1. Construction

The **NTN** bearing unit is a combination of a radial ball bearing, seal, and a housing of high-grade cast iron or pressed steel, which comes in various shapes.

The outer surface of the bearing and the internal surface of the housing are spherical, so that the unit is self-aligning.

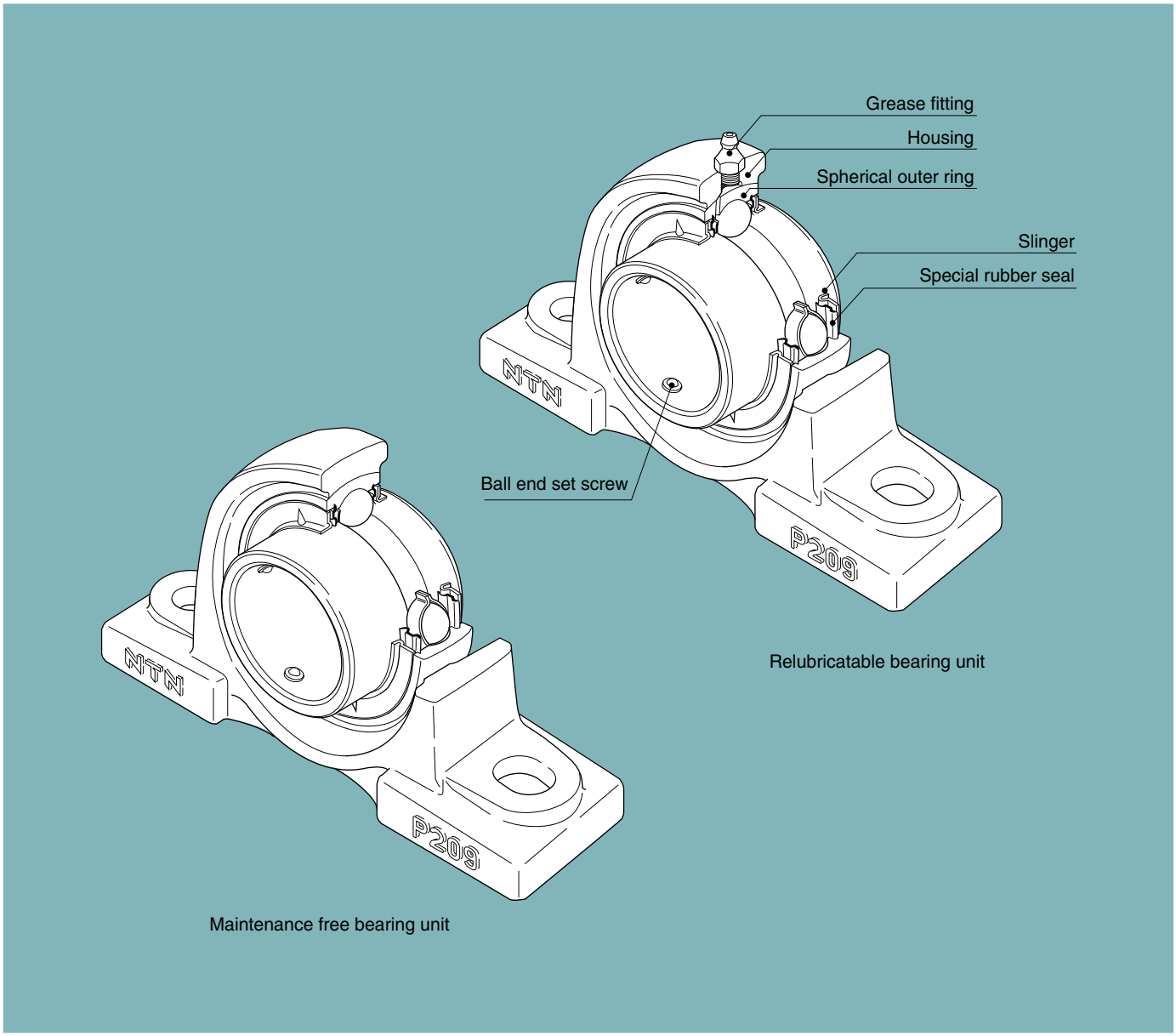
The inside construction of the ball bearing for the unit is such that steel balls and retainers of the same type as in series 62 and 63 of the **NTN** deep groove ball bearing are used. A duplex seal consisting of a combination of an oil-proof synthetic rubber seal and a slinger, unique to **NTN**, is provided on both sides.

Depending on the type, the following methods of fitting to the shaft are employed:

(1) The inner ring is fastened onto the shaft in two places by set screws.

(2) The inner ring has a tapered bore and is fitted to the shaft by means of an adapter.

(3) In the eccentric locking collar system the inner ring is fastened to the shaft by means of eccentric grooves provided at the side of the inner ring and on the collar.



Relubricatable bearing unit

Maintenance free bearing unit

2. Design Features and Advantages

2.1 Maintenance free type

The **NTN** Maintenance free bearing unit contains a high-grade lithium-based grease, good for use over a long period, which is ideally suited to sealed-type bearings. Also provided is an excellent sealing device, unique to **NTN**, which prevents any leakage of grease or penetration of dust and water from outside.

It is designed so that the rotation of the shaft causes the sealed-in grease to circulate through the inside space, effectively providing maximum lubrication. The lubrication effect is maintained over a long period with no need for replenishment of grease.

To summarize the advantages of the **NTN** maintenance free bearing unit:

(1) As an adequate amount of good quality grease is sealed in at the time of manufacture, there is no need for replenishment. This means savings in terms of time and maintenance costs.
(2) Since there is no need for any regreasing facilities, such as piping, a more compact design is possible.
(3) The sealed-in design eliminates the possibility of grease leakage, which could lead to stained products.

2.2 Relubricatable type

The **NTN** relubricatable type bearing unit has an advantage over other simillar units being so designed as to permit regreasing even in the case of misalignment of 2˚ to the right or left. The hole through which the grease fitting is mounted usually causes structural weakening of the housing.

However, as a result of extensive testing, in the **NTN** bearing unit the hole is positioned so as to minimize this adverse effect. In addition, the regreasing groove has been designed to minimize weakening of the housing.

While the **NTN** maintenance free type bearing unit is satisfactory for use under normal operating conditions in-doors, in the following circumstances it is necessary to use the relubricatable type bearing unit:

(1) Cases where the temperature of the bearing rises above 100˚C, 212˚F:
*- Normal temperature of up to 200˚C, 392˚F heatresistant bearing units.
(2) Cases where there is excessive dust, but space does not permit using a bearing unit with a cover.
(3) Cases where the bearing unit is constantly exposed to splashes of water or any other liquid, but space does not permit using a bearing unit with a cover.
(4) Cases in which the humidity is very high, and the machine in which the bearing unit is used is run only intermittently.
(5) Cases involving a heavy load of which the C_r/P_r value is about 10 or below, and the speed is 10 rpm or below, or the movement is oscillatory.
(6) Cases where the number of revolutions is relatively high and the noise problem has to be considered; for example, when the bearing is used with the fan of an air conditioner.

2.3 Special sealing feature

2.3.1 Standard bearing units

The sealing device of the ball bearing for the **NTN** bearing unit is a combination of a heat-resistant and oil-proof synthetic rubber seal and a slinger of an exclusive **NTN** design.

The seal, which is fixed in the outer ring, is steelreinforced, and its lip, in contact with the inner ring, is designed to minimize frictional torque.

The slinger is fixed to the inner ring of the bearing with which it rotates. There is a small clearance between its periphery and the outer ring.

These two types of seals on both sides of the bearing prevent grease leakage, and foreign matter is prevented from entering the bearing from outside.

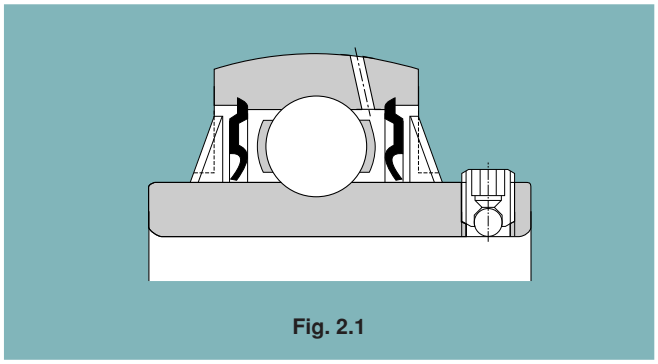


Fig. 2.1

2.3.2 Bearing units with covers

The **NTN** bearing unit with a cover consists of a standard bearing unit and an outside covering for extra protection against dust. Special consideration has been given to its design with respect to dust-proofing.

Sealing devices are provided in both the bearing and the housing, so that units of this type operate satisfactorily even in such adverse environments as flour mills, steel mills, foundries, galvanizing plants and chemical plants, where excessive dust is produced and/or liquids are used. They are also eminently suitable for outdoor environments where dust and rain are inevitable, and in heavy industrial machinery such as construction and transportation equipment.

The rubber seal of the cover contacts with the shaft by its two lips, as shown in Fig. 2.2 and 2.3. By filling the groove between the two lips with grease, an excellent sealing effect is obtained and, at the same time, the contacting portions of the lips are lubricated. Furthermore, the groove is so

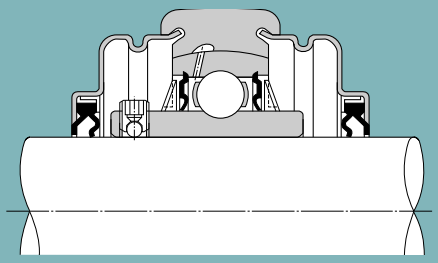


Fig. 2.2 Pressed steel cover

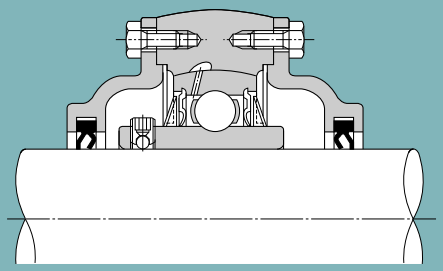


Fig. 2.3 Cast iron cover

designed that when the shaft is inclined the rubber seal can move in the radial direction.

When bearing units are exposed to splashes of water rather than to dust, a drain hole (5 to 8 mm, 0.2 to 0.3 inches in diameter) is provided at the bottom of the cover, and grease should be applied to the side of the bearing itself instead of into the cover.

2.4 Secure fitting

Fastening the bearing to the shaft is effected by tightening the ball-end set screw, situated on the inner ring. This is a unique **NTN** feature which prevents loosening, even if the bearing is subjected to intense vibrations and shocks.

2.5 Self-aligning

With the **NTN** bearing unit, the outer surface of the ball bearing and the inner surface of the housing are spherical, thus this bearing unit has self-aligning characteristic. Any misalignment of axis that may arise from poor workmanship on the shaft or errors in fitting will be properly adjusted.

2.6 Higher rated load capacity

The bearing used in the unit is of the same internal construction as those in **NTN** bearing series 62 and 63, and is capable of accommodating axial load as well as radial load, or composite load. The rated load capacity of this bearing is considerably higher than that of the corresponding self-aligning ball bearings used for standard plummer blocks.

2.7 Light weight yet strong housing

Housings for **NTN** bearing units come in various shapes. They consist of either high-grade cast iron, one-piece casting, or of precision finished pressed steel, the latter being lighter in weight. In either case, they are practically designed to combine lightness with maximum strength.

2.8 Easy mounting

The **NTN** bearing unit is an integrated unit consisting of a bearing and a housing.

As the bearing is prelubricated at manufacture with the correct amount of high-grade lithium base, it can be mounted on the shaft just as it is. It is sufficient to carry out a short test run after mounting.

2.9 Accurate fitting of the housing

In order to simplify the fitting of the pillow block and flange type bearing units, the housings are provided with a seat for a dowel pin, which may be utilized as needed.

2.10 Bearing replaceability

The bearing used in the **NTN** bearing unit is replaceable. In the event of bearing failure, a new bearing can be fitted to the existing housing.

Bearing units with ductile cast iron housing

(Spheroidal graphite cast iron housing)

The **NTN** ductile series helps with design optimization!

Housing weight is reduced by 40%, with a compact design

When compared with the standard **NTN** housing the ductile series housing enjoys a 40% weight reduction . Additionally the housing is useful for a size reduction in machine equipment. This is achieved by minimizing as much as possible non-critical dimensions of the housing allowing the housing to be placed in tight locations.

High fracture strength of housing

Spheroidal graphite cast iron is used for the bearing housing. It is designed to have high strength with fine material structure and uniformed thickness. The average fracture strength for the series is increased by approximately. 30% when compared with **NTN**'s standard product (FC200, Gray cast iron).

Two lubrication types : Relubricatable type maintenance free type

The relubricatable type is suitable for high temperature and high speed application, and the maintenance free type is optimized for a long period under normal using conditions without re-greasing.

Interchangeability

This series is interchangeable with **NTN** standard product and other domestic suppliers' product. This is achieved by keeping the dimensions related to mounting the same as for standard product made according to JIS B 1559 (Housings for rolling bearing units).

Bearing units steel series

(Rolled steel housing for general structures)

NTN rolled steel housings ensure a safer design

Superior Housing Strength

Made of precision gas cut rolled steel, **NTN** steel housings offer superior strength characteristics when compared to cast iron and cast steel housings.

Consistent Microstructure

The rolled steel microstructure is more consistent than cast iron or cast steel, reducing the risk of housing fracture under severe conditions.

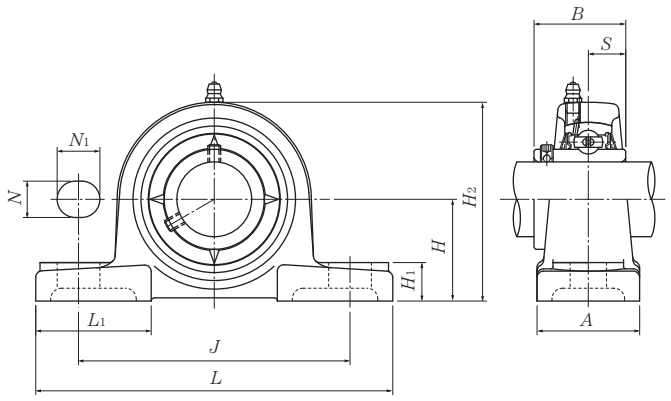
Interchangeability

Rolled steel housing dimensions are consistent with cast units, allowing them to be interchanged with **NTN** standard housings and other manufacturers ISO standard.

Applications

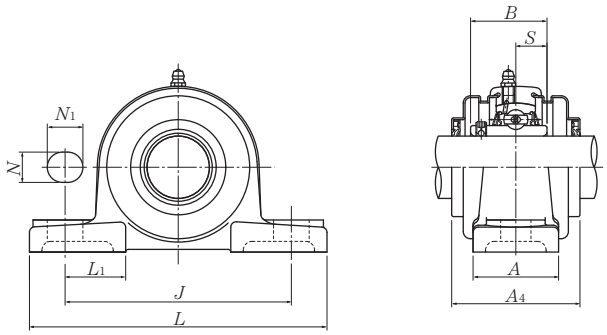
NTN rolled steel housings provide superior strength to cast steel and cast iron. Their ability to resist impact loads makes them suitable for applications involving heavy loads and vibration. Possible applications for **NTN** rolled steel housings include but are not limited to conveyors, trucks and overhead cranes at steel mills, mining machinery and pollution control equipment.

Pillow blocks cast housing
Set screw type

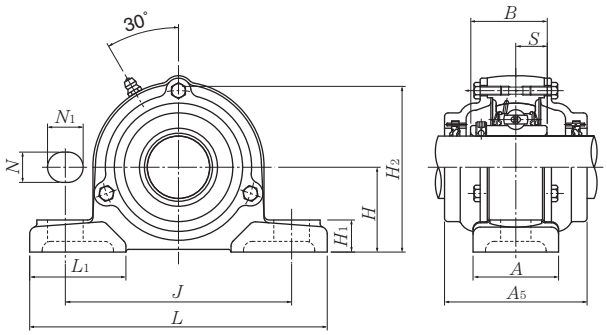


Shaft dia. mm / inch	Unit number [1]	Nominal dimensions mm / inch: H	L	J	A	N	N1	H1	H2	L1	B	S	Bolt size mm / inch	Bearing number
40	**UCP208D1**	49.2	184	137	54	17	20	18	98	52	49.2	19	M14	UC208D1
1 1/2	**UCP208-108D1**	1 15/16	7 1/4	5 13/32	2 1/8	21/32	25/32	23/32	3 27/32	2 1/16	1.9370	0.748	1/2	UC208-108D1
1 9/16	**UCP208-109D1**													UC208-109D1
45	**UCP209D1**	54	190	146	54	17	20	20	106	60	49.2	19	M14	UC209D1
1 5/8	**UCP209-110D1**													UC209-110D1
1 11/16	**UCP209-111D1**	2 1/8	7 15/32	5 3/4	2 1/8	21/32	25/32	25/32	4 3/16	2 3/8	1.9370	0.748	1/2	UC209-111D1
1 3/4	**UCP209-112D1**													UC209-112D1
50	**UCP210D1**	57.2	206	159	60	20	23	21	114	65	51.6	19	M16	UC210D1
1 13/16	**UCP210-113D1**													UC210-113D1
1 7/8	**UCP210-114D1**	2 1/4	8 1/8	6 1/4	2 3/8	25/32	29/32	13/16	4 1/2	2 9/16	2.0315	0.748	5/8	UC210-114D1
1 15/16	**UCP210-115D1**													UC210-115D1
2	**UCP210-200D1**													UC210-200D1
55	**UCP211D1**	63.5	219	171	60	20	23	23	126	65	55.6	22.2	M16	UC211D1
2	**UCP211-200D1**													UC211-200D1
2 1/16	**UCP211-201D1**	2 1/2	8 5/8	6 23/32	2 3/8	25/32	29/32	29/32	4 31/32	2 9/16	2.1890	0.874	5/8	UC211-201D1
2 1/8	**UCP211-202D1**													UC211-202D1
2 3/16	**UCP211-203D1**													UC211-203D1
60	**UCP212D1**	69.8	241	184	70	20	23	25	138	70	65.1	25.4	M16	UC212D1
2 1/4	**UCP212-204D1**													UC212-204D1
2 5/16	**UCP212-205D1**	2 3/4	9 1/2	7 1/4	2 3/4	25/32	29/32	31/32	5 7/16	2 3/4	2.5630	1.000	5 5/8	UC212-205D1
2 3/8	**UCP212-206D1**													UC212-206D1
2 7/16	**UCP212-207D1**													UC212-207D1
65	**UCP213D1**	76.2	265	203	70	25	28	27	151	77	65.1	25.4	M20	UC213D1
2 1/2	**UCP213-208D1**	3	10 7/16	8	2 3/4	31/32	1 3/32	1 1/16	5 15/16	3 1/32	2.5630	1.000	3/4	UC213-208D1
2 9/16	**UCP213-209D1**													UC213-209D1

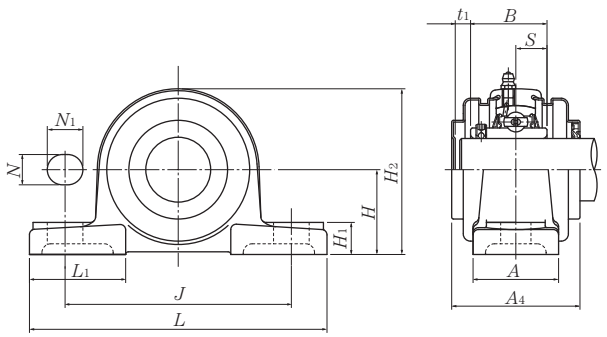
Remarks: 1) These numbers indicate relubricatable type. If maintenance free type is needed, please order without suffix "D1".
Note: Please refer to page 36 for size of grease fitting.



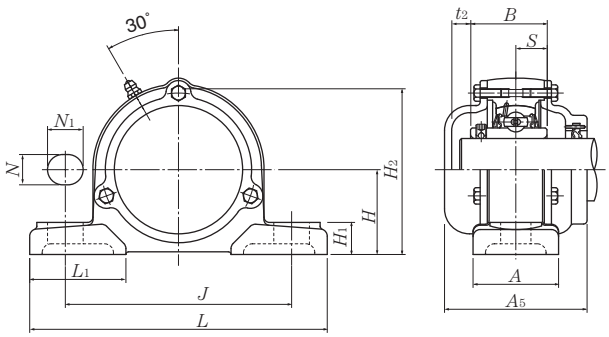
Press steel dust cover type (Open end)
S-UCP…D1



Cast dust cover type (Open end)
C-UCP…D1



Press Steel dust cover type (Close end)
SM-UCP…D1



Cast dust cover type (Close end)
CM-UCP…D1

Housing [1] number	Unit number [1] pressed steel dust cover type	Unit number [1] cast dust cover type	Nominal dimensions mm / inch					Mass (approx.) kg / lb		
			t_1	t_2	A_4	H_3	A_5	UCP	S(SM)	C(CM)
P208D1	S(SM)-UCP208D1	C(CM)-UCP208D1	8	9	82	105	90	1.9	2.1	2.7
P208D1	S(SM)-UCP208-108D1	C(CM)-UCP208-108D1	5/16	23/64	3 7/32	4 1/8	3 17/32	4.2	4.6	6.0
P208D1	S(SM)-UCP208-109D1	C(CM)-UCP208-109D1								
P209D1	S(SM)-UCP209D1	C(CM)-UCP209D1	8	12	82	113	95	2.2	2.4	3.1
P209D1	S(SM)-UCP209-110D1	C(CM)-UCP209-110D1								
P209D1	S(SM)-UCP209-111D1	C(CM)-UCP209-111D1	5/16	15/32	3 7/32	4 7/16	3 3/4	4.9	5.3	6.8
P209D1	S(SM)-UCP209-112D1	C(CM)-UCP209-112D1								
P210D1	S(SM)-UCP210D1	C(CM)-UCP210D1	8	12	87	119	100	2.7	2.8	3.6
P210D1	S(SM)-UCP210-113D1	C(CM)-UCP210-113D1								
P210D1	S(SM)-UCP210-114D1	C(CM)-UCP210-114D1	5/16	15/32	3 7/16	4 11/16	3 15/16	6.0	6.2	7.9
P210D1	S(SM)-UCP210-115D1	C(CM)-UCP210-115D1								
P210D1	S(SM)-UCP210-200D1	C(CM)-UCP210-200D1								
P211D1	S(SM)-UCP211D1	C(CM)-UCP211D1	10	11	92	130	100	3.5	3.5	4.4
P211D1	S(SM)-UCP211-200D1	C(CM)-UCP211-200D1								
P211D1	S(SM)-UCP211-201D1	C(CM)-UCP211-201D1	25/64	7/16	3 5/8	5 1/8	3 15/16	7.7	7.7	9.7
P211D1	S(SM)-UCP211-202D1	C(CM)-UCP211-202D1								
P211D1	S(SM)-UCP211-203D1	C(CM)-UCP211-203D1								
P212D1	S(SM)-UCP212D1	C(CM)-UCP212D1	8	12	102	143	115	4.7	5.0	6.0
P212D1	S(SM)-UCP212-204D1	C(CM)-UCP212-204D1								
P212D1	S(SM)-UCP212-205D1	C(CM)-UCP212-205D1	5/16	15/32	4 1/32	5 5/8	4 17/32	10	11	13
P212D1	S(SM)-UCP212-206D1	C(CM)-UCP212-206D1								
P212D1	S(SM)-UCP212-207D1	C(CM)-UCP212-207D1								
P213D1	S(SM)-UCP213D1	C(CM)-UCP213D1	11	15	107	155	120	5.6	5.8	7.2
P213D1	S(SM)-UCP213-208D1	C(CM)-UCP211-208D1	7/16	19/32	4 7/32	6 3/32	4 23/32	12	13	16
P213D1	S(SM)-UCP213-209D1	C(CM)-UCP213-209D1								