

SPEC. F5-2808E

Date: January, 2000

# ***SPECIFICATION***

## **“NISSHA”**

### **POWER DRILL**

# **Hydraulic Drilling Rig**

Model : PDH-90

(Leader guided telescopic kelly bar type)

Quantity: \_\_\_\_\_ unit

January, 2000

## **NIPPON SHARYO, LTD.**

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Due to company policy of continuous development and improvement, the right is reserved to change the specifications without notice.

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## **1. GENERAL CONDITIONS**

**This specification shall cover the standard specification of NISSHA, POWER DRILL; model PDH-90 (here-in-after called “The machine” ) manufactured by NIPPON SHARYO, LTD.**

**The general arrangement and principal dimensions of the machine are shown in the drawings attached.**

### **1) DESIGN AND WORKMANSHIP**

**The machine shall be designed to perform the maximum efficiency with the least fuel consumption and the lowest maintenance costs.**

**The workmanship shall be of the first class in all respects.**

**The machine shall be built for simple mechanical arrangement and easy in inspection and maintenance.**

### **2) MATERIALS**

**The materials used in the manufacture of the machine shall be of the highest quality, free from defects and imperfections.**

**Principal materials such as bolts, nuts, seals and steel plates used in the machine confirm to the Japanese Industrial Standards. (Almost equal to ISO)**

### **3) TEST AND INSPECTION**

**Routine test and inspection in our factory shall be final.**

### **4) PAINTING AND LETTERING**

**Under-coating by anti-rust paint and enamel finishing shall be performed in accordance with manufacturer’s standard practice.**

**Main parts of the equipment shall be painted in NISSHA Green and other equipment in manufacturer’s standard.**

### **5) LANGUAGE AND UNIT OF MEASUREMENT**

**All documentation, such as specifications, manuals, etc. shall be written in English and all of equipment shall be designed in metric system.**

### **6) SERVICE CONDITIONS**

**The equipment shall meet the following service conditions.**

**Ambient temperature: -10 °C or higher and 40 °C or lower.**

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## **7) WARRANTY**

**All the machines specified herein shall be warranted by us for a period of twelve (12) calendar months after the date of being to put into operation, or fourteen (14) months after the date of shipment at a Japanese port, or one thousand engine operation hours according to the service hour meter, whichever is soonest.**

**The warranty shall cover defects in design, materials and workmanship only, shall not applicable to damage sustained mishandling of the machine or normal wear and tear.**

**The warranty shall not be applicable to the parts and materials mentioned below.**

- 1) Linings as brake/clutch bands and disc.**
- 2) Wear plates**
- 3) Wire ropes**
- 4) Rubber made parts**
- 5) Seals as o-rings, seal rings, back-up rings, etc.**
- 6) Gaskets and sheet packings**
- 7) Filter elements**
- 8) Batteries**
- 9) Electric wiring**
- 10) Glasses**
- 11) Other quick moving parts**
- 12) Lubricants**

... concluded

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## 2. FEATURES

### 1) Powerful drilling performance

The maximum drilling depth of 45.5m and the maximum bore of  $\phi$  2500.

The machine is specially designed for various drilling conditions, as deep and large bore holes into hard stratum where the conventional boom type earth drilling rigs are impossible to execute bore holes.

Leader length	Kelly bar – No. of stage	Kelly bar length (Retracted)	Torque/speed t-m/rpm	Drilling depth	
				Shaft boring	Belling bucket
Standard 18 m (15~21m)	4-stage	13.5m 10m (bell)	Kelly bar 196kN-m (20t-m) Casing 294kN-m (30t-m)	45.5m	37.0m

### 2) Square-section leader supported type kelly drive with a kelly guide head

A stable guiding of the kelly drive by a square section leader eliminates swaying of the kelly bar and gives a high degree of vertical drilling accuracy compared to the conventional boom supported type equipment.

### 3) Easy re-assembling the machine at site

The machine is specially designed as storing its leader at its front side for performing a facile re-assembling work at sites.

### 4) High power diesel engine of 184kW (250 PS)

A powerful diesel engine with low exhaust gas emission allows the machine to maneuver simultaneous operations and assures it to operate efficiently.

### 5) Powerful drilling torque of 196kN-m (20 t-m)

The maximum torque of 196kN-m (20 t-m) for forward and reverse directions conforms to the widespread stratum from soft terrain to bed rocks.

### 6) Strong line-pull force and $\phi$ 28 kelly suspension rope

$\phi$  28 kelly rope wound by a main winch having 249kN (25.4ton) line-pull force gives a powerful drilling performance through 4-stage hollow type telescopic kelly bar (friction type).

### 7) Rack and pinion type elevation mechanism plus lockable kelly bar (Optional extra)

Specially designed rack and pinion type elevation mechanism of the kelly drive allows the machine to push-down and extract not only the kelly bar but also various sized casings for performing cased- bored pile execution.

The rack and pinion type elevation mechanism can automatically control a suitable push-down force of the kelly bar depending on its strength.

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**8) Easy maintenance**

**Adopting floating ring seals in drive tumblers, take-up tumblers and lower track rollers, and sealed bearings to every sheaves require minimum daily maintenance service. A grease-bath type swing pinion gear prolongs its service interval.**

**9) Low fuel consumption**

**The machine is powered by a direct fuel injection type diesel engine with a pair of variable displacement type plunger pumps of efficient performance, accordingly economical operation can be assured.**

**10) Low sound level type kelly bar**

**4-Stage hollow type kelly bar with insulation materials minimizes its sound level.**

**11) SL (Step Less) drive motor of the kelly drive**

**SL controller provided to the kelly drive motor can control its torque or speed automatically from 33 to 100 % of the ratings depending on the working conditions.**

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### 3. SPECIFICATIONS OF POWER DRILL ( PDH-90 )

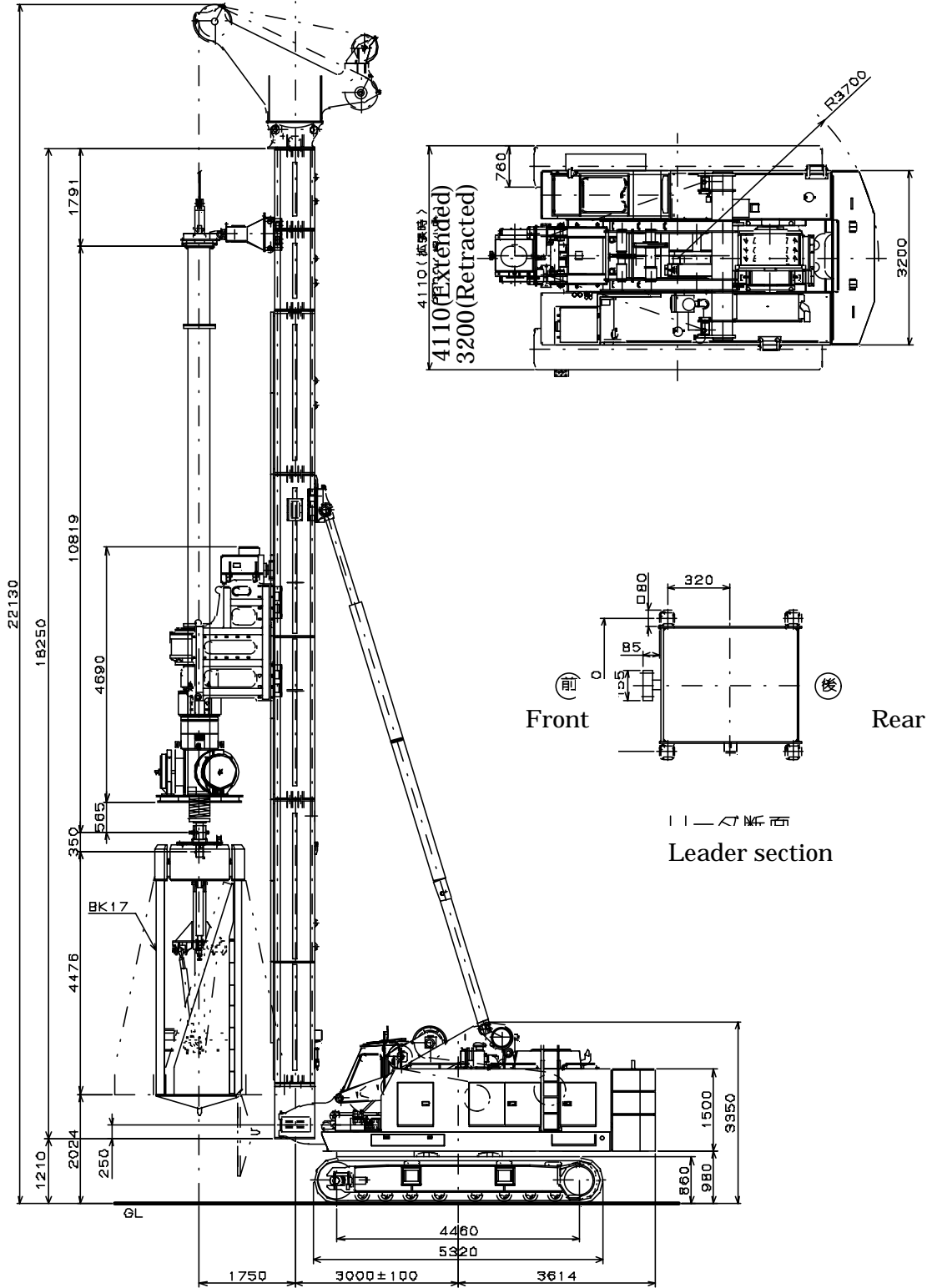
3.1	Model	NISSHA PDH-90 (Power drill)
3.2	Manufacturer	NIPPON SHARYO, LTD.
3.3	Type	
1)	Type of bucket	Rotary bucket (Bottom open)
2)	Drive system	Fully hydraulic drive
3)	Travel system	Self-propelled with crawlers
4)	Type of leader	Square section leader
3.4	Dimensions	
1)	Overall height (18m leader)	Approximately 22,130mm
2)	Overall width (Working order)	4110mm
3)	Overall length (Kelly bar center to rear end)	Approximately 8,364mm
4)	Leader length	Standard 18m ( 15, 18, 21m)
5)	Swing radius (Without bucket, kelly bar center)	
a)	Front end distance from swing center	4,750mm
b)	Rear end distance from swing center	3,614mm
6)	Crawler length	5,320mm
7)	Crawler center to center distance	3,350mm (2,440mm-retracted)
8)	Crawler width	4,110mm (3,200mm-retracted)
9)	Shoe width	760mm
10)	Rear end ground clearance	980mm
11)	Operating weight	93ton
	equipped with 18m leader + kelly bar and kelly drive (without bucket) + 19t counter weight	
12)	Performance	
a)	Travelling speed	*1.4km/hr
b)	Swing speed	3.5 rpm
c)	Gradeability	40%
d)	Average ground pressure	134kPa (1.37kg/cm <sup>2</sup> )
e)	Maximum drilling diameter (bore)	
	Regular stratum	2,500mm
	Belling bucket	1,700~3,100mm
f)	Maximum drilling depth	
	Shaft drilling	45.5m
	Bell pile	37.0m
g)	Kelly drive elevation mechanism	
	Type:	Rack and pinion
	Stroke:	11.7mm
	Elevation speed:	10.2m/min.
h)	Bucket speed	*4.6~18.5 rpm
i)	Bucket torque(Forward/reverse)	196kN-m ( 20t-m)
j)	Casing speed	*3.1~18.5 rpm
k)	Casing torque(Forward/reverse)	294kN-m ( 30t-m)
l)	Kelly bar suspension rope speed	
	Winding/rewinding	*24~83 m/min.
m)	Kelly bar suspension rope line pull	Maximum 58kN (6t)
n)	Auxiliary rope line speed	38m/min
o)	Auxiliary rope line pull	Maximum 58kN (6t)
p)	Kelly drive extraction force	327kN (33.3t)

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<p><b>q) Kelly drive push down force</b>            Kelly bar(bucket)            Casing</p>	<p><b>98kN(10t)</b>  <b>296kN(30t)</b></p>
<p><b>r) Diesel engine</b>            Manufacturer            Model            Type            Output            Maximum torque            Fuel consumption rate            Batteries            Fuel tank</p>	<p><b>HINO MOTOR CO.</b>  <b>P09C-TD diesel engine</b>  <b>4-cycle, water cooled, vertical</b>  <b>Direct fuel injection</b>  <b>184kW (250PS) /2,100 rpm</b>  <b>990N-m (101kg-m)/1,400 rpm</b>  <b>246g/kW-H (181g/PS-H)</b>  <b>24V-120AH</b>  <b>300 liters</b></p>
<p><b>s) Hydraulic pump</b></p>	<p><b>Variable displacement plunger pump: Full power control</b></p>
<p>(*marked : varies depending on load applied.)</p>	
<p><b>13) Structure and functions</b></p>	
<p><b>a) Travelling device (Track frame)</b>            Drive system            Steering system</p>	<p><b>Hydraulic drive</b>  <b>L.H. and R.L. independent drive</b>  <b>(Pivot turn / Spin turn)</b></p>
<p><b>b) Swing system (Superstructure)</b>            Swell bearing            Drive system            Swing lock system</p>	<p><b>Heavy duty ball race bearing with internal gear teeth</b>  <b>Hydraulic drive</b>  <b>Rod tip insertion</b></p>
<p><b>c) Leader</b>            Type            Erection and perpendicularity adjustment mechanism</p>	<p><b>Square section leader</b>  <b>A pair of back-stay cylinders</b></p>
<p><b>d) Kelly drive</b>            Type            Drive system            Kelly bar</p>	<p><b>Direct drive</b>  <b>Hydraulic drive</b>  <b>Hollow type, 4-stage telescopic with guide head</b></p>

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4. General view of PDH-90 drilling rig with BK17 belling bucket



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**5 . STANDARD SCOPE OF SUPPLY**

**1) Basic machine : model PDH-90 ..... 1 unit**

**equipped with**

- **19 ton counter weight**
- **Two drums of main and auxiliary**
- **Electric fan in operator’s cab**
- **Radio and electric fan**
- **Electric fuel pump**
- **Ash tray and sight level gauge with a bubble**

**2) Earth drill front-end attachments ..... 1 set**

- **18m square leader**
- **Kelly drive**
- **4-stage telescopic kelly bar (Hollow / friction type-13.5m long when retracted)**
- **Kelly guide head**
- **Kelly suspension rope of  $\phi$  28 and auxiliary rope of  $\phi$  22.4**
- **Kelly suspension rope over-hoist preventive device**

**( OPTIONAL EXTRA DEVICE )**

- **Shaft drilling bucket..... Required diameter**
- **Rotary table for bell pile..... 1 set**
- **Belling bucket ..... Required diameter**
- **Computer monitor/recorder ..... 1 set**
- **3m extension leader..... 1 set**
- **Lockable kelly bar..... 1 set**
- **Casing adapter ..... 1 set**
- **Depth meter ..... 1 unit**