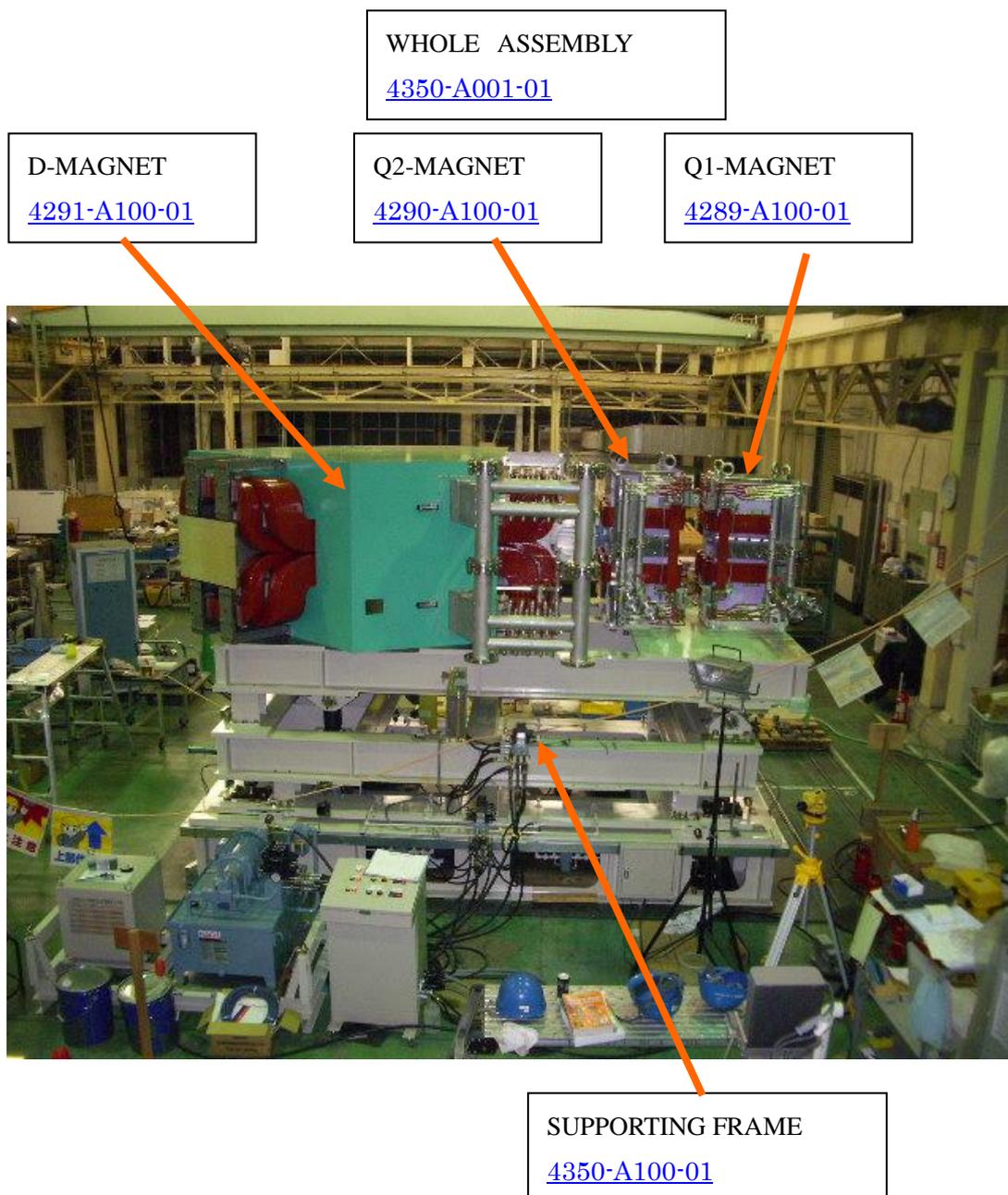


HES SPECTROMETER

D-Q1-Q2 ELECTROMAGNET ASSEMBLY

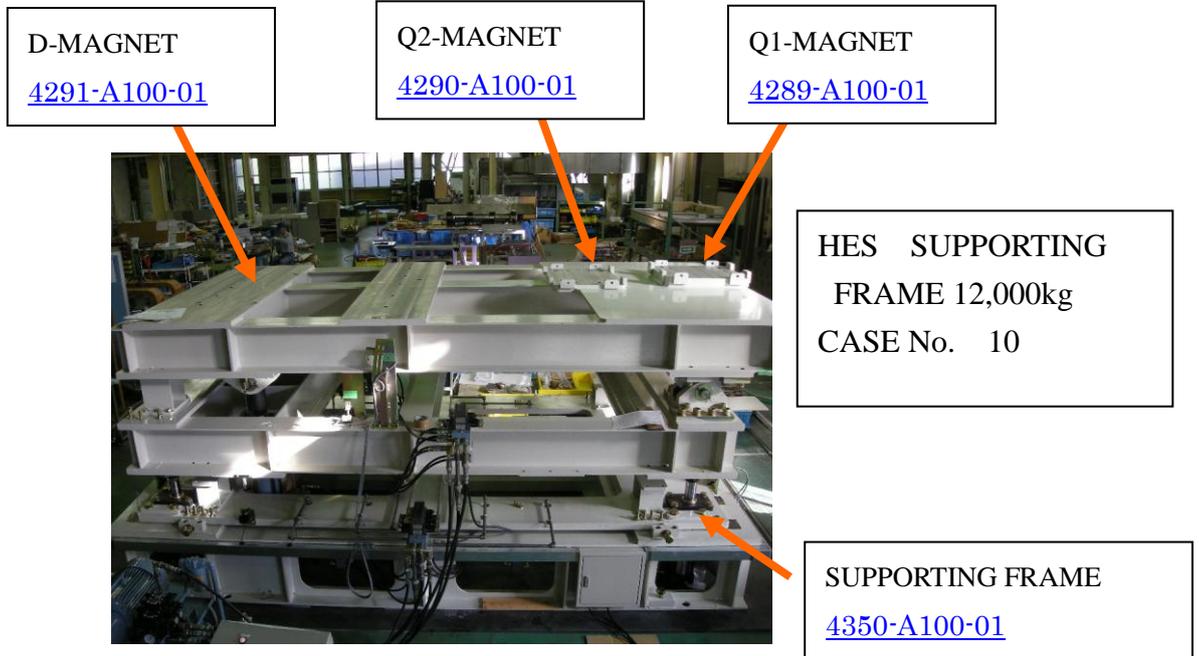
The electromagnet and the vacuum duct are set up on the supporting frame, becomes like under the photograph.

The D electromagnet is disassembled when transporting, but because the coil is installed in the yoke beforehand, at this job it is not necessary to disassemble.



1 . SUPPORTING FRAME PREPARATION

Each electromagnet is installed in the supporting frame surface.
The supporting frame surface is cleaned.



The positioning pin is installed, on the supporting frame surface.



The molybdenum grease is applied to the positioning pin.

For Locating D mag
Location Pin \varnothing 40 x 40
QTY1
SHCS M12x45 QTY1
Accessories #14
(Supporting Frame)



2. D ELECTROMAGNET ASSEMBLY (1)

The vacuum duct ([4291-N501-01](#)) for the D electromagnet is removed from the lower yoke ([4291-N101-01](#)).

HES D-MAGNET
LOWER&VC 16,000kg
CASE No. 1

Connecting bolt is removed from angle of Incident side of the lower yoke.

Unrestricted bolt is installed in 4 places, the lower yoke of the D electromagnet is lifted.

You take balance with chain block and lift horizontally.

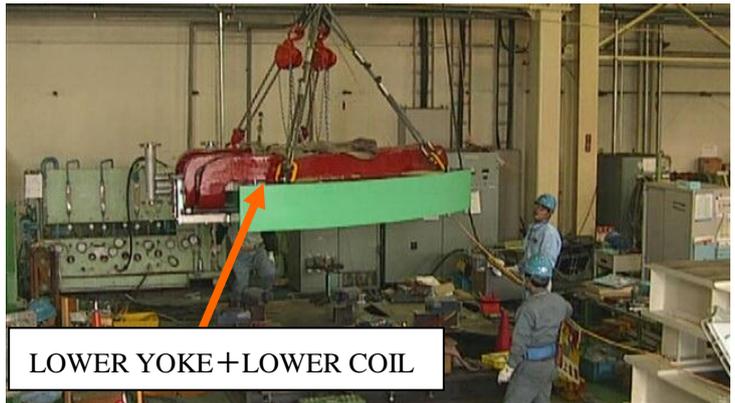
HES D-MAGNET
LOWER 15,400kg

The positioning pin and the lower yoke positioning hole are adjusted. And the D electromagnet is lowered gently.

VACUUM DUCT [4291-N501-01](#)



VACUUM DUCT CONNECTING BOLT
(INSIDE COIL)



LOWER YOKE+LOWER COIL



POSITIONING PIN

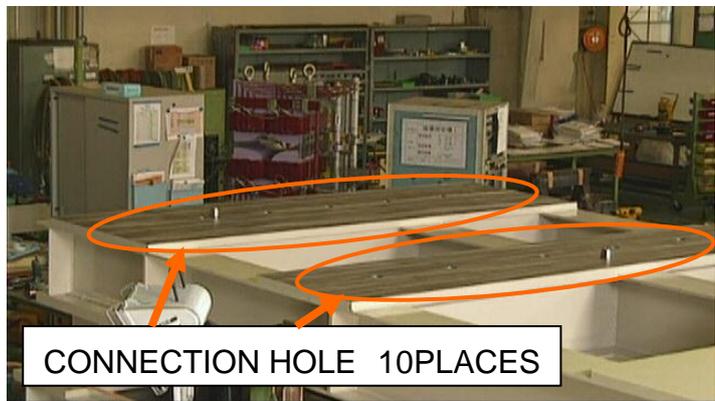
Coil lead is directed to Q2 side.



COIL LEAD SIDE

Q2 SIDE

Connect D mag
Hex Bolt M36x90 QTY10
Washer Flat M36 QTY10
Accessories #10
(Supporting Frame)
CASE No. 16



CONNECTION HOLE 10PLACES

D MAGNET SIDE

The molybdenum grease is applied to connecting bolt.
Bolt is inserted from underneath.



SUPPORTING FRAME SIDE

After the hand tightening, it tightens with the extension socket.



3. Q ELECTROMAGNET ASSEMBLY

Q1-MAGNET
[4289-A100-01](#)

HES Q1 MAGNET
2,800kg
CASE No. 8



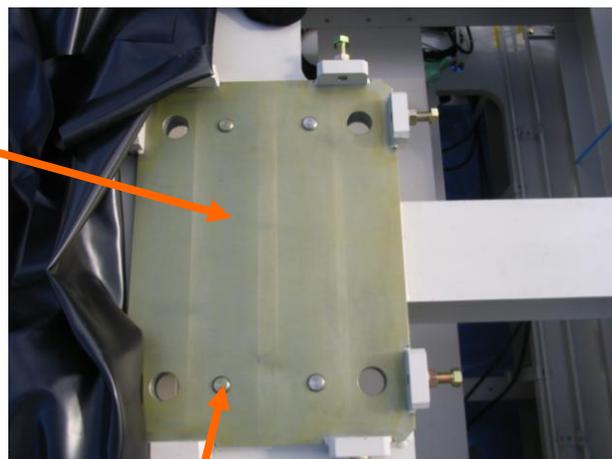
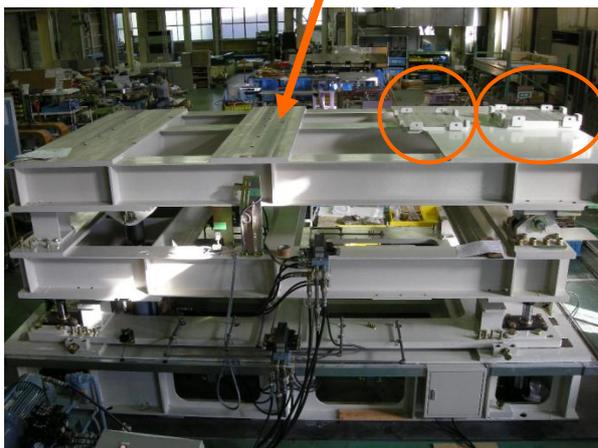
Q2-MAGNET
[4290-A100-01](#)

HES Q2 MAGNET
3,100kg
CASE No.



The point of jack bolt of the installation section of Q1 and the Q2 electromagnet 5mm is extended.

SUPPORTING FRAME
[4350-A100-01](#)



The jack bolt point 5mm is extended.

Q2-MAGNET
[4290-A100-01](#)

Q1-MAGNET
[4289-A100-01](#)

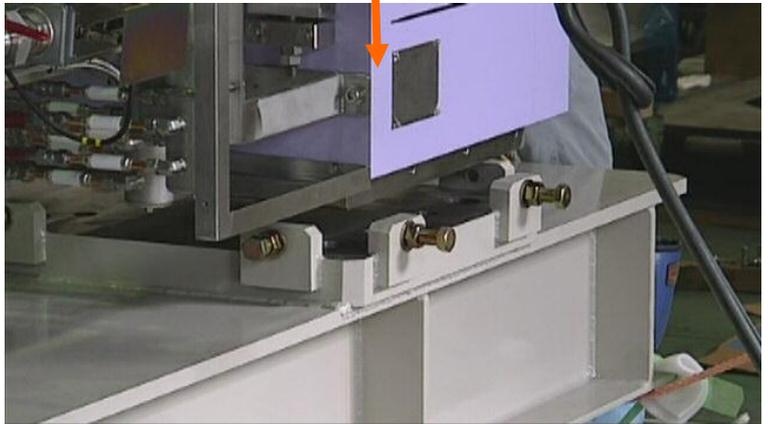
The Q1 electromagnet and the Q2 electromagnet are placed in the supporting frame.



The molybdenum grease is applied to connecting bolt.

Bolt is inserted from underneath.

After the hand tightening, it tightens with the extension socket.



Connect Q1 mag
Hex Bolt M30x200 QTY4
Washer Flat M30 QTY4

Connect Q2 mag
Hex Bolt M30x160 QTY4
Washer Flat M30 QTY4
Connecting Washer for Q1Q2
 ϕ 70x ϕ 32x12 QTY8

Accessories #10
(Supporting Frame)
CASE No. 16

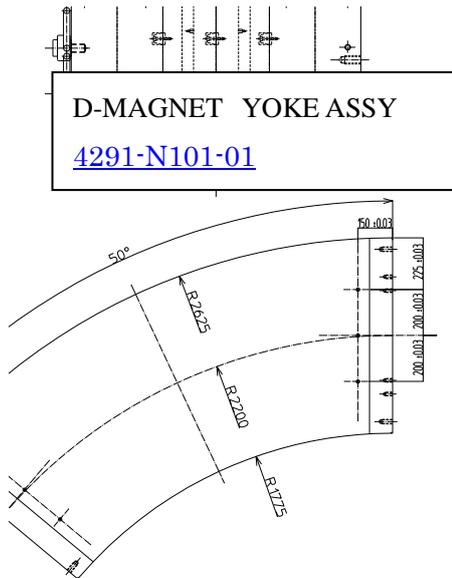
4. Q ELECTROMAGNET ASSEMBLY

In the yoke surface of the Q1 electromagnet and the Q2 electromagnet the target(makes with Jlab) is installed in the hole for the alignment.

Position of the target and the D electromagnet is adjusted.

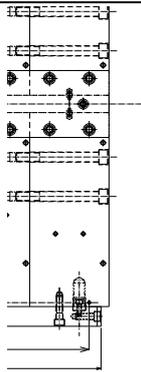
(See:WHOLE ASSEMBLY [4350-A001-01](#))

Position relationship of the target between pole is as in the figure.



Q1 ELECTROMAGNET

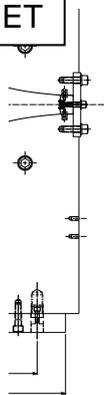
Q1-MAGNET
YOKE ASSY
[4289-N101-01](#)



1 四極電磁石

Q2 ELECTROMAGNET

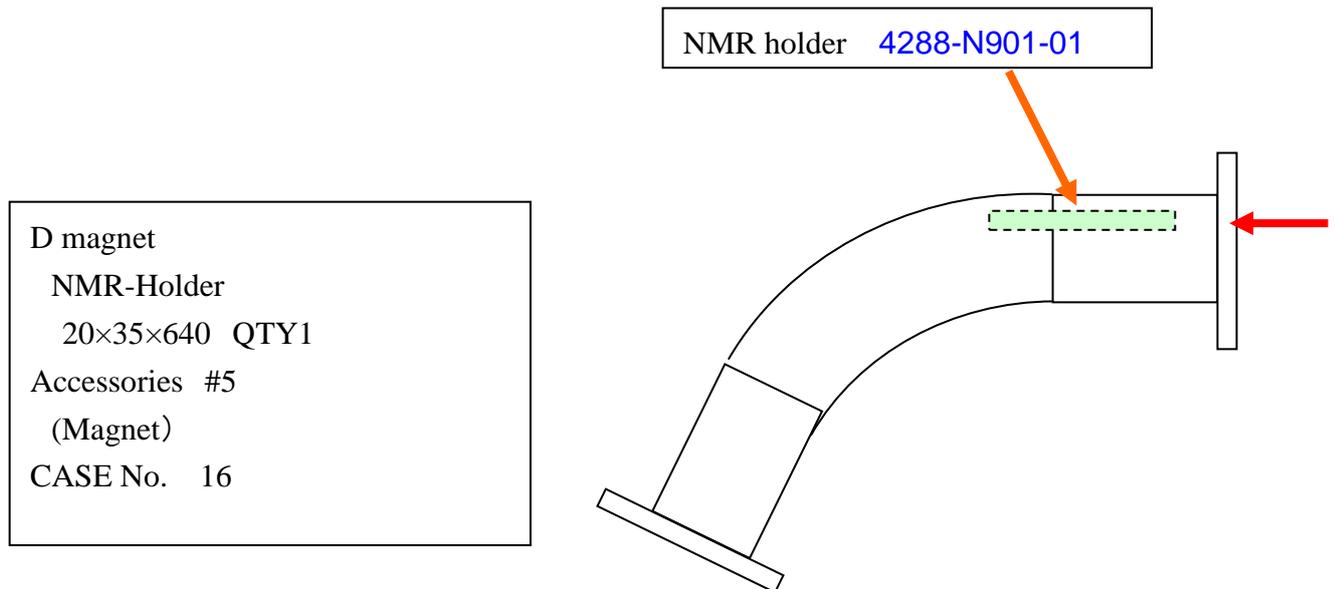
Q2-MAGNET
YOKE ASSY
[4290-N101-01](#)



2 極電磁石

5. VACUUM DUCT INSTALLATION

- 1) The D vacuum duct ([4291-N501-01](#)) is installed in the D electromagnet ([4291-A100-01](#)).
The NMR element is installed in the NMR holder ([4288-N901-01](#)).
The NMR element is inserted from the flange of beam high-level side.
It is locked with the part for NMR holder fixing inside D vacuum duct.



The duct is locked in angle of the D electromagnetic lower yoke input/output section.



2) The vacuum duct is installed in the Q electromagnet.

The Q1 electromagnet and the Q2 electromagnet top and bottom two are disassembly.
And the Q vacuum duct ([4289-N401-01](#)) is inserts.

Q-VACUUM CHAMBER

150kg

CASE No. 12

The gasket is installed on the header flange divided aspect.

Q1 header : [4289-N301-01](#)

Q2 header : [4290-N301-01](#)



Cooling Manifold Flange

Gasket 50A 20K

For Q1 QTY2

For Q2 QTY2

Accessories #1

(Magnet)

CASE No. 16

The upper yoke of the Q1 electromagnet and the Q2 electromagnet is attached.

Position is decided by the pin which is installed in the spacer.

See Q1 YOKE ASSY : [4289-N101-01](#)

See Q2 YOKE ASSY : [4290-N101-01](#)

3)The D vacuum duct ([4291-N501-01](#)) and the Q vacuum duct ([4289-N401-01](#))
are connected.

Connect

D and Q Vacuum Chamber

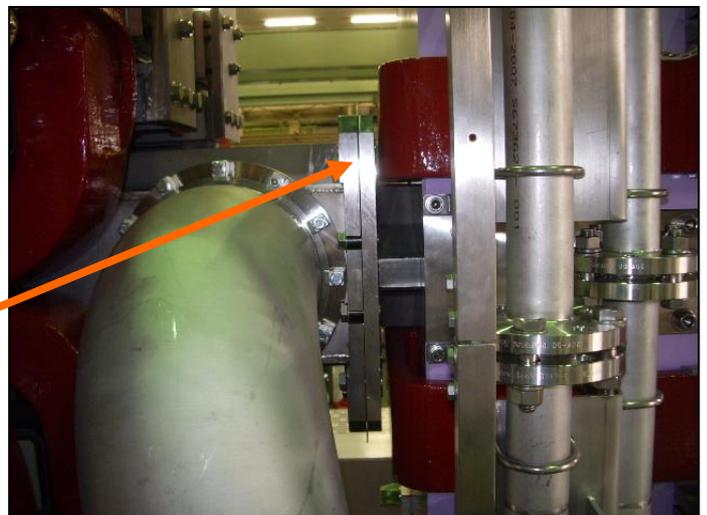
Hex Bolt M16x50 QTY30

Washer Flat M16 QTY30

Accessories #9

(Vacuum System)

CASE No. 16



6. D ELECTROMAGNET ASSEMBLY (2)

The inside yoke and the outside yoke are installed in the lower yoke.

It locks with bolt.

It is positioned with the pin.



D-MAGNET
SIDE(INNER) 2,000kg
CASE No. 4



D-MAGNET
SIDE(OUTER) 3,100kg
CASE No. 3

See D YOKE ASSY : [4291-N101-01](#)



D magnet Connect Side Yoke
Hex Bolt M36x500 QTY6
Accessories #38,39,40,41,42,43 (D-MAGNET)
CASE No. 17

The pin is installed in surface two place of the inside yoke.

See D YOKE ASSY : [4291-N101-01](#)

For Locating Side Yoke (INNER)
Location Pin ϕ 40x40 QTY2
SHCS M12x45 QTY2
Accessories #48 (D-MAGNET)
CASE No. 16



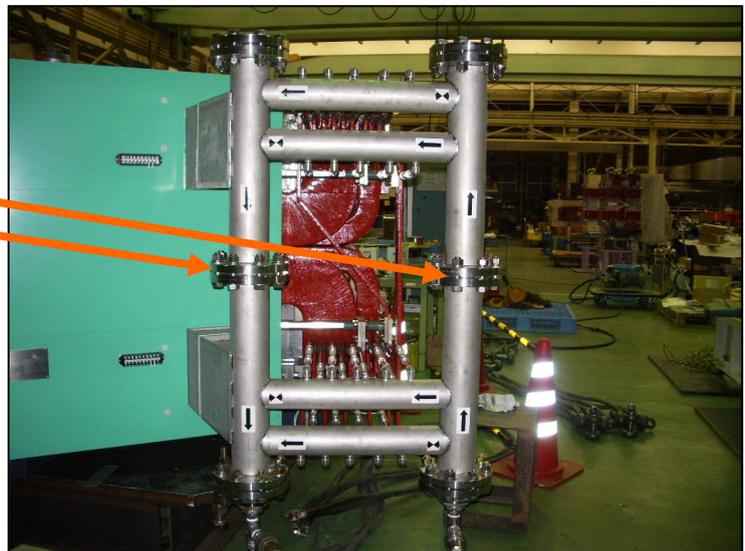
The blind flange of the header is removed.

The gasket is installed on the header flange divided aspect.

D header : [4291-N401-01](#)

Cooling Manifold Flange
Gasket 100A 20K
QTY2

Accessories #1
(Magnet)
CASE No. 16



The upper yoke (the upper coil is installed) is installed in the side yoke.
 It locks with bolt.
 It is positioned with the pin.

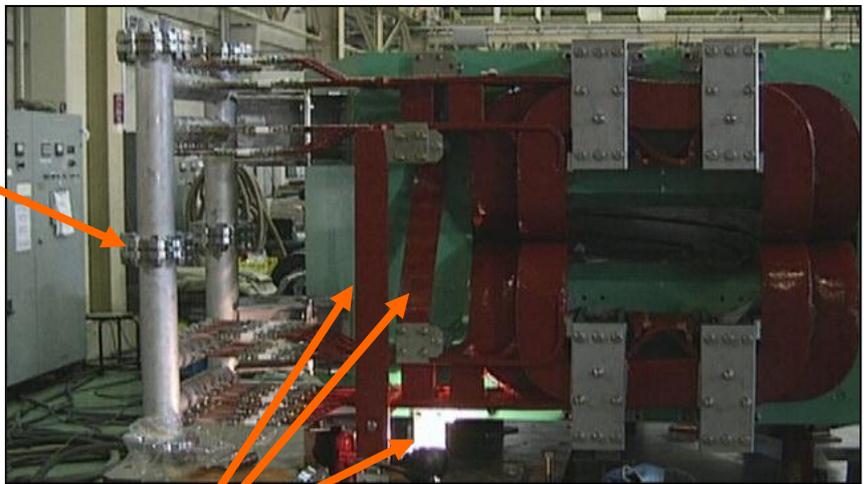
D-MAGNET
 UPPER 15,400kg
 CASE No. 2



D magnet Connect Upper Yoke
 Hex Bolt M36x425 QTY6
 Accessories #32,33,34,35,36,37 (D-MAGNET)
 CASE No. 17

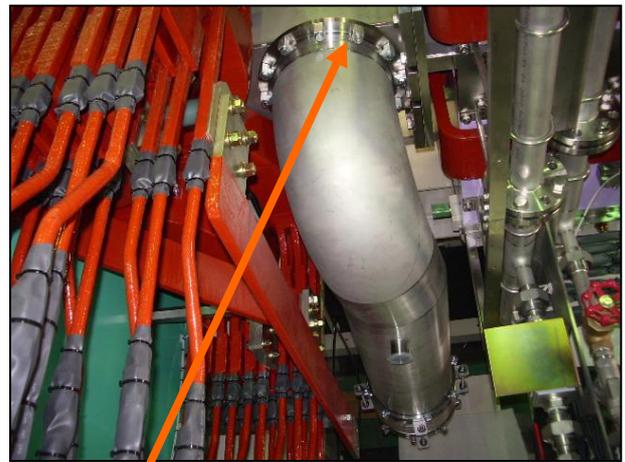
The top and bottom coil connected bus bar is installed.
 It locks with bolt.
 See D ASSY : [4291-A100-01](#)

The top and bottom header is tightened with connected bolt.



D magnet Electric Terminal (Cu Busbar)
 Electric Terminal 1 15x100x257 QTY1
 Electric Terminal 2 100x356x971 QTY1
 Electric Terminal 3 15x100x1128 QTY1
 Accessories #29,30,31 (D-MAGNET)
 CASE No. 17

The exhaust duct ([4292-N850-01](#)) for TMP is installed on high-level side of the D vacuum duct ([4291-N501-01](#)).



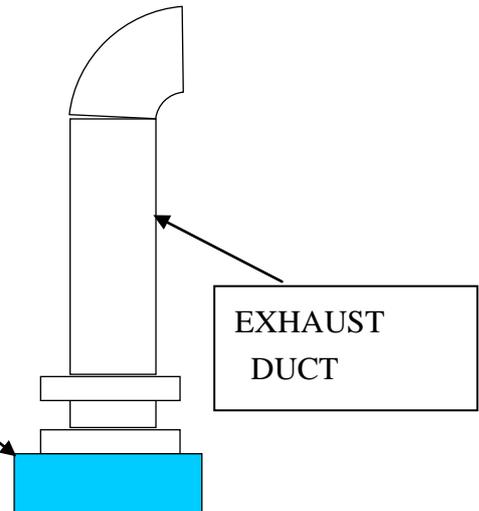
EXHAUST DUCT
60kg
CASE No. 14

Connecting Vacuum Flange between D Vacuum Chamber and Exhaust Duct
CLAW
32044-QAPR (VAT) with
Hex Bolt M10 × 45 QTY12
Accessories #8 (Vacuum System)
CASE No. 16

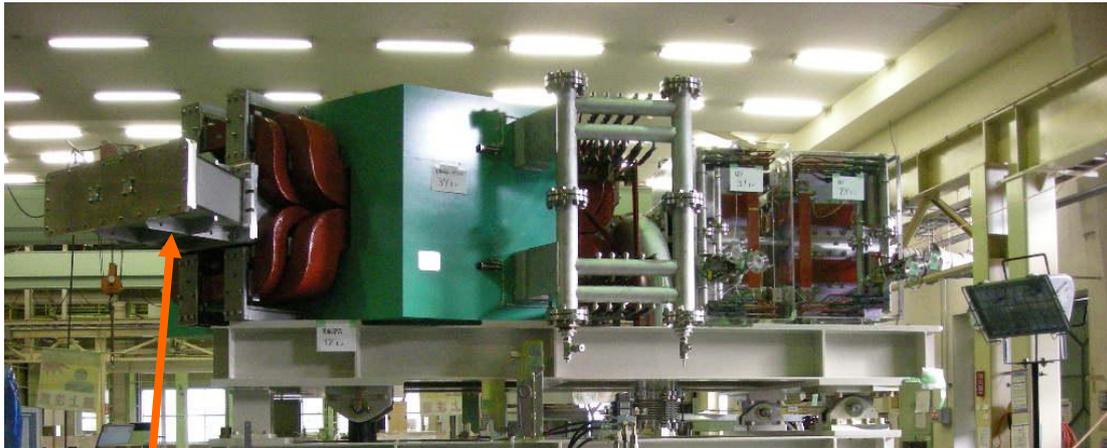
The insulation flange([4291-K850-01](#)) for TMP is installed underneath exhaust duct ([4292-N850-01](#)).

Insulated Flange
φ 350 × 40 (MonoCast Nylon)
QTY1
Accessories #7 (Vacuum System)
CASE No. 16

Connecting Vacuum Flange Between Insulated Flange and Exhaust Duct
SHCS M10x45 QTY50
Washer Flat M10 QTY50
Accessories #9 (Vacuum System)
CASE No. 16



The D vacuum chamber extension ([4291-N801-01](#)) is installed on downstream side of the D vacuum duct ([4291-N501-01](#)).



D-VACUUM CHAMBER
EXTENSION 250kg
CASE No. 13

Connecting Vacuum Flange Between D Vacuum Chamber and D Vacuum Chamber Extension		
Hex Bolt	M16x55	QTY30
Washer Flat	M16	QTY30
Accessories	#9 (Vacuum System)	
CASE No. 16		

At above it completes.