b>	Motorcycle	HALF THREAD, Ground Elec. Pt.&TAPERCUT	10	19	16	0.9	0.6	2.0	4.0	S	5	V32	267700-2060	
/NH27 <b>Z</b>	Motorcycle	HALF THREAD, Ground Elec. Pt.&TAPERCUT	10	19	16	0.9	0.6	2.0	4.0	S	5	V31	267700-2070	
/NH27ZB	Motorcycle	HALF THREAD, Ground Elec. Pt.&TAPERCUT	10	19	16	0.9	0.6	2.0	4.0	S	5		267700-1920	





# High Performance Spark Plug

Iridium alloy fine center electrode

> Lasting high performance, long life and high response

Economical and long lasting!

# Fine diameter, iridium alloy and platinum tipped ground electrode achieve high durability!

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LASER WELDING

#### Built-in, Highly B

Highly Reliable Resistor All specification types include an embedded, highly reliable, monoiithic resistor to eliminate electromagnetic noise interference from all kinds of electronic devices.

Burnished Highly Corrosion Resistant, Nickel Burnished Nickel Plating

The insulator housing is plated with burnished nickel the same as racing plugs, resulting in high corrosion resistance. (VKA and VKB excluded)

#### 360° Laser Welding

The iridium tip is mounted with an "All-around Laser Welding" method that insures high reliability and durability even under the most severe driving conditions.



#### Platinum-tipped Ground Electrode

The ground electrode has a platinum tip, from DENSO's experience with platinum plugs. This greatly moderates electrode wear and insures high durability.

#### 2 Fine Diameter Ultra-fine Iridium Center Electrode

Using DENSO's exclusive iridium alloy having a very high melting point, the tip of the center electrode can be shaped very thin and fine, reducing spark voltage requirements and greatly improving ignitability.

### IRIDIUM TOUGH<sup>®</sup> is recommended for the following user.



### For long distance and heavy-use drivers.

Because of its long lifetime, recommended to drivers for long driving.

By greatly minimizing electrode wear, DENSO improved mileage and extended the plug's useful life. Longevity provides you with peace of mind and safety when using IRIDIUM TOUGH".



### For drivers that care about mileage.

As I drive every day, so I want less fuel consumption.

If you use your car on a daily basis, you may be concerned about fuel consumption. **IDUM TOUGH** is one solution.



#### Improved Ignitability

#### Realizing high ignition performance with a fine diameter electrode.



**Improved Acceleration** 





「シリリカ」 **てのリの**計<sup>®</sup> will increase combustion pressure and engine output.

up

15.8

15.760

15.646

15.6

15.4

DENSO

### **IRIDIUM TOUGH**<sup>®</sup> Specifications

TYPE	APPLICATION	SPEC	DIA.	REACH	HEX	GAP	PROJECI	POSITION	GROUND ELECTRODE HIGH	TERMINAL SHAPE	RESISTOR	No.	IRIDIUM TOUGH® ONE PC BOX	2pcs BLISTER PA
TIPL	AFFLICATION	GFLO	(mm)		(mm)	(mm)		Q (mm)	1	VAL	TOR (kΩ)		DENSO P/N	DENSO P/N
VQ16	Automobile	JIS	14	19	16	1.1	1.5	3.0	5.7	S	5	V01	267700-0741	100676-3740
VQ20	Automobile	JIS	14	19	16	1.1	1.5	3.0	5.7	S	5	V02	267700-0751	100676-3750
VQ22	Automobile	JIS	14	19	16	0.8	1.5	3.0	5.4	S	5	V13	267700-0761	100676-3760
VK16	Automobile	ISO	14	19	16	1.1	1.5	3.0	5.7	S	5	V03	267700-0711	100676-3710
VK20	Automobile	ISO	14	19	16	1.1	1.5	3.0	5.7	S	5	V04	267700-0721	100676-3720
VK22	Automobile	ISO	14	19	16	0.8	1.5	3.0	5.4	S	5	V10	267700-0731	100676-3730
VK16G	Automobile	SUS GASKET	14	19	16	1.1	1.5	3.0	5.7	S	5	V40	267700-5631	
VK20G	Automobile	SUS GASKET	14	19	16	1.1	1.5	3.0	5.7	S	5	V41	267700-5641	
VK22G	Automobile	SUS GASKET	14	19	16	0.8	1.5	3.0	5.4	S	5	V36	267700-5671	100676-5340
VK20Y	Automobile		14	19	16	0.8	1.5	3.0	5.4	S	5	V20	267700-3721	100676-3950
VKA16	Automobile	NEW 3 ELECTRODE SHROUD	14	22	16	1.1	2.5	4.0	6.5	S	5	V22	267700-5031	100676-5360
VKA20	Automobile	NEW 3 ELECTRODE SHROUD	14	22	16	1.1	2.5	4.0	6.5	S	5	V23	267700-5041	100676-5370
VKB16	Automobile	NEW 3 ELECTRODE	14	19	16	1.1	2.5	4.0	6.5	S	5	V24	267700-5051	100676-5380
VKB20	Automobile	NEW 3 ELECTRODE	14						6.5	S	5	V25	267700-5061	100676-5390
VFK16	Automobile	DOUBLE NEEDLE Ir & Pt ELEC.		19					6.5	S	5	V47	267700-9151	
VFK20F		DOUBLE NEEDLE II & PT ELEC. COPPER CORE GROUND ELEC.							6.5	S	5		267700-9161	
VFKB16		NEW 3 ELECTRODE, DOUBLE NEEDLE IRIDIUM, PLATINUM		-		0.8				S	5	V64	267700-9271	
VFKH16	Automobile	DOUBLE NEEDLE Ir & Pt ELEC.		26.5						s	5		267700-7411	
VFKH20	Automobile	DOUBLE NEEDLE II & Pt ELEC.		26.5						s	5	V55	267700-7421	
VFKBH20		NEW 3 ELECTRODE, DOUBLE NEEDLE IRIDIUM, PLATINUM			-		-	-	-	S	5		267700-7661	
VKH16	Automobile	NEW 3 ELECTRODE, DOUBLE NEEDLE INDION, FEATINOIN		26.5						S	5	V43	267700-3681	100676-5250
VKH20	Automobile			26.5		1.1				S	5	V18	267700-3691	100676-5150
KH20Y	Automobile			26.5						S	5	V39	267700-4541	100676-5260
/KH22	Automobile			26.5						S	5	V19	267700-2681	100676-5270
/W16	Automobile			19						S	5	V05	267700-0771	100676-3770
/W20	Automobile		14			5 1.1				S	5	V06	267700-0781	100676-3780
/W22	Automobile	71252.0517	14			6 0.8				S	5	V07	267700-0791	100676-3790
/T16	Automobile	TAPER SEAT		17.5						S	5	V21	267700-2811	100676-5280
<b>/T</b> 20	Automobile	TAPER SEAT		17.5		1.1				S	5	V38	267700-4481	100676-5290
/XU20	Automobile		12		-	1.1	-		-	S	5	V49	267700-9141	
/XU22	Automobile		12	19	16	0.9	1.3	2.8	5.0	RC	5	V08	267700-0801	100676-3800
VXU24	Automobile		12	19	16	0.9	1.3	2.8	5.0	RC	5	V09	267700-0811	100676-3810
/XU22I	Automobile		12	19	16	0.9	1.3	3.5	5.7	S	5	V51	267700-8441	
VXUH22	Automobile		12	26.5	16	0.9	1.5	3.0	5.2	S	5	V11	267700-6461	
VXUH20I	Automobile		12	26.5	16	0.9	1.5	4.0	6.2	S	5	V50	267700-8161	
XUH22I	Automobile		12	26.5	16	0.9	1.5	4.0	6.2	S	5	V56	267700-7381	
XUHC22G	Automobile	SUS GASKET SHROUD	12	28	16	0.8	2.0	3.5	5.6	S	5	V52	267700-8671	
FXUHC22FG	Automobile	DOUBLE NEEDLE Ir & Pt ELEC, SUS GASKET SHROUD	12	28	16	1.1	2.0	3.5	5.7	S	5	V53	267700-8681	
VCH16	Automobile		12	26.5	14	1.1	2.5	4.0	6.4	S	5	V58	267700-9211	
VCH20	Automobile		12	26.5	14	1.1	2.5	4.0	6.4	S	5	V37	267700-7671	
/FCH16	Automobile	DOUBLE NEEDLE Ir & Pt ELECTRODE	12	26.5	14	0.8	2.5	4.0	6.8	S	5	V65	267700-9281	
DCH22F	Automobile	DOUBLE NEEDLE Ir & Pt ELECTRODE	12	26.5	14	0.9	3	3.0	6.0	S	5	V63	267700-9291	
DKH22F	Automobile	DOUBLE NEEDLE Ir & Pt ELECTRODE	14	26.5		0.9	3	3.0	6.3	S	5	V62	267700-8751	
XEBH27	Automobile	NEW 3 & COPPER CORE GROUND ELEC.	12	26.5	14	0.8	2	3.5	5.6	S	5	V86	267700-9171	
XEHC24G	Automobile	SUS GASKET SHROUD 1.5mm	12	28	14	0.8	2	3.0	5.7	S	5	V60	267700-9231	
FXEH20E	Automobile	DOUBLE NEEDLE Ir & Pt ELECTRODE, SHROUD 2mm	12	28.5	14	1.1	2.5	4.0	7.2	S	5	V44	267700-7631	
VFXEH22	Automobile	DOUBLE NEEDLE Ir & Pt ELECTRODE	12	26.5	14	1.1	2.5	4.0	7.2	S	5	V46	267700-7651	
	Automobile	DOUBLE NEEDLE Ir & Pt ELECTRODE	12	26.5	14	1.1	2.5	4.0	7.2	S	5	V45	267700-7641	
		DOUBLE NEEDLE Ir & Pt ELECTRODE, SHROUD 1.5mm									5	V59	267700-9221	
												V61		1

Spark gap example .........For a 1.1 mm gap, set from 1.0 to 1.1 mm. Insulator projection......Length from edge of side housing to top of insulator. The plus (+) direction is the distance from the edge to the piston head. Spark position .....Length from edge of side housing to top of center electrode. The plus (+) direction is the distance from the edge to the piston head. Ground electrode height....Length from edge of side housing to top of ground electrode. The plus (+) direction is the distance from the edge to the piston head. Terminal shapes......S: solid terminal, R: removable, RC: crimped nut, T: threaded

### IRIDIUM TOUGH® lineup





DENSO

#### High Performance Spark Plug

# RIDIUN PLUS





**1** Fine Diamater Ultra-fine

**2** Platinum-tipped Ground Electrode The ground electrode has a platinum tip, from DENSO's experience with platinum plugs This greatly moderates electrode wear and insures high durability.

Iridium Alloy Center Electrode

**3** High Strength Insulator

Using a high strength ceramic insulator for LPG engines improves strength by 20% over conventional insulators.

### **IRIDIUM PLUS**<sup>®</sup> Specifications

TYPE	APPLICATION	SPE	DIA.	REACH	HEX	GAP	PROJECION	SPARK POSITI	GROUND Electrod	TERMII	RESIS	No.	<i>IRIDIUM PLUS</i> ° ONE PC BOX
	CATION	ဂ	(mm)	т (mm)	(mm)	(mm)		9 (mm)	e hight (mm)	VAL	TOR <sub>(kΩ)</sub>		DENSO P/N
VK20T	For LPG	For LPG	14	19	16	0.8	1.5	3.0	5.4	S	5	-	067700-9540
<b>VW20T</b>	For LPG	For LPG	14	19	20.6	0.8	1.5	3.0	5.4	S	5	-	067700-9240
VKH20T	For LPG	For LPG	14	26.5	16	0.8	2.5	4.0	6.2	S	5	-	267700-7760
VDKH16T	For LPG	For LPG	14	26.5	16	0.8	1.5	3.0	6.2	S	5	-	267700-8920

### **Next Generation High Performance Plugs for Taxi**

#### Economical spark plug with high durability, mileage, and acceleration performance.

#### **Excellent Durability**

#### Realizing astounding life and durability with platinum ground electrodes.

By welding a platinum tip to the ground electrode, wear has been controlled to a significant extent in the **IRIDIUM PLUS**. In addition to acceleration performance, the life and durability of this plug has been increased to that of a platinum plug.



#### Improved Mileage

#### Less fuel consumption with a fine diameter center electrode.

Even during idling, when it is easy for ignition to degrade, **IRIDIUM PLUS** reduces mis-sparking and stabilizes idling speed. This results in a quieter engine and improved fuel consumption.

Fuel Consumption Comparison



\* The data shown is from internal studies. Also, the Regular Plug" and "Platinum Plug' referred to here are DENSO pro

#### Improved Acceleration

#### Through steady ignitability, acceleration performance is greatly improved.

IRIDIUM PLUS, through its fine diameter iridium center electrode, has realized high ignition performance and low spark voltage at levels heretofore unseen. Because of this, there is less non-firing under high spark voltage conditions and fewer misfires under conditions where ignition is difficult, permitting operation with a high level of response under a variety of conditions. As a result, acceleration has been improved.



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CHINA AUSTRALIA

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INDONESIA

# High Performance Spark Plug RIDIUM RACING

RIDIUI RACING



with an iridium center electrode

### **Unbeatable spark technology** fine-tuned for racing



#### **Specifications Include Terminal**

Included with the plug comes with a terminal nut compatible to the Nology Hot Wire and most plug cords around the world. Please remove for vehicle types that do not require terminals. (Some plugs have solid terminals. Please refer to the list.)

#### **Built-in, Highly Reliable Resister**

All IRIDIUM RACING plugs specify a resistor, and contain a highly reliable monolithic-type resistor that blocks noise that may affect electronic devices. (IW06 has no resistor.)

**Highly Corrosion Resistant, Burnished Nickel Plating** Burnished nickel plating on the housing, a high level of corrosion resistance has been realized. Also, because the amount on the threads is low, the damage to the female thread in the cylinder is reduced.



RIDIUM

RACING

Burnished

Nickel Plating



The center electrode tip is able to be made fine using a new iridium alloy with a high melting point. The required voltage is reduced, and ignitability is improved greatly

#### **1** All-platinum **Ground Electrode**

Compared to the nickel alloy used in conventional spark plugs, the high melting point of platinum will reduce such problems as ground electrode melting and wear. Also, the 0.8mm platinum alloy is welded on and gapped without any bending, reducing residual stress and increasing durability

#### 2 Insulators for Racing

By using a new, strengthened insulator which was developed during numerous and repeated testing during racing trials, strength is improved by 20%

#### **3** Spark Cleaning Pocket



fouling or deposition, this part will discharge and burn off the carbon, restoring electrical resistance. This technology is patented by DENSO (Japan Patent No. 2727558).

#### 4 Silicone Oil Coating

During the start of the race, non-starting from carbon fouling and carbon deposits can be fatal. To stop this, the insulator has been coated with a silicone coating. Using the water repellency of silicone, the insulator surface is isolated from moisture and carbon. preventing a decrease in resistance.



#### **5** 360° Laser Welding

The process used to join the iridium tip is a highly reliable "All-around Laser Welding" process that is able to withstand various kinds of driving conditions.



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The data shown is from internal studies. Also, the "Regular

Racing Plug" referred to here is a DENSO product

### IRIDIUM RACING is recommended for the following user.



### Improve acceleration and engine power with IRIDIUM RACING

Reliability and durability, backed by the racing results of major drivers such as Sorberg, Stoner & Koyama

It's the age of iridium electrodes. Discover more acceleration with 0.4 mm DENSO Racing Plugs. DENSO would like you to try the 0.4 mm **IRIDIUM RACING** advantage. Use **IRIDIUM RACING** and experience a ride like never before.

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Generally, electrodes that project into the combustion chamber have better ignitability and have better performance. However, because of more exposure to

Horsepower

**Improved Horse Power** 

dramatically, increasing enginen output.

lormal race

Speed (km/h)

(0.8 mm electrode)

70 80 90 100 110 120 130

nlug

More power with an ideal combustion cycle.

misfires under a variety of conditions has been greatly

Through superb ignitability and required voltage, non-firing and

Output (ps) [at 120 km/h]

33

Plug

עוופואו

RACING

0.8 mm electro

Vehicle: 250 cc (2-cycle water cooled, 2 cylinder) Conditions: WOT 60 to 120 km/h (locked in 4th gear

ular race plug

reduced. As a result, combustion conditions have improved

**Improved Acceleration** 

#### Unbeatable acceleration performance on the circuit.

With an ultra-fine, 0.4 mm diameter center electrode, **IRDIUM RACING** plugs are the realization of superb ignition performance and reguired voltage at unparalleled levels. Misfires have been controlled and will allow you to have steadily high levels of response and increased acceleration.



Vehicle: 250 cc (2-cycle water cooled, 2 cylinder) Conditions: WOT 60 to 129 km/h (locked in 6th gear)

### 🔥 How to Choose a Racing Plug



high temperature combustion gases and because ground electrode becomes longer, heat resistance and durability decrease. The higher the level of tuning, the greater the need is to use a less projecting type.
 As the level of tuning is increased, so does the need for higher heat range.



#### Identifying IRIDIUM RACING (Stamped into the Center of the Housing)

Ι	W	0	1	-	27	
Variety	Thread Size	Intermediate Number (Overall Size)	Intermediate Number (Electrode Shape)		Heat Range	
	U:10 mm		1 : Slant ground		24	
I : Iridium	XU:12 mm		electrode or		27	
1. maium	A:14 mm AE:14 mm		surface gap plug.		29	
	K:14 mm		2 : Flat ground electrode		31	
	KH:14 mm		•		32	
R : Surface	Q:14 mm		6 : Slant ground electrode and		34	
Gap	RE:14 mm RL:14 mm		non-resistor plug		35	
	RT:14 mm			01 bas a	flat ground elect	trada
	W:14 mm		(Exception) IRE	or nas a	nat ground elect	rode.
	WM:14 mm					

DENSO	TYPE	Electrode	Cross Reference
IU01-🗆	U-E		R0373A, R0379A, R016
RU01-□*	U-E (SURFACE)		R0045J, R0045Q
IXU01-🗆	XU-E	2 A	R216, R2525
IRE01-🗌	ROTARY ENGINE	3 B	R6725
IW01-🗆	W-E	<b>4 A</b>	R6385P, R7379, R6918B
IW06-🗆	W-E (NON=RESISTOR)	<b>4 A</b>	B-EGP, R4630A
IWM01-	W-EM	<b>5</b> A	R5184, R6179AP
IK01-🗆	ISO (SLANT ELECT)	6 A	R7116, R7117
IK02-🗆	ISO (STRAIGHT ELECT)	6 B	R7279, R7118, R7119
IQ01-🗆	SLANT ELECT	<b>7 A</b>	R7236, R7237
IQ02-🗆	STRAIGHT ELECT	7 B	R7238, R7239
IA01-🗆	FOR DETONATION COUNTER	8 A	R7282A, R6120A
IAE01-	FOR W/OUT DETONATION COUNTER	9 A	R7282, R6120
IKH01-🗆	K-LONGREACH	10 A	R7438
IRL01-🗆	ROTARY ENGINE RX8	<b>11 A</b>	R7440A-L
IRT01-🗆	ROTARY ENGINE RX8	12 A	R7440B-L
	Irface gap plugs, not ones with iridium ound electrodes.		

### **IRIDIUM RACING**<sup>®</sup> Specifications

TYPE	APPLICATION	SPEC	DIA.	REACH	HEX	GAP		SPARK POSITION	ground Electrode Hig	TERMINAL SHAPE	RESISTOR	No.	IRIDIUM RACIN ONE PC BOX
			(mm)	(mm)	(mm)	(mm)	(mm)	2 (mm)	Hight (mm)	ŕ	OR (kΩ)		DENSO P/N
IK01-24	Automobile	ISO(SLANT ELEC.)	14	19	16	0.7	-1.0	0.5	2.0	S	5	R01	267700-1311
K01-27	Automobile	ISO(SLANT ELEC.)	14	19	16	0.7	-1.0	0.5	2.0	S	5	R02	267700-1321
IK01-31	Automobile	ISO(SLANT ELEC.)	14	19	16	0.7	-1.0	0.5	2.0	S	5	R03	267700-1331
IK01-34	Automobile	ISO(SLANT ELEC.)	14	19	16	0.7	-1.0	0.5	2.0	S	5	R42	267700-1341
IK02-24	Automobile	ISO(STRAIGHT ELEC.)	14	19	16	0.7	-2.3	-0.8	0.7	S	5	R04	267700-1361
IK02-27	Automobile	ISO(STRAIGHT ELEC.)	14	19	16	0.7	-2.3	-0.8	0.7	S	5	R05	267700-1371
IK02-31	Automobile	ISO(STRAIGHT ELEC.)	14	19	16	0.7	-2.3	-0.8	0.7	S	5	R06	267700-1381
IKH01-24	Automobile	LONG REACH	14	26.5	16	0.7	-1.0	0.5	2.0	S	5	R49	267700-4451
IKH01-27	Automobile	LONG REACH	14	26.5	16	0.7	-1.0	0.5	2.0	S	5	R50	267700-4461
IKH01-31	Automobile	LONG REACH	14	26.5	16	0.7	-1.0	0.5	2.0	S	5	R51	267700-4471
IQ01-24	Automobile	SLANT ELEC.	14	19	16	0.7	-1.0	0.5	2.0	S	5	R07	267700-1411
IQ01-27	Automobile	SLANT ELEC.	14	19	16	0.7	-1.0	0.5	2.0	S	5	R08	267700-1421
IQ01-31	Automobile	SLANT ELEC.	14	19	16	0.7	-1.0	0.5	2.0	S	5	R09	267700-1431
IQ01-34	Automobile	SLANT ELEC.	14	19	16	0.7	-1.0	0.5	2.0	S	5	R43	267700-1441
IQ02-24	Automobile	STRAIGHT ELEC.	14	19	16	0.7	-2.3	-0.8	0.7	S	5	R10	267700-1461
IQ02-27	Automobile	STRAIGHT ELEC.	14	19	16	0.7	-2.3	-0.8	0.7	S	5	R11	267700-1471
IQ02-31	Automobile	STRAIGHT ELEC.	14	19	16	0.7	-2.3	-0.8	0.7	S	5	R12	267700-1481
IW01-24	Motorcycle	W-E	14	19	20.6	0.6	-1.5	0.0	1.6	RC	5	R13	267700-1111
IW01-27	Motorcycle	W-E	14	19	20.6	0.6	-1.5	0.0	1.6	RC	5	R14	267700-1121
W01-29	Racing Kart	W-E	14	19	20.6	0.6	-1.5	0.0	1.6	RC	5	R15	267700-1131
IW01-31	Racing Kart	W-E	14	19	20.6	0.6	-1.5	0.0	1.6	RC	5	R16	267700-1141
W01-32	Racing Kart	W-E	14	19	20.6	0.6	-1.5	0.0	1.6	RC	5	R17	267700-1151
W01-34	Racing Kart	W-E	14	19	20.6	0.6	-1.5	0.0	1.6	RC	5	R18	267700-1161
W06-27	Automobile	W-E NON RESISTOR	14	19	20.6	0.6	-1.5	0.0	1.6	S	0	R44	067600-1811
IW06-31	Automobile	W-E NON RESISTOR	14	19	20.6	0.6	-1.5	0.0	1.6	S	0	R45	067600-1821
W06-34	Automobile	W-E NON RESISTOR	14	19	20.6	0.6	-1.5	0.0	1.6	S	0	R46	067600-1831
IRE01-27	Rotary Engine	ROTARY ENGINE	14	21.5	20.6	0.7	-2.2	-0.7	0.8	S	5	R19	267700-1521
IRE01-31	Rotary Engine	ROTARY ENGINE	14	21.5	20.6	0.7	-2.2	-0.7	0.8	S	5	R20	267700-1531
IRE01-32	Rotary Engine	ROTARY ENGINE	14	21.5	20.6	0.7	-2.2	-0.7	0.8	S	5	R21	267700-1541
IRE01-34	Rotary Engine	ROTARY ENGINE	14	21.5	20.6	0.7	-2.2	-0.7	0.8	S	5	R22	267700-1551
IRE01-35	Rotary Engine	ROTARY ENGINE	14	21.5	20.6	0.7	-2.2	-0.7	0.8	S	5	R41	267700-1561
IRL01-27	Rotary Engine	ROTARY RX8(LEADING)	14	21	20.6	1.1	-2.5	-0.5	1.6	S	5	R54	267700-4821
IRL01-31	Rotary Engine	ROTARY RX8(LEADING)	14	21	20.6	1.1	-2.5	-0.5	1.6	S	5	R55	267700-4831
IRT01-31	Rotary Engine	ROTARY RX8(TRAILING)	14	19	20.6	1.1	-2.5	-0.5	1.6	S	5	R52	267700-4841
IRT01-34	Rotary Engine	ROTARY RX8(TRAILING)	14	19	20.6	1.1	-2.5	-0.5	1.6	S	5	R53	267700-4851
IA01-31	Motorcycle	WITH DETONATION COUNTER	14	22	16	0.6	-1.0	0.5	1.9	S	5	R23	267700-1261
IA01-32	Motorcycle	WITH DETONATION COUNTER	14	22	16	0.6	-1.0	0.5	1.9	S	5	R24	267700-1271
IA01-34	Motorcycle	WITH DETONATION COUNTER	14	22	16	0.6	-1.0	0.5	1.9	S	5	R25	267700-1281
IAE01-32	Motorcycle	W/OUT DETONATION COUNTER	14	19	16	0.6	-1.3	0.5	2.1	S	5	R47	267700-2941
IAE01-34	Motorcycle	W/OUT DETONATION COUNTER	14	19	16	0.6	-1.3	0.5	2.1	S	5	R48	267700-2951
IWM01-29	Motorcycle	W-EM	14	19	20.6	0.6	-1.5	0.0	1.6	S	5	R26	267700-1211
IWM01-31	Motorcycle	W-EM	14	19	20.6	0.6	-1.5	0.0	1.6	S	5	R27	267700-1221
IWM01-32	Motorcycle	W-EM	14	19	20.6	0.6	-1.5	0.0	1.6	S	5	R28	267700-1231
IWM01-34	Motorcycle	W-EM	14	19	20.6	0.6	-1.5	0.0	1.6	S	5	R29	267700-1241
IXU01-24	Motorcycle	XU-E	12	19	16	0.6	-1.5	0.0	1.4	R	5	R30	267700-1061
IXU01-27	Motorcycle	XU-E	12	19	16	0.6	-1.5	0.0	1.4	R	5	R31	267700-1071
IXU01-31	Motorcycle	XU-E	12	19	16	0.6	-1.5	0.0	1.4	R	5	R32	267700-1081
IXU01-34	Motorcycle	XU-E	12	19	16	0.6	-1.5	0.0	1.4	R	5	R33	267700-1091
IU01-24	Motorcycle	U-E	10	19	16	0.6	-1.8	-0.3	1.2	R	5	R34	267700-1011
IU01-27	Motorcycle	U-E	10	19	16	0.6	-1.8	-0.3	1.2	R	5	R35	267700-1021
IU01-31	Motorcycle	U-E	10	19	16	0.6	-1.8	-0.3	1.2	R	5	R36	267700-1031
IU01-34	Motorcycle	U-E	10	19	16	0.6	-1.8	-0.3	1.2	R	5	R37	267700-1041
RU01-27	Motorcycle	U-E(SURFACE)	10	19	16	1.1	-0.2	0.0	0.0	R	5	R38	267700-1571
RU01-31	Motorcycle	U-E(SURFACE)	10	19	16	1.1	-0.2	0.0	0.0	R	5	R39	267700-1581
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### IRIDIUM RACING<sup>®</sup> CROSS REFERENCE

	DENSO							
IRIDIUM POWER	IRIDIUM RACING	FIGURE	DIA. (mm)	REACH (mm)	HEX (mm)	RESISTOR	FIGURE	TYPE
IW		4 D	14	19	20.6		BP-E	R4304A-
	IW01/IW06- (Note 1)		14	19	20.6		B-E	BEGP
		<b>4 D</b>	14	19	20.6		B-E	B EGV
IW	IW01/IW06(Note 1)		14 14	19 19	20.6 20.6		B-E B-E	R4118S-
	IW01/IW06- (Note 1)	4 A 4 A	14	19	20.6	R	B-E	R6252K-
	IW01/IW06- (Note 1)		14	19	20.6	R	B-E	R6918B-
	IW01/IW06- (Note 1)	<b>4</b> A	14	19	20.6	R	B-E	R6918C-
IW		4 D	14	19	20.6	R	B-E	R6021E-
	IW01/IW06- (Note 1)	<b>4</b>	14	19	20.6	R	B-E	R6385-□P
	IW01/IW06- (Note 1)	<b>4</b>	14	19	20.6	R	B-E	R7376-□(lr)
			14	19	20.6		B-E SEMISURFACE	R5649-
	IWM01-		14	19 19	20.6 20.6	R	B-E SEMISURFACE	R6712-
		<b>5</b> A	14 14	19	20.6	B	B-E COMPACT B-E COMPACT	R5184-
			14	19	20.6	R	B-E COMPACT	R5300N-
			14	19	20.6	R	B-E COMPACT	R5540F-
	IWM01-	<b>5</b> A	14	19	20.6	R	B-E COMPACT	R6179A- P
			14	22	20.6	R	B-E COMPACT	R6179C-□PA
			14	22	20.6	R	B-E	R7376B(lr)
	IA01-	<b>8</b> A	14	22	16	R	BC-E COMPACT	R6120A-
		<b>8</b> A	14	22	16	R	BC-E COMPACT	R7282A- (Ir)
	IAE01- IAE01- (Note 2)	9 A 9 A	14 14	19 19	16 16	R	BC-E COMPACT BC-E COMPACT	R6120-
	IAE01 - (Note 2) IAE01 - (Note 2)	9 A 9 A	14 14	19 19	16 16	R	BC-E COMPACT	R6120C-
		9 A 9 A	14	19	16	R	BC-E COMPACT	R7282(lr)
	IAE01(Note 2)	9 A	14	19	16	R	BC-E COMPACT	R7282C-[(Ir)
	IAE01- (Note 2)	9 A	14	19	16	R	BC-E COMPACT	R7282M-[(Ir)
IK		6 D	14	19	16	R	BK-E ISO	R6888A-
IK		6 D	14	19	16		BK-E ISO	R7112-🗌
IK_		6 D	14	19	16	R	BK-E ISO	R7113-
IK		6 D	14	19	16	R	BK-E ISO	R7433- (ir)
		<b>6 D</b>	14	19	16		BK-E ISO	R7114-
IK	IK01-	6 D	14 14	19 19	16 16	R	BK-E ISO BK-E ISO	R7115-
	IK01-	6 A 6 A	14	19	16	B	BK-E ISO	R7110-
	IK02-	<b>6 B</b>	14	19	16	n	BK-E ISO	R7118-
	IK02-	<b>6</b> B	14	19	16	B	BK-E ISO	R7119-
	IK01-	6 A	14	19	16	R	BK-E ISO	R7434(lr)
	IK02-	6 B	14	19	16	R	BK-E ISO	R7279- (Ir)
			14	19	16	R	<b>BK-E SEMISURFACE</b>	R6601-
			14	19	16		BK-E SEMISURFACE	R6711-
IQ		0 D	14	19	16	R	BCP-E	R7435- (Ir)
			14	19	16		BCP-E	R7232-
			14 14	19 19	16 16	R	BCP-E BC-E	R7233-
			14	19	16	R	BC-E BC-E	R7234-
	IQ01-		14	19	16		BC-E	R7236-
	IQ01-		14	19	16	R	BC-E	R7237-
	IQ02-	0B	14	19	16		BC-E	R7238-
	IQ02-	7 B	14	19	16	R	BC-E	R7239-🗌
	IQ01-	<b>7</b>	14	19	16	R	BC-E	R7436-[](lr)
			14	19	16	_	BC-E SEMISURFACE	R5883-
		<b>~</b> -	14	19	16	R	BC-E SEMISURFACE	R6690-
IKH	IKH01-		14 14	26.5 26.5	16 16	R	LFR LFR	R7437-□(lr) R7438-□(lr)
IWF			14	12.7	20.6	n	B-H	R7438(Ir) R5525
			14	12.7	20.6		B-H	R5530-
	IRE01-	<b>8</b> B	14	21.5	20.6	R	ROTARY	R6725-
	IRE01-	<b>B</b>	14	21.5	20.6	R	ROTARY	R7420-□(lr)
			14	21.5	20.6		ROTARY, SURFACE	T813J-N13
	IRL01-		14	21	20.6	R	ROTARY RX-8(L)	R7440AL(Ir)
	IRT01-	<b>1</b> 2 A	14	19	20.6	R	ROTARY RX-8(T)	R7440B- T(lr)
	IXU01- (Note 3)	<b>2</b> A	12	19	18		D-E	R216-
IX (Note 3)	IXUO1- (Note 3)	0D,0A	12	19	18 18		D-E	R217-
			12 12	21 19	18 16	R	D-Z DC-E SEMISURFACE	R2188-
	IXU01-(Note 3)	<b>2</b> A	12	19	16	R	DC-E	R2349-
			12	19	16		DC-E DC-E SEMISURFACE	R2430-
	IU01-		10	19	16		C-E	R016-
		<b>0</b>	10	19	16		C-E	R017-
IU🗛	IU01-	<b>O</b> A	10	19	16		C-E	R0373A-[](lr)
IU				19	16		C-E SEMISURFACE	
IU			10	10	-			
IU_A	RU01-	10	10	19	16		C-E SEMISURFACE	R0045J-
IU□A	RU01 RU01	0 🖸	10 10	19 19	16	R	C-E SEMISURFACE	R0045Q-
IU A IUF (A)	RU01-		10	19		R R		



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(Note 1) IW06 is a non resistor type (Note 2) Remove the gasket with nippers before use (Note 3) IX = B and IX = is different from IXU01- \_ only in the hex size (18 mm or 16 mm), and are otherwise interchangeable in terms of installation. ( \_ ) show the heat range.

DENSO

### **IGNITION TECH Q&A**



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### & A about Plug Performance

### Q.1 Will output and torque increase if I use *IRIDIUM POWER* ?

A These are chassis dynamo test results comparing a Vitz 1300 using *IRIDIUM POWER*<sup>\*</sup> and another which uses Normal plugs are shown below. With the normal plugs, the output is 98.2PS, while torque is 14.8 kgf; when this was changed to the *IRIDIUM POWER*<sup>\*</sup>, the output was 99.3PS, while torque was 15.2 kgf. (This is approximately a 1.5% improvement in output.)



### Q.2 Is there a standard for differentiating the uses of *IRIDIUMPOWER* and *IRIDIUM RACING*?

**A INDIUM RACING** uses a platinum tip for the ground electrode and a high strength fine insulator for racing. Also, there is a silicone coating on the insulator giving it an increased resistance to carbon fouling. However, because of the withdrawn spark position, the **IRIDIUM POWER** has the high ignitability of the two. Instead, because of the "extension" in engine revolution felt by many at high revolutions, it is popular with customers who race. Choose "**IRIDIUM POWER**" for response and "**IRIDIUM RACING**" " for high revolutions. **IRIDIUM RACING** is particularly popular on the circuit scene.

### Q.3 How does the engine respond to changed settings?

We sometimes hear that "IRIDIUM POWER" is too sensitive to setting changes." However, the flip side to sensitivity is that "the response to setting changes is fast and easier," and during races, we hear that it makes setting changes easier. If IRIDIUM POWER" is used, it should become possible to draw out more performance from your vehicle.



### Q.4 <sup>W</sup><sub>if</sub>

Will my exhaust emissions be cleaner if I put on *IRIDIUM POWER*?

A Improved combustion efficiency will clean your exhaust emission! Fuel consumption will improve too! With the superior ignitability of ultra-thin electrodes (0.4 mm), combustion efficiency will be improved.

Oreaner Exhaust Emissions

CO and CO<sub>2</sub> levels will decrease in the "EURO III" emissions test to be implemented in the feature.

OImproved Mileage

A great bonus for long-distance drivers. Even for those who are concerned about the environment, we recommend Iridium Power.

Iridium Plug Motorcycle Emissions Comparison TestTest Vehicle:CBR250Test Conditions:EURO IIITest Equipment:MEXA-7400, CVS 7100Tested Plugs:U24FER9 (Ni Plug) Gap: 0.85IUH24 (Ir Plug) Gap: 0.85



# **Q&A** about Plug Performance

### Q.5 Can I replace my double, triple, or quadruple electrode plugs to *IRIDIUM POWER* or *IRIDIUM TOUGH*?

A This is possible. The reason: because of the fine center electrode in Iridium Power and Iridium Tough plugs, they have a lower spark voltage compared to double, triple, and quadruple electrode plugs. Please refer to the Standard Resistor Model Quick Chart.

#### Spark Voltage

The thinner the electrode is, the stronger the electrical field is. Because the electrical field affects spark voltage, a thinner electrode lowers spark voltage. If each type of electrode shape is modeled as shown below, Iridium Tough has a lower voltage than double electrode plugs.



#### Ignitability

The more the contact area between the flame kernel and the electrode is minimized, the smaller the cooling action from the electrodes and the better ignitability is. Because of the fine center electrode, the contact area between the flame kernel and the electrode is small, resulting in excellent ignitability.



#### Service lifetime of plugs

The service lifetime of a spark plug may be shortened due to driving conditions or ignition properties when used in a vehicle equipped with a simultaneous ignition system (plus-minus discharge and D-DL methods). Please ask your dealer to check if your vehicle is equipped with a simultaneous ignition system. The simultaneous ignition system fires the plug at the top dead center point not only of the compression stroke, but also the exhaust stroke.



### Q.6 What kind of vehicles are surface gap plugs used for?

These are plugs developed for racing, and there are many people who use these plugs in the All-Japan Road Race Championship JSB1000 class and in drag racing. Because the ground electrode is gone, there are the following advantages and disadvantages.

#### Advantages

- [1] When the engine is tuned so that the compression ratio is increased, these can avoid interference with the piston.
- [2] Because there are no excess projections into the combustion chamber, the combustion efficiency at high revolutions is improved.
- [3] Difficulties due to the ground electrode can be prevented.

#### Disadvantages

- [1] The ignitability becomes worse, and thus feeling and response at low and mid-revolutions deteriorates.
- [2] For peak engine characteristics demanded under the most severe operating conditions. In the popular ST600 class, many drivers use a plug with a ground electrode.



### How is the compatibility with plug cords such as Nology?

A There are no particular issues with compatibility. In fact, there are some cord manufactures who sell products "especially for iridium plugs."

### **Q.8** When changing plugs, is there any need to change the settings?

A For normal vehicles, there is no need to change the settings. It is advisable to reset vehicles with modified exhaust systems, though in most cases adjusting the air screw is sufficient. (Except for racing carburetors such as FCRs)

Q.9 Is the ther

Is there a way to tell them apart when replacing them?

A This can be done by confirming the level of wear (the gap width) on the ground electrode. DENSO's Iridium electrodes are different from conventional products in that their center electrodes hardly wear, and because of this it is better to check for wear on the ground electrode.



### The vehicle seems to be running worse now that I've installed them?

A In most cases there is a problem with the vehicle. Scooters are often run for long periods of time without maintenance, and it is common to see them with richer fuel-air mixtures from dirty air cleaners. Our investigations have found that these vehicles tend to be susceptible to carbon fouling, and when replacing plugs also remember to inspect and clean the air cleaner. The effectiveness of the change should become even more apparent.

INDIA CHINA AUSTRALIA

EUROPE & USA JAPAN VIETNAM THAILAND TAIWAN SINGAPORE SAUDIARABIA PHILIPPINES MALAYSIA KOREA INDONESIA

Q.2

### **Q&A** about Tuning Cars

#### Q.1 I have dia. ca Which

I have a 4AG engine NA tuned, with a Solex 44 dia. carburetor installed, giving a 200PS output. Which plug is good for a car such as this?

DENSO has IRIDIUM POWER and IRIDIUM RACING to meet the needs of tuned and racing engines. For the engine described in the question, the right plug should be around IRIDIUM POWER IK (IQ) 22, 24, or 27. Here is an introduction to using the different types of the Iridium Series on racing engines.
 IRIDIUM POWER : NA Tuned (Short distance racing), Turbo tuned where a regular turbine has been tuned to increase the boost.
 IRIDIUM RACING (01 Type): The 01 Type is usually called the slant ground electrode type. If your car is turbo tuned where the turbine has been replaced and the boost pressure is above 1.2 to 1.3 kg/cm<sup>2</sup>, an IRIDIUM RACING 01 type is needed. Also, if a NA tuned engine with comparatively high vibration (4 cylinders) is to be raced over long distances, switching to this type can increase the reliability of the ground electrodes.

**IRIDIUM RACING** (02 Type): The 02 type (flat ground type) is appropriate for higher output engines than the 01 type, but because the spark position is withdrawn compared to the 01 type, only consider this plug for racing applications.

#### I drive a GT-R tuned to 850HP. Would it be okay to install 0.4 mm dia. Iridium Power series plugs?

A The DENSO Iridium Series have the world's thinnest 0.4 mm iridium center electrodes, but because the durability of the iridium alloy developed by DENSO is higher that even platinum, which has in the past been said to be the most durable, it can be said that it's the best plug for tuned engines. Specifically, it has the following advantages:

- [1] Iridium alloy has a melting point and hardness above that of platinum, even turbo, with its high combustion temperature, can be used with confidence. Also, even when used with powerful ignition systems such as MSD and MDI, these plugs are even more reliable than platinum racing plugs.
- [2] The issue for high boost engines is that misfiring that occurs at high revolutions. The fine electrodes of the Iridium series require a lower voltage, allowing the energy generated by the coil to be sparked without losses. It can be said the 0.4 mm dia. DENSO **IRIDIUM POWER** series are a strong ally of tuned high-boost turbo systems.

#### Q.3 What is the optimum heat range for a tuned up Golf4 GTI 1.8L Turbo? (Tuning: Turbine Changed, High Volume Injector Installed,

A lt's difficult to give a heat range based on going from 150PS to 200PS alone, and it's best if you judge the condition of your

current plugs and judge for yourself, but as a general rule, for boost pressures between 1.0 and 1.2 kg/cm<sup>2</sup>, an IK24 should be sufficient. During the winter, IK22 should improve starting and low speed feel. The heat range is different depending on how the engine has been tuned and how it's used; using an increase in heat range of 1 or 2 as a starting point, decide on a heat range, always looking at the condition of your current plugs.

### Q.4

### Can an *IRIDIUM POWER*<sup>®</sup> be installed on an RX-7 (SA22C Turbo Model)?

In the rotary engines in some old Mazda's on the T (Trailing) side there is a plug, the terminal nut for which must be removed. In others, the removal of the T side plug terminal nut is necessary as in the Cosmo (HB22S). DENSO has **IRIDIUM RACING** for rotary engines, with a variety of heat ranges from #27 to #35. **IRIDIUM RACING** for Potary Engines

ranges from #27 to #35. **IRIDIUM RACING** for Rotary Engines come standard with terminal nuts.

### Q.5 The plugs of racing karts are susceptible to carbon fouling, but how does **IRIDIUM POWER** do in this case?

 but how does IRIDIUM POWER' do in this case?

 We frequently hear that IRIDIUM POWER' is resistant to

carbon fouling compared to plugs from other companies. However, there is no way that they are a 100% solution, and it's good to know these techniques to prevent carbon fouling.

- When rolling in the race, close the carburetor's low needle or pinch the fuel pipe with your hand to prevent excess fuel from entering the engine.
- [2] By pumping the accelerator during rolling, a rich fuel air mixture goes into the engine, making it easier for carbon fouling to occur. Operate the accelerator gently.
- [3] If carbon fouling happens while running with the throttle fully open, this could mean that the heat range is too low or that the fuel mix is to rich. Consult with a kart shop to find the optimum setting.

Q.6

Α

### Please advise us about selecting a plug for upgraded turbo engine vehicles.

A The following suggestions are only guidelines. First, regarding thermal value, if the boost pressure is 1.4 or lower, please choose No. 24. For thermal values of 1.5 or above, we recommend using No. 27. Thermal value may vary depending on the engine type and tuning, so please decide after checking the burned condition of the plugs.

Next, regarding the type of plug, if the boost pressure is 1.7 or lower, either **IRIDIUM POWER** or **IRIDIUM RACING** can be used. As a guideline, if you often drive with lower speeds or in town, **IRIDIUM POWER** is recommended since it is resistant to carbon fouling. If you are racing in 400-meter runs or often drive at high speeds, we recommend **IRIDIUM RACING**. When the boost pressure exceeds 1.7, it causes misfiring at high rpm. In such cases, it is necessary to use **IRIDIUM RACING**.

PART CROSS SMALL MOTOR I NUMBER REFERENCE ENGINE CYCLE

# **A** about Motorcycles

#### How is the compatibility 0.1with trial Motorcycle?

The "IW series" is well suited for most trial vehicles. Though these vehicles frequently use a low heat range, the heat ranges available for IRIDIUMPOWER' starts with IW16, so choose one that matches the type of driving you do. Better accelerator response and torque can be expected with IRIDIUM POWER, which has excellent ignitability. Recently, with downsizing of the space to install plugs in trial vehicles, demand for miniature plugs is increasing. In these cases, try the IK types. However, the space between the plug cable and the insulator will require waterproofing.

#### What is the difference in the life of an Q.2IRIDIUM POWER<sup>®</sup> used under 2-cycle conditions and one used under 4-cycle conditions?

In 4-cycle engines, a spark is produced for every 2 revolutions of the crankshaft, resulting in explosion and combustion in the engine. In 2-cycle engines, a spark is produced for each revolution of the crankshaft, resulting in explosion and engine combustion in the engine.

This simple comparison may lead you to conclude that 2-cycle engines simply have twice the wear; however wear is made up of not only wear from sparking, but also wear from high temperatures (oxidation). Thus, the amount of wear depends on the driving conditions of the vehicle, how the rotations of the engine are applied (that is, how the shift is used), and whether the resulting combustion temperature is high or low.

2-cycle engines have a higher level of electrode wear. This electrode wear is estimated at approximately 1.5 to 2 times that of 4cycle engines, and plug life is also shorter with 2-cycle engines. Iridium has a high melting point; however, it will undergo wear from sparking and wear from high temperatures (oxidation). To our knowledge, 2-cycle engines are only found in 2-wheel vehicles, our recommended value in this catalog for lifetime is 3000 to 5000km. (This value is based on a variety of conditions, and, racing use may require even more frequent replacement.) From the above, it is recommended that plugs for 2-cycle engines be replaced about every 3000km. However, the condition of wear depends on operating conditions and the typical engine rpms, so it is also possible to take out the plugs occasionally to confirm the amount of electrode wear and judge when the best time is to replace the plug.

#### Is it true that installation on Ducati watercooled Q.3 4-valve engines is not possible?

Since the 996R, the interior of the Testastretta (narrow head) engine's plug holes have been very narrowly machined, and with regular plug wrenches, the socket OD hits the wall and thus the plugs cannot be fully tightened. (Not possible with a 21.5mm OD) In this case, a thin-wall plug wrench is required. [We recommend the "NB3-16SP (nepros)" or the "B3A-16SP" by KTC.]

#### The terminal on the end of the plug is frequently unnecessary on motorcycle, so why is this included with all types?

IRIDIUM POWER comes standard with a plug terminal (not Α including combined types). This is because some of the other companies' plug cords require a terminal, and at DENSO we decide our product specifications keeping in mind every customer.

# Q.5

0.4

see that IRIDIUM TOUGH plugs, such as VUH27D and VK24PRZ11, are available for Honda vehicles. Will they last 100,000 km? Also, can IRIDIUM POWER be substituted here?

Plugs for motorcycle vehicles with a "V" in the part number have a platinum tip welded to the ground electrode, the same as in 4-wheel vehicles. They have more durability than Iridium Power, but do last 100,000 km. Thus we do not offer them as Iridium Tough products. You can choose the Iridium Power plug for those vehicle types with a compatible Iridium Power plug shown in the Model Chart; however, please understand that it will be not as durable.

> I installed IRIDIUM POWER<sup>®</sup> on to my motor cycle vehicle. Sometimes when I start it, there is a loud, explosive "pop.

With regular plugs this did not happen. Why is the reason for this?

A loud explosive "pop" pop sound can have the following two causes:

(1) An afterfiring muffler

Q.6

(2) Backfiring due to blowback from the carburetor

If it is the same vehicle and these symptoms were not there before changing to the new plugs, the reason for this is (1) afterfiring. The causes of afterfiring are:

- (1) An abnormally elevated intake pressure, the combustion becomes unsteady (during engine brake)
- (2) A problem with an ignition device (improper ignition timing, misfiring)
- (3) The fuel-air mixture is too rich (problem with the carburetor, too much choke)
- (4) The valve timing is off

If the problem is during starting, (2), (3), or (4) are thought to be the reason. A specific example for (2) is "ignition timing that is off" and specific examples for (3) include "a dirty air cleaner" and "pulling the choke too much."

We often hear that Iridium plugs improve ignitability so much that people "don't have to pull the choke to start the engine." If you are pulling the choke to full, try pulling it to the "halfway" point and see if this solves the problem.