

TITLE

VACUUM EQUIPMENT FOR CATALYST REMOVAL

FINAL

CUSTOMER : Kawasaki Heavy Industries. LTD.

: Namvaran Consulting Engineers

: M. W. Kellogg Limited

CLIENT : KPIC

PLANT : 1200 MTPD Ammonia Plant / Kermanshah. Iran

FINAL
05.2.-4
SANKO AIR PLANT LTD.
OSAKA JAPAN

Purchaser review and comments shall not be assumed to indicate either responsibility or liability for accuracy and completeness of this document or to alter any contractual terms and conditions.

Item Numbers
H-2101

Purchasers Disposition

No Comments Comments as Noted Rejected Not reviewed

Date	Company	Initial
<u>20. October, '04</u>	<u>KHI</u>	<u>[Signature]</u>

SDRL Code	REQ. No.	Purchase Order No.
A10	5777-21D1-B626-01	04AA4H70

REPRO	COPY	No.	DATE	DESCRIPTION	DRAWN	CHK'D	APP'D
	8	1	2004. 10. 26	REVISION	T. FUJINAGA	M. KAWATA	H. OKAMURA
	11	0	2004. 9. 30	ORIGINAL	T. FUJINAGA	M. KAWATA	H. OKAMURA
	6	CUSTOMER (KHI)		SSK No. 4 2 2 6 0 1 4	[Signature]	[Signature]	[Signature]
		CUSTOMER (NCE)					
				SAP No. N-899			
	1	SSK		DOCUMENT No. 9 9 8 4 AM 07-0-01	[Signature]	[Signature]	[Signature]
	1	SAP					

SANKO AIR PLANT LTD.
9. FEB 2005
JAPAN
ENGINEERING DIV.

SANKO AIR PLANT LTD.

CONTENTS .

§ 1.	CONDITION OF DESIGN	3
§ 2.	BASIC ENGINEERING DESIGN DATA	3
§ 3.	EQUIPMENT LIST FOR VACUUM EQUIPMENT FOR CATALYST REMOVAL	4-5
§ 4.	DRAWING AND PERFORMANCE DATA	

NUMBER	SUPPLIER DRAWINGS AND DOCUMENTS	SUPPLIER DRAWINGS OR DATA NUMBER	REV. No.	PAGE
1	VACUUM PRODUCER	9984AM01001	0	6
2	MOTOR	9984AM02001	1	7-8
3	ROOT'S TYPE BLOWER	9984AM03001	0	9
4	PREDICTED PERFORMANCE DATA	9984AM03002	0	10
5	BAG FILTER ASSEMBLY DRAWING	9984AM04001	0	11
6	DUST HOLE COVER	9984AM04002	0	12
7	SILENCER & AIR FILTER	9984AM05001	0	13
8	VACUUM SAFTY VALVE	9984AM06001	0	14
9	VACUUM GAUGE	9984AM07001	0	15
10	SLUICE VALVE	9984AM08001	0	16
11	TOP HAT TYPE PRIMARY SEPARATOR	9984AM09001	0	17
12	ASSEMBLY OF PICK-UP HOSE	9984AM10002	0	18
13	HINGED VALVE "A1", "B1"	9984AM11001	0	19
14	ASSEMBLY OF CONNEETING HOSE "A", "B"	9984AM12001	0	20
15	SWITCH BOX	9984AM13001	1	21-22
16	PARTS LIST OF SWITCH BOX	9984AM13002	1	23-24

§ 1. CONDITIONS OF DESIGN.

- 1). JIS material will be used for all equipment.
- 2). Specification of flange for our vacuum producer & secondary separator unit will be followed to JIS.
HINGED VALVES are not flange, there are NPT 2 1/2" or NPT 4" IPS male thread on one end.
- 3). Only the surface of the carbon steel shall be painted.
(Primer: 2 times, Finish: 2 times,
Finishing color: RAL7035 (Light Gray))

§ 2. BASIC ENGINEERING DESIGN DATA.

2.1. UTILITIES.

- 1) Driving power. 400 V , 3 phase , 50Hz

2.2. Codes and Standards.

Specification of Materials and Equipments are followed to JIS (Japanese Industrial Standards) or IEC (International Electrotechnical Commission).

2.3. Ambient Condition.

- 1) Temperature -27~44°C (Only switch box shall be out of applicability.)
- 2) Altitude(above sea level) 1322m
- 3) Barometric Pressure 851.6~881.2 mbar Average 877.6 mbar

**§ 3 . EQUIPMENT LIST FOR VACUUM EQUIPMENT
FOR CATALYST REMOVAL .**

1. Vacuum producer & secondary separator.

1) BLOWER

Q'TY : 1 set
MATERIALS : JIS FC250
TYPE : Roots
CAPACITY : 815 m³/h 13.6 m³/min × -2600mmAq(190 mmHg vaccum)
(1446 m³/h 24.1 m³/min at Ambient Condition × -4050mmAq(298 mmHg vaccum))
ACCESSORIES : Base plate, Safety guard, Pulleies, Belt, Vacuum gage, Safety valve, Silencer
DRIVER : WP II MOTOR Yaskawa Siemens 22kW IEC, EExn

2) SWITCH BOX

Q'TY : 1 set
EXPLOSION PROOF : JIS,d2G4
ACCESSORIES : Power cable(10m)

3) BAG FILTER

Q'TY : 1 set
MATERIAL : JIS SS400
TYPE : Manual
FILTER : 5 m²
ACCESSORIES : Manhole, Dust container (Volume 0.32m³)

4) Portable truck

Q'TY : 1 set
MATERIAL : JIS SS400

2. Primary separator

Q'TY : 1 set
MATERIAL : JIS SS400
TYPE : Top hat type
SIZE : I.D. 510mm

3. Pick-up hose

1) Hose (with hose coupling)

Q'TY : 2 sets
MATERIAL : Rubber
TYPE : Flexible
SIZE : 2 1/2 " × 25 m

2) Pick-up nozzle

Q'TY : 2 sets
MATERIAL : JIS SUS304

4. Hinged valve

Q'TY : 4 sets
MATERIAL : JIS SS400, STPG
TYPE : Slip type
SIZE : 2 1/2 "

5. Hinged valve

Q'TY : 4 sets
MATERIAL : JIS SS400, STPG
TYPE : Slip type
SIZE : 4 "

6. Connecting hose (with hose coupling)

Q'TY : 1 set
MATERIAL : Rubber
TYPE : Flexible
SIZE : 4 "×4m

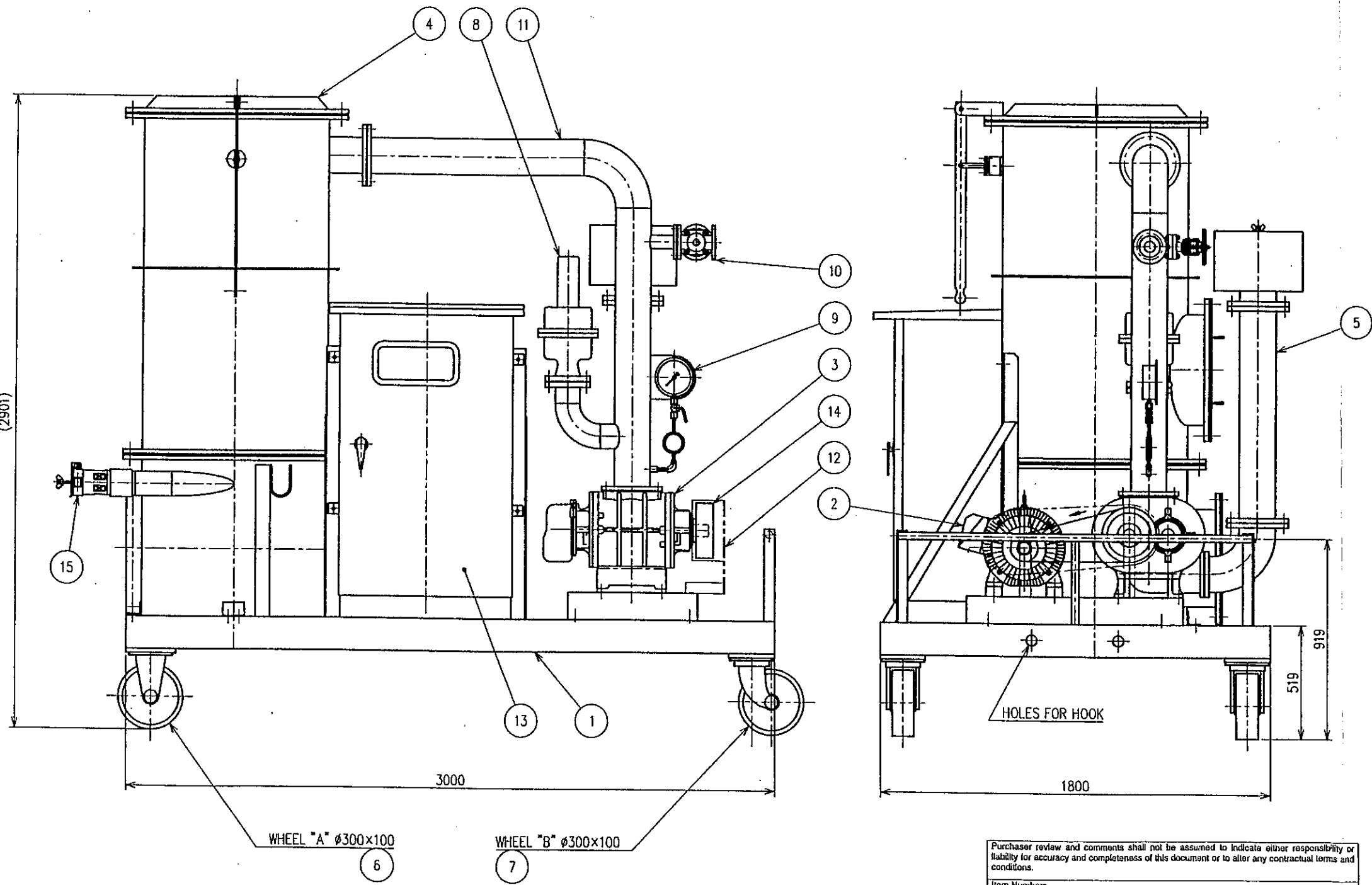
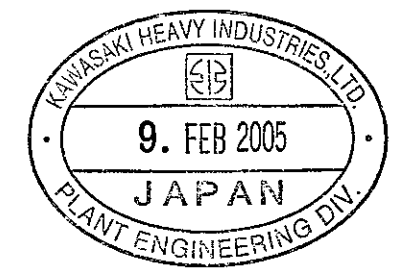
7. Connecting hose (with hose coupling)

Q'TY : 1 set
MATERIAL : Rubber
TYPE : Flexible
SIZE : 4 "×2m

REV. No.	DATE	DESCRIPTION	CHCD	APPD.
△				
△				
△				

- NOTES
1. QUANTITY : 1 SET
 2. PAINTING : PRIMARY COAT 2 TIMES
ANTICORROSIVE
FINISH COAT : RAL7035
 3. NET WEIGHT : APPROX 2500kg

FINAL



15	HINGED VALVE "A1"	1	SS400,STPG370	4B
14	V-BELT	1 SET		
13	SWITCH BOX	1	SS400	t2.3
12	BELT COVER	1	SS400	
11	PIPE	1 SET	STPG370	6B
10	SLUICE VALVE	1	SCS13	2B
9	VACUUM GAUGE	1	NAGANO	φ150
8	SAFETY VALVE	1	FC200	4B
7	WHEEL "B"	2		φ300x100
6	WHEEL "A"	2		φ300x100
5	SILENCER	1	SS400	
4	BAG FILTER	1	SS400	t4.5
3	ROOTS TYPE BLOWER	1	FC200	
2	MOTOR	1	YASKAWA SIEMENS	22KWx4P 400V 50Hz
1	CAR BODY	1	SS400	

Purchaser review and comments shall not be assumed to indicate either responsibility or liability for accuracy and completeness of this document or to alter any contractual terms and conditions.

Item Numbers
H-2101

Purchasers Disposition
 No Comments
 Comments as Noted
 Rejected
 Not reviewed

Date: 29 October 04 Company: KHI Initial: AKH

SDRL Code	REQ. No.	Purchase Order No.
A10	6777-21D1-B628-01	04AA4H170

PART No.	NAME OF PART	No. FOR 1 SET	MATERIALS	REMARKS
FOR		NAME OF JOB		
DATE	TITLE			
2004.08.19	VACUUM PRODUCER			
FILE No.				
DRAWN	DESIGNED	CHECKED	APPROVED	SCALE
T.F.	T.F.	M.K.	H.O.	NON
OUR JOB No.				N-89984
SANKO AIR PLANT LTD.				9984AM01001

SIEMENS

Bestell-Daten/ Ordering Data

Motortyp
Motor type
Kurzangaben
Order Codes

1LG42074AA90-Z
B02 +D04 +K09 +K40 +K84 +L1Y +M72 +Y54

Elektrische Daten/Electrical Data

Bemessungsspannung
Rated motor voltage
Frequenz
Frequency
Bemessungsleistung
Rated motor power
Bemessungsdrehzahl
Rated motor speed
Bemessungsmoment
Rated motor torque
Bemessungsstrom
Rated motor current
Anzugs-/ Bemessungsstrom
Starting-/ Rated motor current
Kipp-/ Bemessungsmoment
Breakdown/ Rated motor torque
Anzugs-/Bemessungsmoment
Starting-/ Rated motor torque
Wirkungsgrad bei
Efficiency at
100 % P_n, 75 % P_n, 50 % P_n
100 %, 75 % and 50 % rated power
Wirkungsgradklasse
Efficiency class
Leistungsfaktor bei
Power factor at
100 % P_n, 75 % P_n, 50 % P_n
100 % P_n, 75 % P_n, 50 % P_n

400.0VD/690.0VY		
50.0Hz		
22kW		
1465 min ⁻¹		
143.41 Nm		
41.07 A		
6.7		
3.4		
2.5		
91.6 %	92 %	-/- %
EFF 2		
0.85	0.80	-/-

Mechanische Daten/ Mechanical Data

Schalldruckpegel (LpA) 50 Hz/60Hz
Noise 50Hz/60 Hz
Trägheitsmoment
Moment of inertia
Lager AS
Bearing AS
Lager BS
Bearing BS
Art der Lagerung
Locating bearing
Kondenswasserlöcher
Drain Holes
Nachschmierleinrichtung
Regreasing device
Schmiermittel
Type of lubrication
Fettgebrauchsdauer: 40°C/25°C
Relubrication interval at 40°C/25°C
Fettmenge Nachschmierung: 40°C/25°C
Quantity of grease for relubrication
Äußere Erdungslemme
External earthing
Anstrich
Paintwork

66 dB(A)	70 dB(A)
0.19 kgm ²	
6212 C3	
6212 C3	
Locating bearing, NDE (standard)	
yes	
yes	
Esso Unirex N3	
8000 h	8000 h
40 g	40 g
yes	
Special paint finish, other colors	

Umgebungsbedingungen/ Site conditions

Umgebungstemperatur
Ambient temperature
Höhe über Meeresspiegel
Altitude above sea level
Normen und Vorschriften
Standards and specifications

-30 - +45°C
1500 m
IEC, DIN, ISO, VDE, EN

Bemerkungen/Remarks:

16.01.2004
00_76_30_01.01 v.1

L1Y=3 AC 50.0Hz, 400.0VD/690.0VY
L1Y=Pn=22.0kW, XT=150°C, H=1500m
L1Y=F used as class B

Allgemeine Daten/General Data

Baugröße
Frame size
Bauform
Type of construction
Gewicht in kg, Bauform IM B3 ohne Opt.
Weight in kg, Type of construction IM B3 without Opt.
Gehäusematerial
Frame material
Schutzart
Degree of protection
Kühlart, TEFC
Method of cooling, TEFC
Vibrationsklasse
Vibration class
Isolation
Insulation
Betriebsart
Duty type
Drehrichtung
Direction of rotation

200 L
IM B3
205 kg
Grey cast iron
IP 55
IC 411
N (standard)
F, ausgenutzt nach B - F, utilized to B
S1
Bi-directional

Klemmenkasten/ Terminal box

Klemmenkastenmaterial
Material of terminal box
Typ
Type
Gewinde Kontaktschraube
Terminal screw thread
Max. Leiterquerschnitt
Max. cable diameter
Kabeldurchmesser von ... bis ...
Cable diameter from ... to ...
Kabeleinführung
Cable entry
Kabelverschraubung
Cable gland

Aluminum	
gt 451	
M8	
25 mm ²	
24 mm	35 mm
2xM50x1,5	
1 certified gland, 1 plug	

Explosionsschutz/ Explosion protection

Zündschutzart
Type of protection

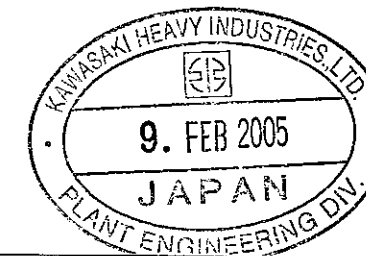
BBx/Ex nA II T3 acc. to EN50021/IEC

Sonderausführungen/ Special configurations

B02 - Werksprüfzeugnis 2.3 nach EN10204
B02 - factory test in acc. with EN10204 2.3
D04 - coolant temperature -30°C to 40°C
K09 - Klemmenkasten seitlich rechts (Blick auf AS)
K09 - side-mounted terminal box, right (viewed to DE)
K40 - Nachschmierleinrichtung
K40 - regreasing device
K84 - terminal box rotated 90° entry from non-drive end
L1Y - SpgKennziffer 9 Wickl. anormal
L1Y - special voltage, non-standard winding
M72 - BBx nA II T3 n. EN 5002 Ex nA II T3 n. IEC 60 079-15-N
Y54 - Sonderanstrich RAL 5010
Y54 - special paintwork RAL 5010, look to remarks

REV. No.	DATE	DESCRIPTION	CHCD	APPD.
△	2004.10.22	REVISION		T. Fujimura / H. Okamura
△				
△				

FINAL



Purchaser review and comments shall not be assumed to indicate either responsibility or liability for accuracy and completeness of this document or to alter any contractual terms and conditions.

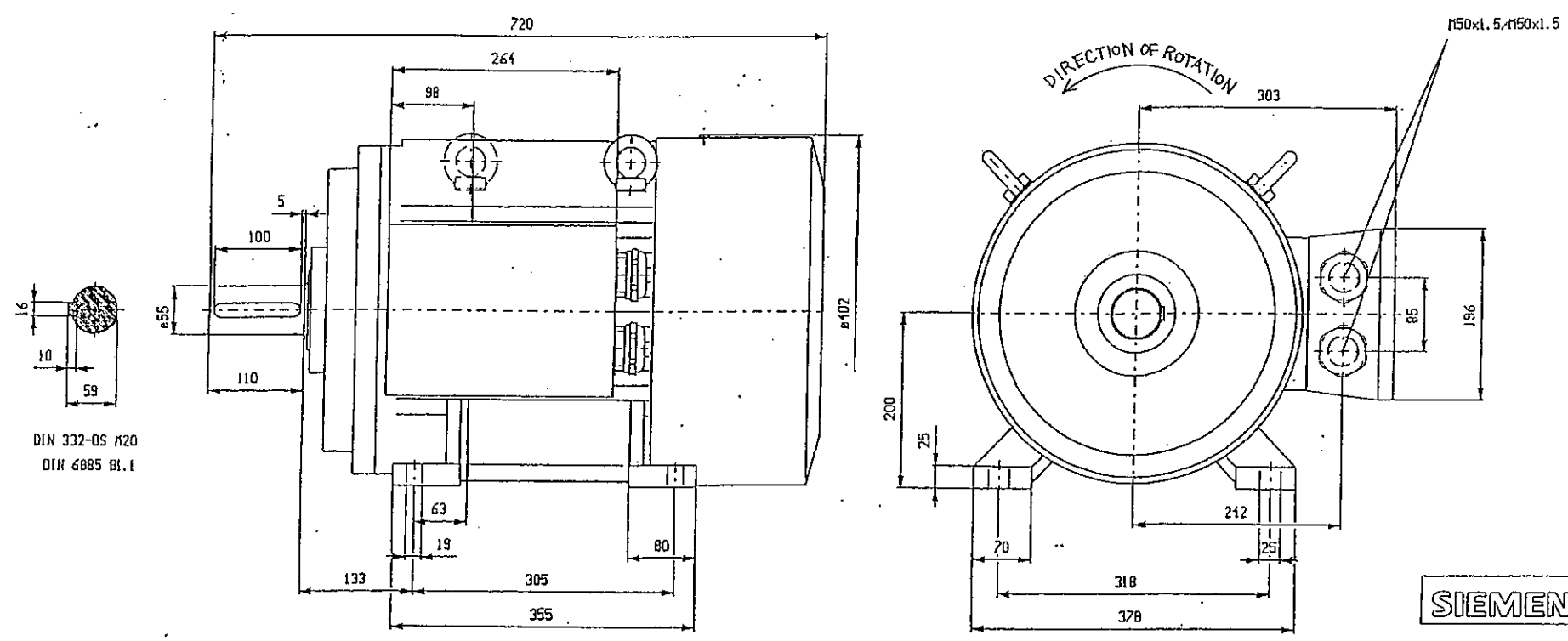
Item Numbers
H-2101

Purchaser's Disposition
 No Comments
 Comments as Noted
 Rejected
 Not reviewed

Date: 28. October 04
Company: KHI
Initial: H/O

SDRL Code: A10
REQ. No.: 5777-21D1-8628-01
Purchase Order No.: 04AA4H70

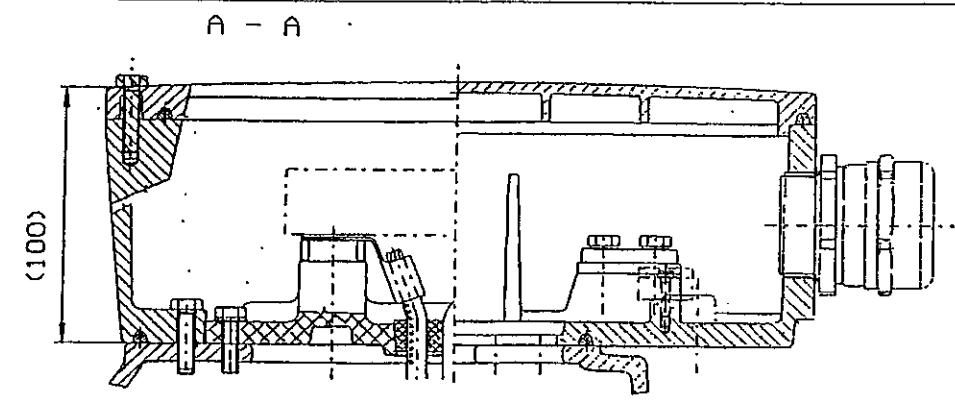
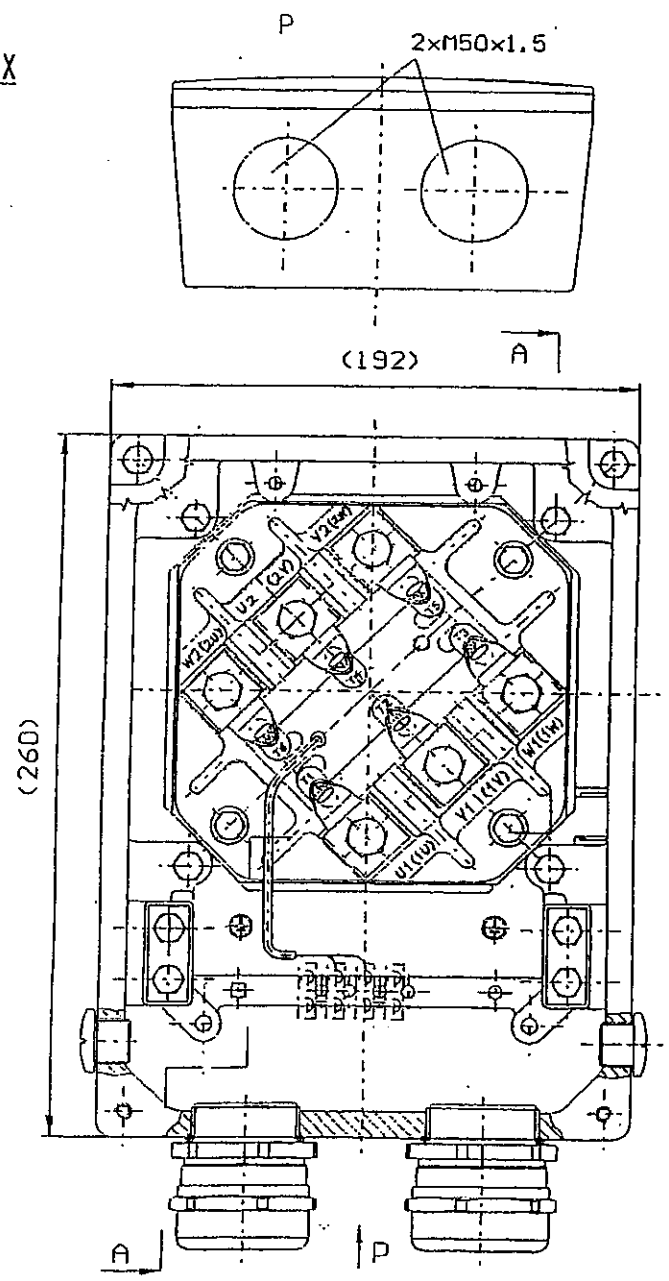
PART No.	NAME OF PART	No. FOR 1 SET	MATERIALS	REMARKS
FOR	NAME OF JOB			
DATE	TITLE			
2004.09.14	MOTOR			
FILE No.	DATA SHEET			
DRAWN	DESIGNED	CHECKED	APPROVED	SCALE
T.F.	T.F.	M.K.	H.O.	NON
OUR JOB No.				N-89984
SANKO AIR PLANT LTD.			9984AM02001	



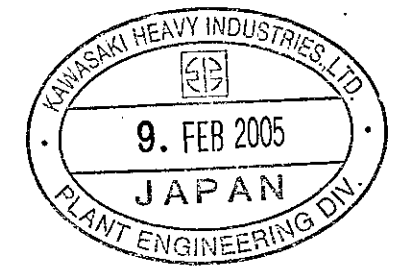
REV. No.	DATE	DESCRIPTION	CHCD	APPD.
△				
△				
△				

SIEMENS B02+D01+K09+K10+K84+L1Y+M72+Y54

TERMINAL BOX



FINAL



Purchaser review and comments shall not be assumed to indicate either responsibility or liability for accuracy and completeness of this document or to alter any contractual terms and conditions.

Item Numbers
H-2101

Purchaser's Disposition
 No Comments
 Comments as Noted
 Rejected
 Not reviewed

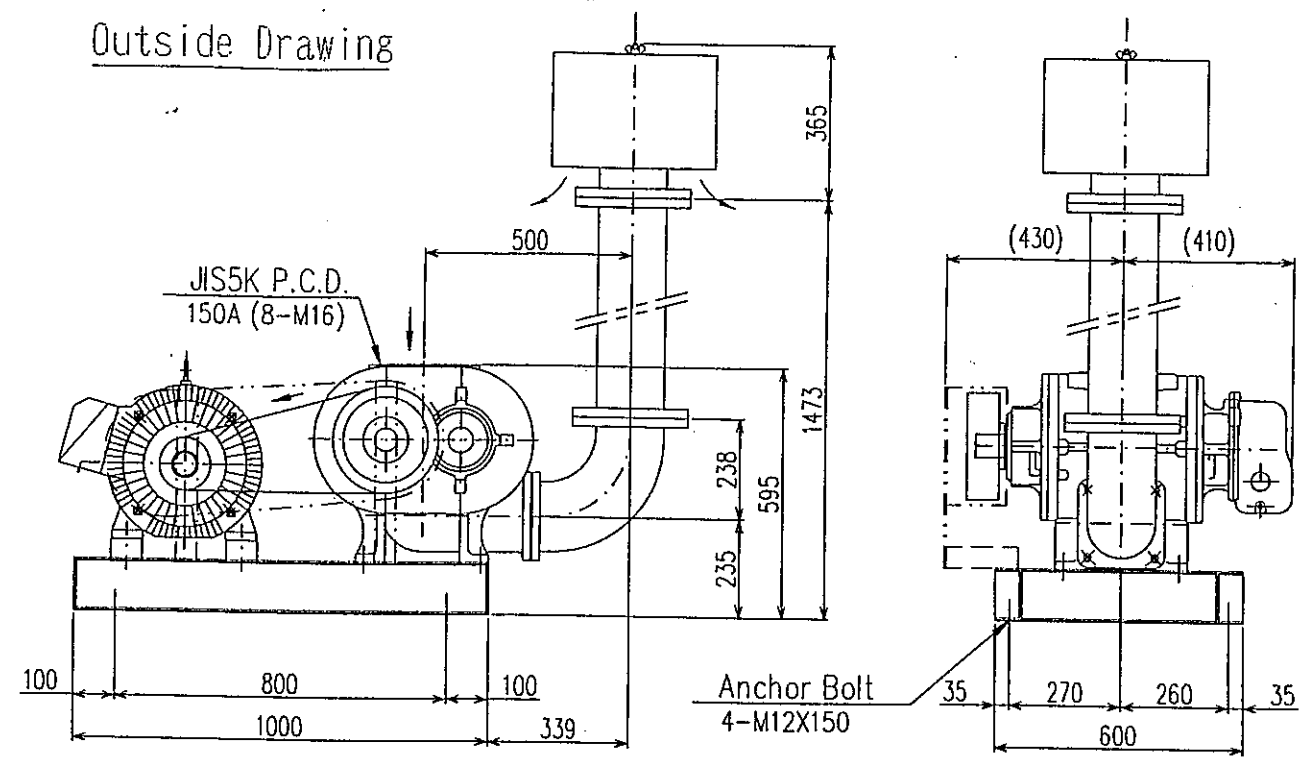
Date: 26 October 04 Company: KHI Initial: Haki

SDRL Code: A10 REQ. No.: 5777-21D1-8626-01 Purchase Order No.: 04AA4H70

PART No.	NAME OF PART	No. FOR 1 SET	MATERIALS	REMARKS
FOR			NAME OF JOB	
DATE	TITLE			
2004.09.14	MOTOR			
FILE No.	DRAWING			
DRAWN	DESIGNED	CHECKED	APPROVED	SCALE OUR JOB No.
T.F.	T.F.	M.K.	H.O.	NON N-89984
SANKO AIR PLANT LTD.			9984AM02002	

REV. No.	DATE	DESCRIPTION	CHCD	APPD.
△				
△				
△				

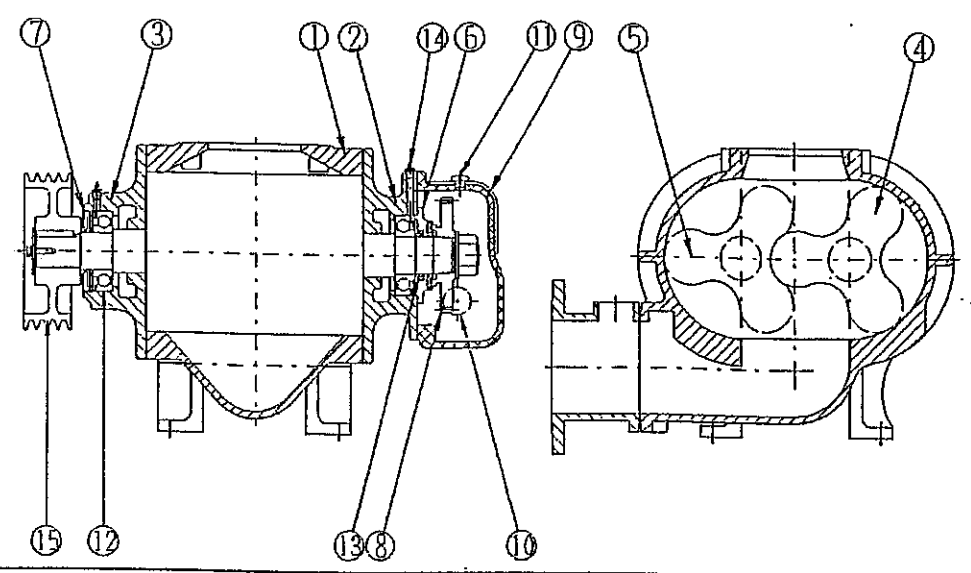
Outside Drawing



ANLET ROOT'S TYPE BLOWER

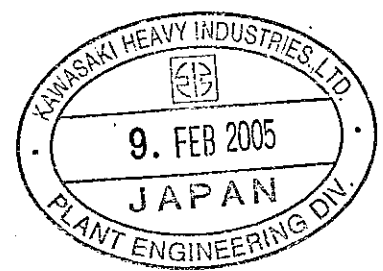
Customer		D.No. 702139	
		S.No. BH150-C-001E	
		Jul.29.2004	
Type	BH150	Q'ty	1
Blower		Motor	
Capacity	24.1 m ³ /min	Type	T.E.F.C.(out door)
Pressure	Inlet -40.5 kPa	Out Put	22 kW 4 P
	Outlet -15 kPa		3Phases 400 V 50 Hz
Speed	1550 min ⁻¹	Maker	Provision
Color	Munsell 7.5BG5/2		
Weight	about 380 kg	Weight	205 kg
Standard Accessories		Remarks	
Base Belt Cover (Type M)		Long elbow (LE150HA) Dis. Silencer (ADS150A) Air filter (HAF150A) Vacuum safety valve (VB100) set pressure -45kPa	
Anchor Bolt Blower Pulley Motor Pulley V-Belt			

Cross-Sectional View



No.	Name of Parts	Material
1	Casing	FC200
2	Housing R	FC200
3	Housing L	FC200
4	Rotor Shaft A	FCD500-7
5	Rotor Shaft B	FCD500-7
6	Collar R	FC200
7	V Seal	N B R
8	Timing Gear	SCM415
9	Gear Cover	FC200
10	Oil Gauge	Resin
11	Oil Cap	Resin
12	Bearing	SUJ2
13	Oil Seal for Collar R	N B R
14	Grease Nipple	C3604
15	Blower Pulley	FC200

FINAL



ANLET CO., LTD

Oct.2000

A. Hashimoto

NOTE

1. QUANTITY : 1 SET / UNIT

Purchaser review and comments shall not be assumed to indicate either responsibility or liability for accuracy and completeness of this document or to alter any contractual terms and conditions.

Item Numbers
H-2101

Purchaser's Disposition
 No Comments
 Comments as Noted
 Rejected
 Not reviewed

Date: 28 October 04 Company: KHJ Initial: *[Signature]*

SDRL Code: A10 REQ. No.: 5777-21D1-B628-01 Purchase Order No.: 04AA4H70

PART No.	NAME OF PART	No.FOR 1 SET	MATERIALS	REMARKS
FOR				NAME OF JOB
DATE	TITLE			
2004.08.19	ROOT'S TYPE BLOWER			
FILE No.				
DRAWN	DESIGNED	CHECKED	APPROVED	SCALE
T.F.	T.F.	M.K.	H.O.	NON
OUR JOB No.				
SANKO AIR PLANT LTD.				N-89984
				9984AM03001

REV. No.	DATE	DESCRIPTION	CHCD	APPD.
△				
△				
△				

CHARACTERISTIC CURVE

JIS B 8341

Date
Jul. 29. 2004

Customer Messrs _____

User _____

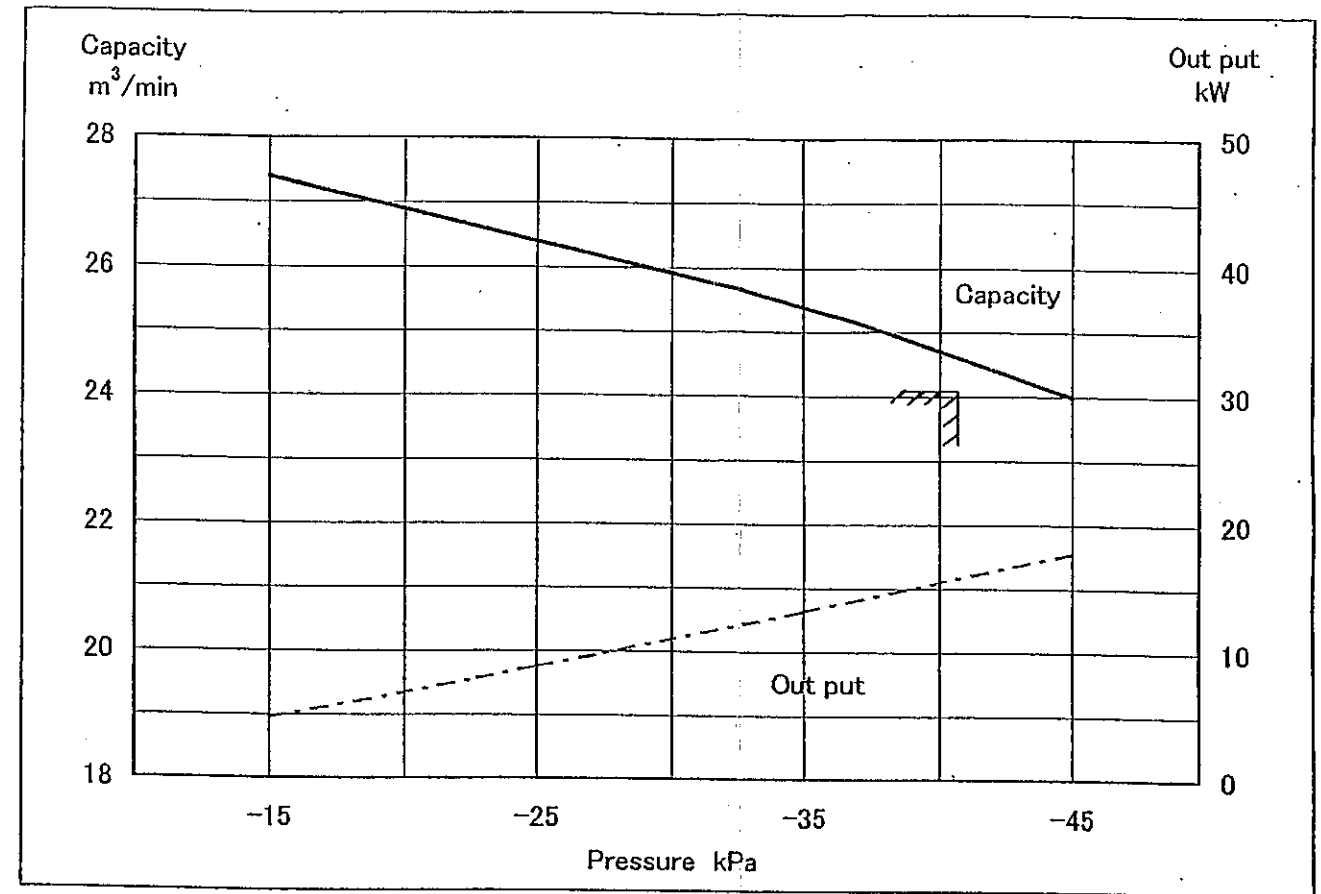
Type Root's type blower BH150

Application _____

Specifications	Capacity	Suc. pressure	Dis. Pressure	Speed	Out put
	m ³ /min	kPa	kPa	min ⁻¹	kW
	24.1	-40.5	-15	約1550	22

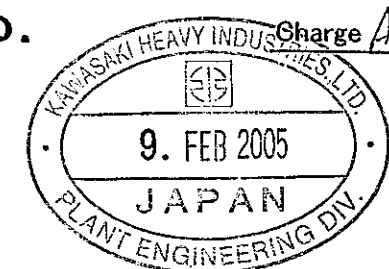
No.	Speed min ⁻¹	Pressure		Capacity m ³ /min	Out put kW
		Suction kPa	Discharge kPa		
1	約1550	-15	-15	27.4	4.8
2		-25		26.4	8.8
3		-35		25.4	13.2
4		-45		24.0	17.8
5					
6					
7					
8					

Capacity are the suction capacity under design conditions (at 40 °C)



ANLET CO., LTD.

FINAL



PART No.	NAME OF PART	No.FOR 1 SET	MATERIALS	REMARKS
FOR		NAME OF JOB		
DATE	TITLE			
2004.08.19	PREDICTED PERFORMANCE DATA (ROOT'S TYPE BLOWER)			
FILE No.				
DRAWN	DESIGNED	CHECKED	APPROVED	SCALE
T.F.	T.F.	M.K.	H.O.	NON
OUR JOB No.				N-89984
SANKO AIR PLANT LTD.				9984AM03002

Purchaser review and comments shall not be assumed to indicate either responsibility or liability for accuracy and completeness of this document or to alter any contractual terms and conditions.

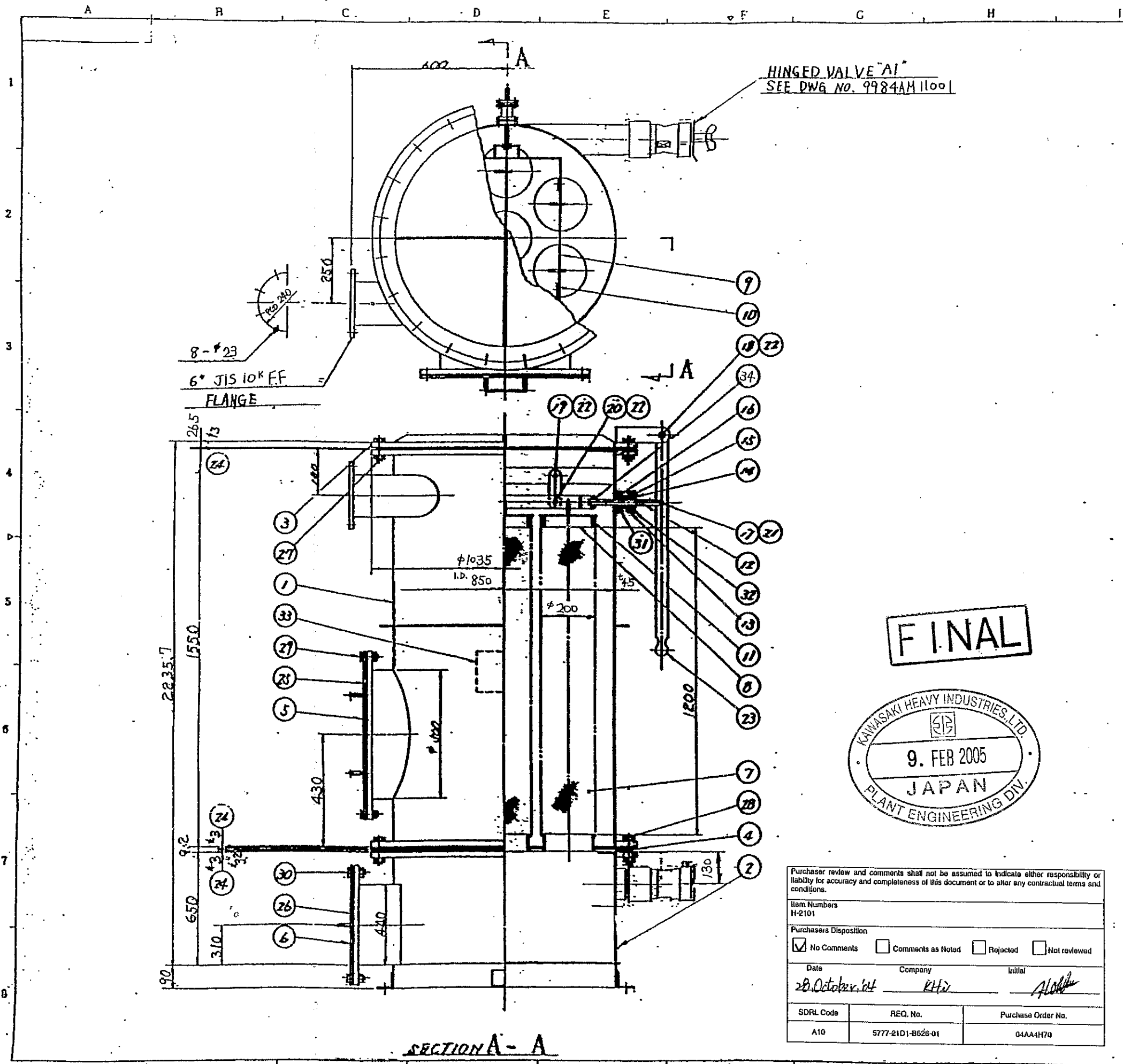
Item Numbers
H-2101

Purchasers Disposition
 No Comments
 Comments as Noted
 Rejected
 Not reviewed

Date _____ Company KHI Initial AH

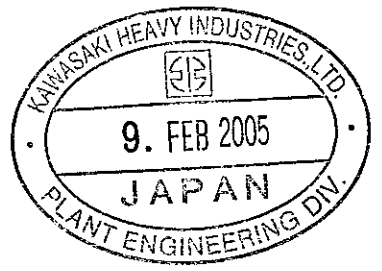
SDRL Code _____ REQ. No. _____ Purchase Order No. _____

A10 5777-2101-8829-01 04AA4H70



HINGED VALVE "A1"
SEE DWG NO. 9984AM11001

FINAL



Purchaser review and comments shall not be assumed to indicate either responsibility or liability for accuracy and completeness of this document or to alter any contractual terms and conditions.

Item Numbers: H-2101

Purchaser's Disposition:
 No Comments
 Comments as Noted
 Rejected
 Not reviewed

Date: 28 October 04
 Company: KHI
 Initial: ALD

SDRL Code	REQ. No.	Purchase Order No.
A10	577-2101-8528-01	04AA4H70

REV. No.	DATE	DESCRIPTION	CHGD	APPR

NOTES:
 1. NO. REQ.D : 1 set/unit
 2. PAINTING : PRIMARY COAT
 ANTICORROSSIVE
 : FINISH COAT
 RAL 7035

QTY	PART No.	NAME OF PART	MATERIALS	REMARKS
2	SK5	SNAP RING "C"	SK5	TOKUHATSU 51020
1	SUS 304	NAME PLATE	SUS 304	
2	SS400(Zn)	STUB BOLT & NUT	SS400(Zn)	M8 X 35
4	*	BOLT	*	M8 X 60
26	*	BOLT & NUT	*	M20 X 55
20	*	BOLT & NUT	*	M20 X 60
20	*	BOLT & NUT	*	M24 X 75
20	SS400(Zn)	BOLT & NUT	SS400(Zn)	M24 X 75
1	RUBBER	SHEET PACKING "D"	RUBBER	t 2
1	*	SHEET PACKING "C"	*	t 2
3	RUBBER	SHEET PACKING "B"	RUBBER	t 3
1	SS 400	HANDLE	SS 400	FB 50 = 5
18	SK 5	SNAP RING "B"	SK 5	TOKUHATSU 51018
2	SK 5	SNAP RING "A"	SK 5	TOKUHATSU 51010
4	SUS 304	PIN "D"	SUS 304	t 18
4	*	PIN "C"	*	t 18
1	*	PIN "B"	*	t 18
1	SUS 304	PIN "A"	SUS 304	t 10
1	RUBBER	SHEET PACKING "A"	RUBBER	t 2
4	CONTAIN PTFE ASBESTOS	GLAND PACKING	CONTAIN PTFE ASBESTOS	t 4.5
1	SS 400	GLAND	SS 400	
1	S25C	CAP	S25C	
1	SUS 304	SHAKING SHAFT	SUS 304	t 20
14	SS 400	PUNCH BAND	SS 400	t 200
4	SUS 304	HANGING PLATE	SUS 304	t 6
1	SUS 304	HANGING SUPPORT	SUS 304	FB 50 = 6
7	SS 400	HANGING CAP	SS 400	t 3.2
7	POLYPROPYLENE	FILTER CLOTH	POLYPROPYLENE	t 200 X 1300
1	SS 400	DUST NOLE COVER	SS 400	t 9
1	*	MAN HOLE COVER	*	t 9
1	*	BLU. JETTING PLATE	*	t 32
1	*	UPPER CASE COVER	*	t 4.5
1	*	UNDER CASE	*	t 4.5
1	SS 400	UPPER CASE	SS 400	t 4.5

PART No.	NAME OF PART	No. FOR 1 SET	MATERIALS	REMARKS

TOR: _____ NAME OF JOB: _____

TITLE: **BAG FILTER ASSEMBLY DRAWING**

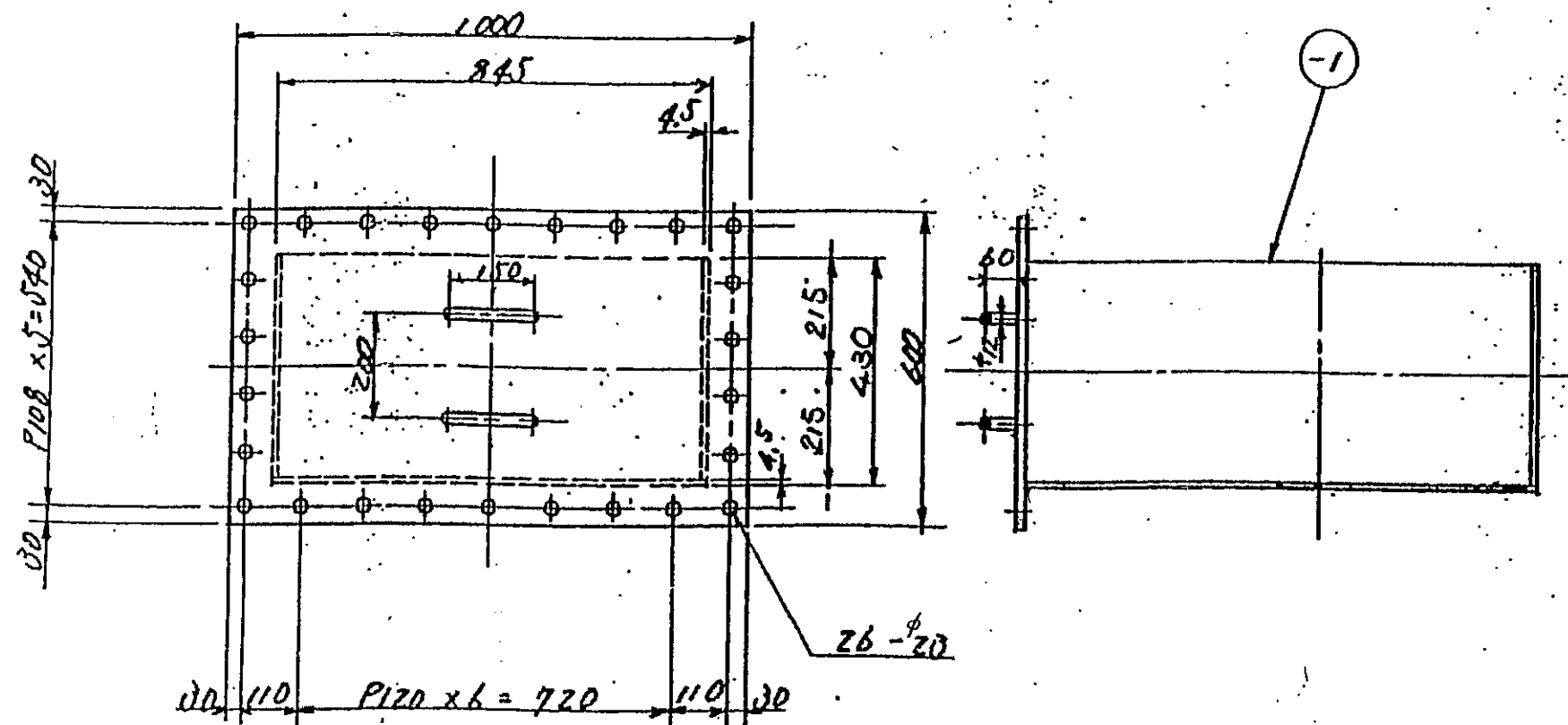
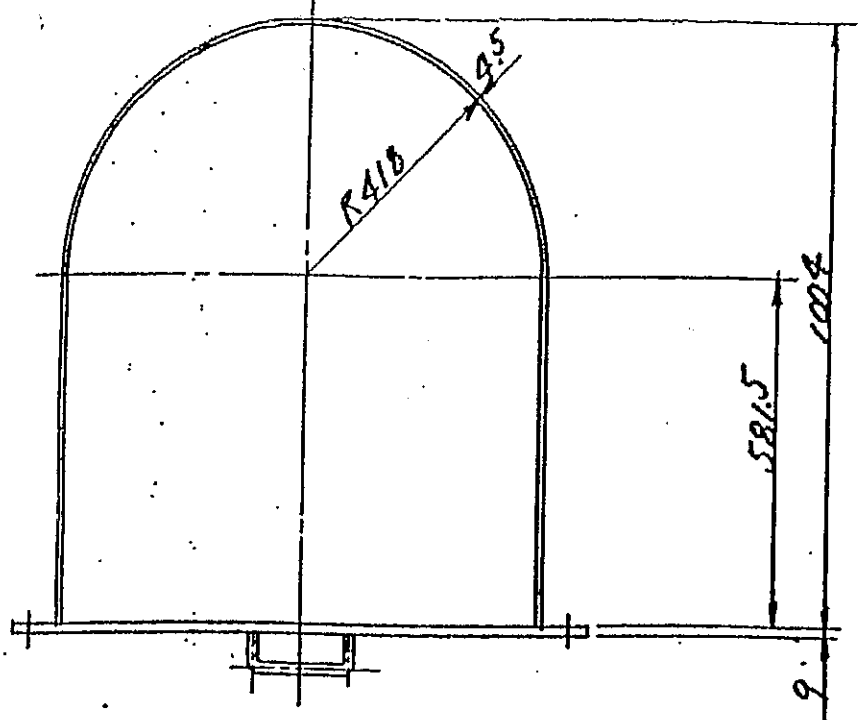
OUR JOB No. **N-89984**

DATE: 04.8.6

SCALE: 1/10

DRAWN: M.T. DESIGNED: M.T. CHECKED: K.F. APPROVED: K.F.

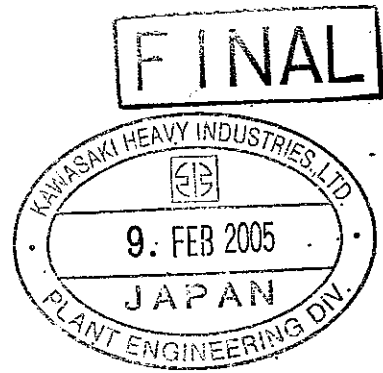
SANKO AIR PLANT, LTD. 9/9/84 1/10/01



REV. No.	DATE	DESCRIPTION	CHCD	APPD.
△				
△				
△				
△				

NOTE

1. QUANTITY : 1 SET
2. PAINTING : PRIMARY COAT 2TIME ANTICORROISIVE
FINISH COAT RAL7035
3. INSIDE PAINTING:
 - 1) SURFACE TREATMENT
TAKE OFF THE RUST, SLAG, AND SPATTER BY POWER TOOL.
 - 2) PRIMARY COAT 2TIMES ANTICORROISIVE.



-1	DUST HOLE COVER	1	00400		
PART No.	NAME OF PART	No. FOR 1 SET	MATERIALS	REMARKS	
FOR			NAME OF JOB		
TITLE			PUR JOB No.		
DUST HOLE COVER			N-89984		
(DUST CONTAINER) (6)			PRES No.		
DRAWN	DESIGNED	CHECKED	APPROVED	SCALE	DATE
md	m. S. M. K.	K. U.		1/2	04.8.6
SANKO AIR PLANT, LTD.			9984AM04002		

Purchaser review and comments shall not be assumed to indicate either responsibility or liability for accuracy and completeness of this document or to alter any contractual terms and conditions.

Item Numbers
H-2101

Purchasers Disposition
 No Comments
 Comments as Noted
 Rejected
 Not reviewed

Date: 26 October '04 Company: KHI Initial: [Signature]

SDRL Code	REQ. No.	Purchase Order No.
A10	5777-21D1-8626-01	04AA4H70

REV. No.	DATE	DESCRIPTION	CHCD	APPD.
△				
△				
△				

FINAL

No.	Name of parts	Material	Q'ty
1	Flange	S S	2
2	Pipe(Out)	SIK	1
3	Absover	Urethan	1
4	Pipe(Center)	SPCC	1

	F 1	F 2
A	10K	10K
B	10K	5K
C	---	---
D	5K	5K

Parts No.	mm	mm	Kg
Flange Rating	A	B	Weight
ADS-020 A	42.7	525	4.0
ADS-025 A			4.5
ADS-032 A	48.6		5.3
ADS-040 A	60.5	580	6.5
ADS-050 A	76.3	815	9.1
ADS-065 □		785	11.7
ADS-080 □	89.1	900	12.6
ADS-100 □	114.3		17.8
ADS-125 □	139.8	1000	27.8
ADS-150 □	165.2		31.2
ADS-200 □	216.3		42.5
ADS-250 □	267.4		72.5
ADS-300 □	318.5		88.0

Drawing revision	Date	Prepared	Chief	Check	Drawing	Date	Name
						March 14, 1996	ADS Silencer

Material: NTS
Scale: 3rd. A. Unit: mm
Model: ADS-0000
Sheet No: ADS-G-020300-1-E
DWG. No: ADS-G-001

ANLET CO., LTD.

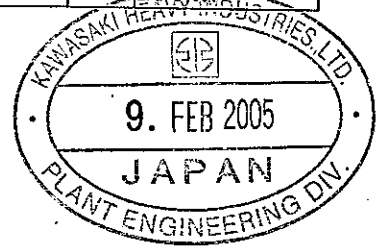
Part No.	Flange Rating	Bore	A	B	C	D	E
HAF32□		32	170	150	85	45	20
HAF40□		40	170	150	85	45	20
HAF50□		50	220	200	120	60	20
HAF65□		65	220	200	120	60	20
HAF80□		80	320	315	230	60	25
HAF100□		100	320	315	230	60	25
HAF125□		125	350	335	240	70	25
HAF150□		150	400	365	270	70	25
HAF200□		200	550	525	430	70	25
HAF250□		250	550	525	430	70	25

Flange Rating	JIS
A	JIS10K P. C. D.
B	JIS5K P. C. D.

Drawing revision	Date	Prepared	Chief	Check	Drawing	Date	Name
						Mar. 1, 1999	Air Filter (for the inhalation)

Material: NTS
Scale: 3rd. A. Unit: mm
Model: HAF0000
Sheet No: HAF-C-01-R2E
DWG. No: HAF-C-001

ANLET CO., LTD.



NOTE
1. QUANTITY : 1 SET / UNIT

Purchaser review and comments shall not be assumed to indicate either responsibility or liability for accuracy and completeness of this document or to alter any contractual terms and conditions.

Item Numbers: H-2101

Purchasers Disposition:
 No Comments
 Comments as Noted
 Rejected
 Not reviewed

Date: 20 October 04
 Company: KHI
 Initial: [Signature]

SDRL Code: A10
 REQ. No.: 5777-21D1-B628-01
 Purchase Order No.: 04AA4H70

PART No.	NAME OF PART	No.FOR 1 SET	MATERIALS	REMARKS
FOR				NAME OF JOB
DATE	TITLE			
2004.08.19	SILENCER & AIR FILTER			
FILE No.				
DRAWN	DESIGNED	CHECKED	APPROVED	SCALE
T.F.	T.F.	M.K.	H.O.	NON
OUR JOB No. N-89984				
SANKO AIR PLANT LTD.			9984AM05001	

REV. No.	DATE	DESCRIPTION	CHCD	APPD.
△				
△				
△				

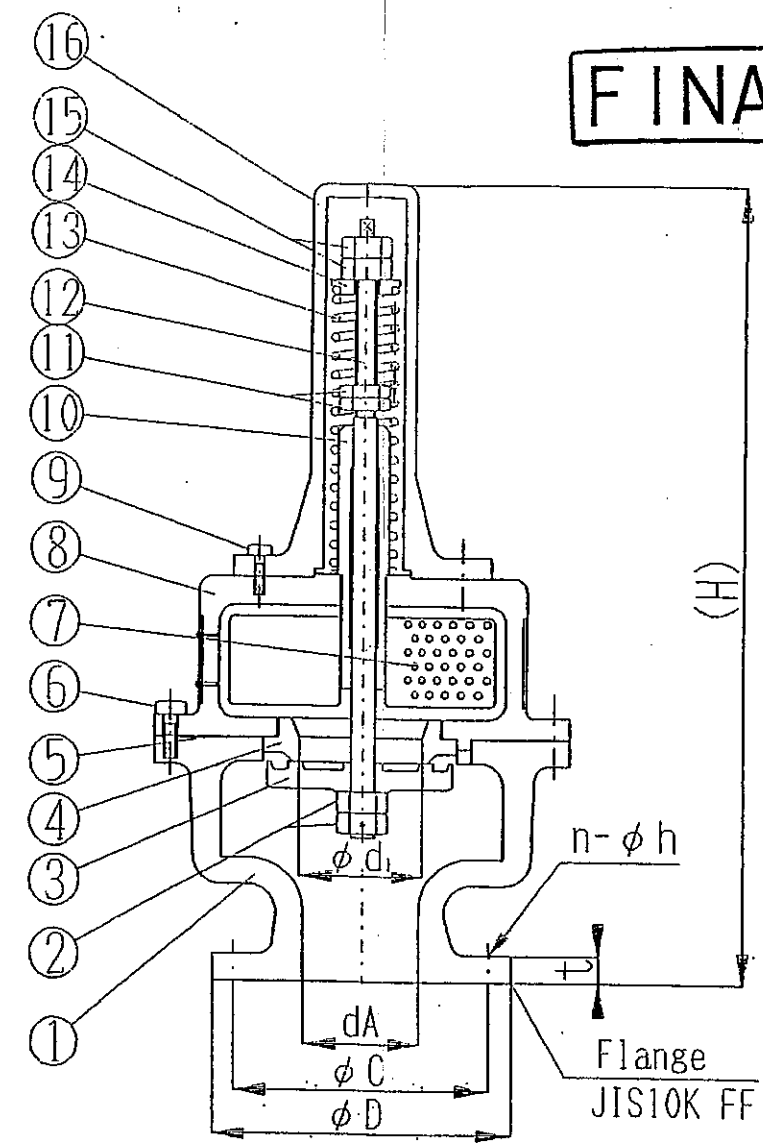
Maker:SHIDA

No.	Name of Parts	Material
1	BODY	FC200
2	LOCK NUT	SUS304
3	VALVE DISC	BC6
4	VALVE SEAT	BC6
5	GASKET	V #1500
6	SET BOLT	SS400
7	STRAINER	SUS304
8	BODY COVER	FC200
9	SET BOLT	SS400
10	SPINDLE GUIDE	C3604
11	LIFT STOPPER	SS400
12	SPINDLE	SUS304
13	SPRING	SWPA, SWDSM SUP or
14	SPRING SEAT	SS400
15	LOCK NUT	SS400
16	SPRING CASE	FC200

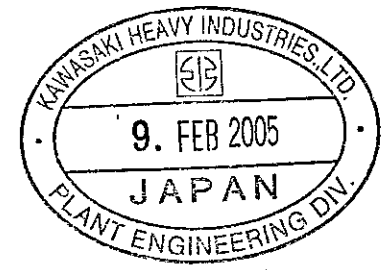
dA	d _i	D	C	t	n	h	H
25A	50	125	90	18	4	19	330
32A	50	135	100	20	4	19	330
40A	50	140	105	20	4	19	330
50A	80	155	120	20	4	19	410
65A	100	175	140	22	4	19	485
80A	100	185	150	22	8	19	485
100A	150	210	175	24	8	19	570
125A	175	250	210	24	8	23	655
150A	200	280	240	26	8	23	720
200A	250	330	290	26	12	23	830
250A	300	400	355	30	12	25	940
300A	350	445	400	32	16	25	1000

Set pressure -45kPa NORMAL

Drawing revision	Date	Prepared	Chief	Check	Drawing	Date	Name
						Aug. 30. 1999	VACUUM SAFETY VALVE
							Material
							Scale NTS : 3rd. A. Unit mm
							Type VB
							Sheet No. VB-A-C-001-E
							DWG. No. VB-C-01



FINAL



NOTE
1. QUANTITY : 1 SET / UNIT

Purchaser review and comments shall not be assumed to indicate either responsibility or liability for accuracy and completeness of this document or to alter any contractual terms and conditions.

Item Numbers H-2101

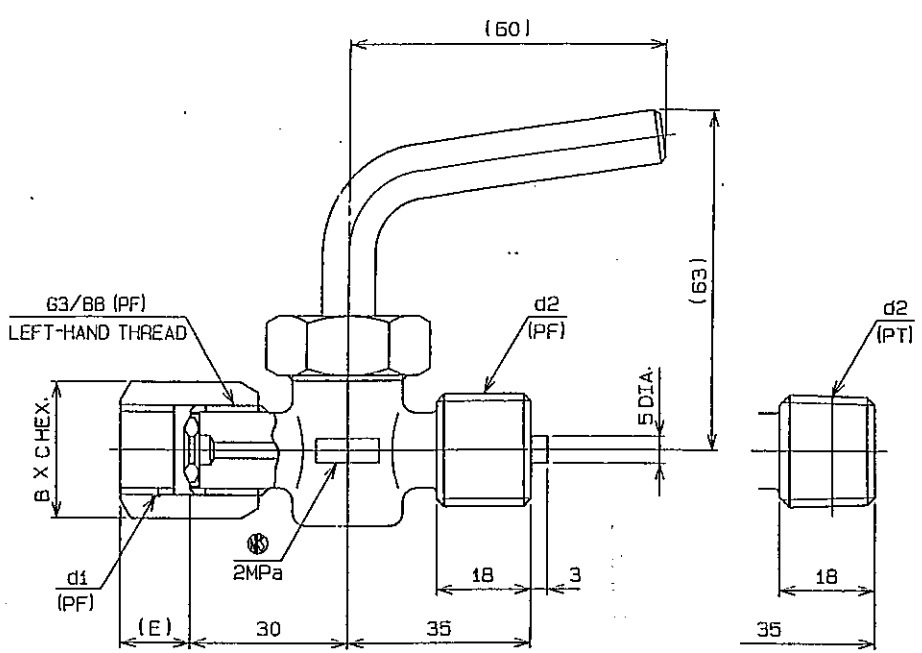
Purchaser Disposition
 No Comments Comments as Noted Rejected Not reviewed

Date: 9. October '04 Company: KHI Initial: Al

SDRL Code: A10 REQ. No.: 5777-21D1-8628-01 Purchase Order No.: 04AA4170

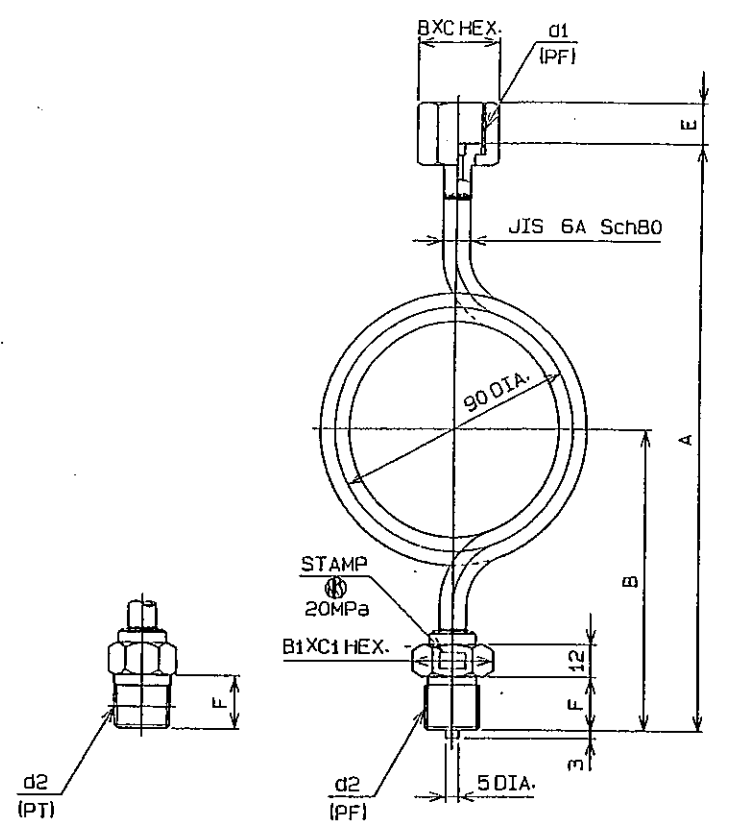
PART No.	NAME OF PART	No.FOR 1 SET	MATERIALS	REMARKS
FOR				NAME OF JOB
DATE	TITLE			
2004.08.19	VACUUM SAFETY VALVE			
FILE No.				
DRAWN	DESIGNED	CHECKED	APPROVED	SCALE
T.F.	T.F.	M.K.	H.O.	NON
				OUR JOB No. N-89984
SANKO AIR PLANT LTD.				9984AM06001

REV. No.	DATE	DESCRIPTION	CHCD	APPD.
△				
△				
△				



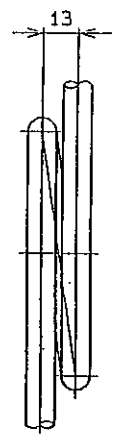
DWG.No.		d1 X d2	E	B X C
BRASS	ST.ST.			
FC10-331	FC10-333	G3/8 X G3/8B	13	22 X 25.4
-441	-443	G1/2 X G1/2B	15	27 X 31.2
-381	-383	G3/8 X R3/8	13	22 X 25.4
-491	-493	G1/2 X R1/2	15	27 X 31.2

MAX. WORKING PRESSURE : 2MPa
 TEST PRESSURE : 3MPa
 WORKING FLUID : LIQUID
 WORKING FLUID TEMPERATURE : UP TO 200°C
 WETTED MATERIALS : BRASS ····· CAC203△
 ····· YB563, C3604BD, C1100BD,
 SUS316, ASBESTOS
 STAINLESS STEEL ··· SUS316, ASBESTOS

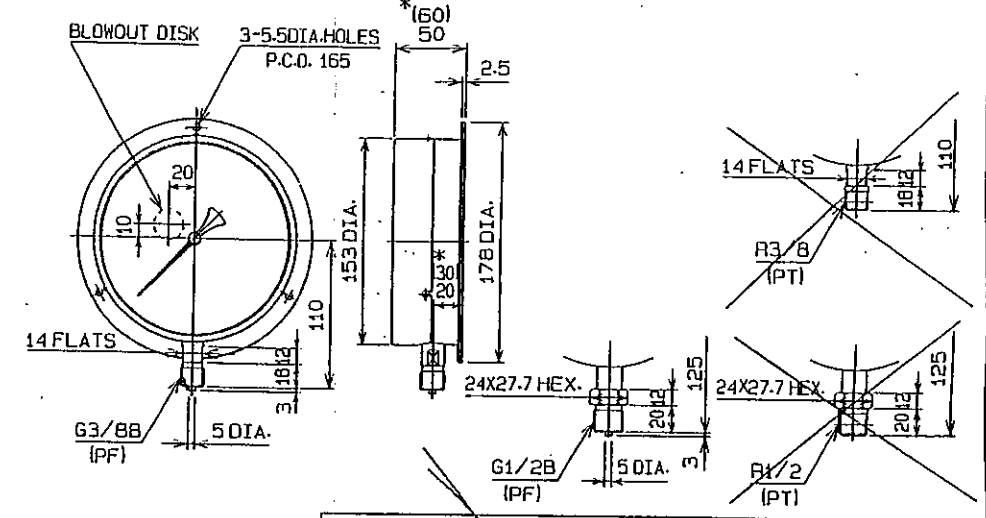


DWG. No.		d1 x d2	A	B	E	F	B X C	B1 X C1
STEEL	ST. ST.							
FP10-332	FP10-333	G3/8 x G3/8B	215	110	13	18	22x25.4	19x21.9
-442	-443	G1/2 x G1/2B	217	112	15	20	27x31.2	22x25.4
-382	-383	G3/8 x R3/8	215	110	13	18	22x25.4	19x21.9
-492	-493	G1/2 x R1/2	217	112	15	20	27x31.2	22x25.4

MAX. WORKING PRESSURE : 20MPa
 TEST PRESSURE : 30MPa
 WORKING FLUID : GAS, LIQUID
 WORKING FLUID TEMPERATURE : UP TO 350°C
 WETTED MATERIALS : STEEL ····· SGD400-D, STPG370
 ST. ST. ····· SUS316, SUS316TP



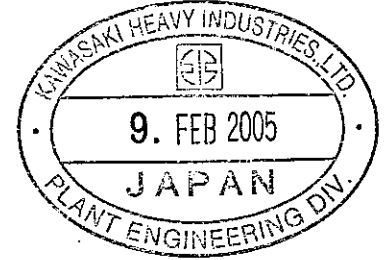
SURFACE MOUNTING



* 20.50 : 0.1MPa AND ABOVE
 30.60 : 0.05MPa AND BELOW

DWG. NO.				U S E
G3/8B(PF)	R3/8(PF)	G1/2B(PF)	R1/2(PF)	GENERAL
AG10-231	AG10-281	AG10-241	AG10-291	AMMONIA
-232	-282	-242	-292	AMMONIA
-233	-283	-243	-293	CORROSION PROOF

FINAL



NOTE
 1. QUANTITY : 1 SET / UNIT

Purchaser review and comments shall not be assumed to indicate either responsibility or liability for accuracy and completeness of this document or to alter any contractual terms and conditions.

Item Numbers
H-2101

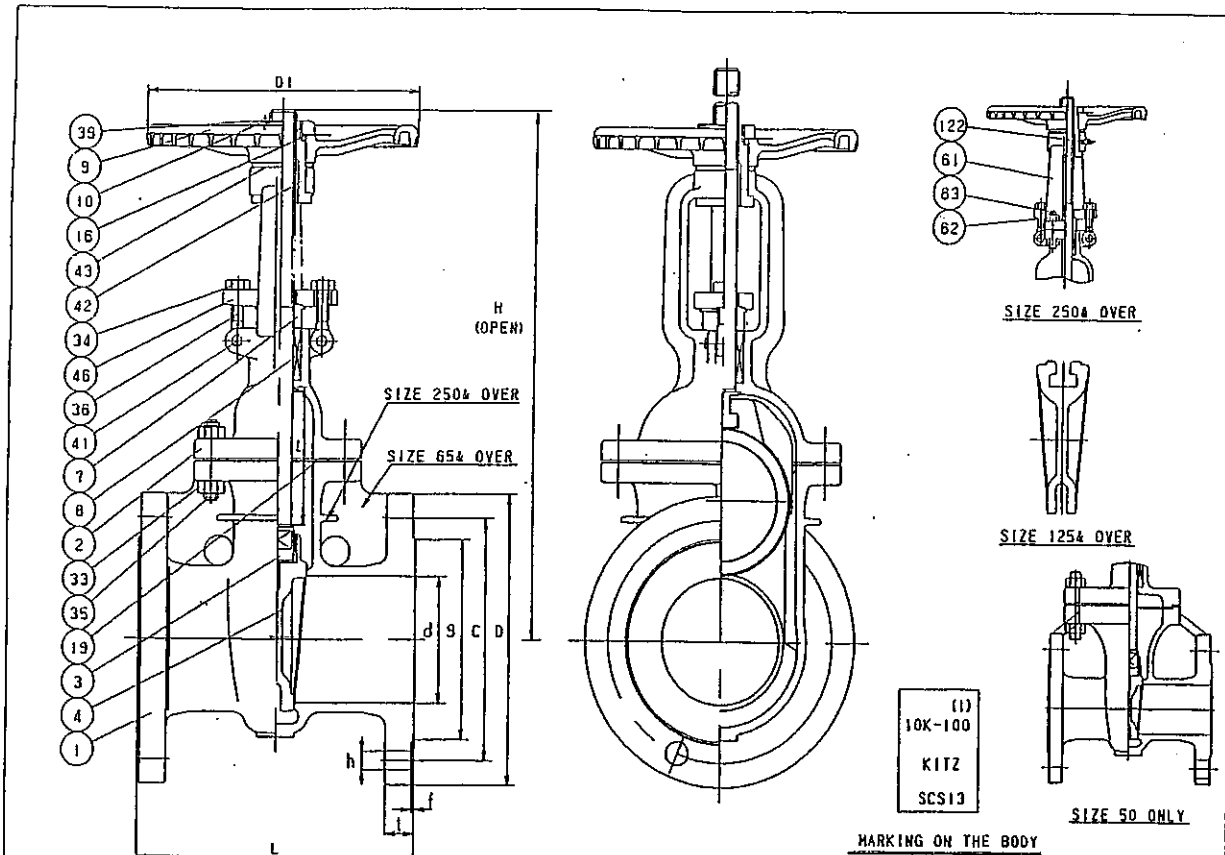
Purchasers Disposition
 No Comments Comments as Noted Rejected Not reviewed

Date: 8 October 04 Company: KHI Initial: [Signature]

SDRL Code: A10 REQ. No.: 5777-21D1-B626-01 Purchase Order No.: 04AA4170

PART No.	NAME OF PART	No. FOR 1 SET	MATERIALS	REMARKS
FOR	NAME OF JOB			
DATE	TITLE			
2004.08.30	VACUUM GAUGE			
FILE No.				
DRAWN	DESIGNED	CHECKED	APPROVED	SCALE
T.F.	T.F.	M.K.	H.O.	NON
OUR JOB No.				
N-89984				
SANKO AIR PLANT LTD.			9984AM07001	

REV. No.	DATE	DESCRIPTION	CHCD	APPD.
△				
△				
△				



DIMENSIONS UNIT: mm

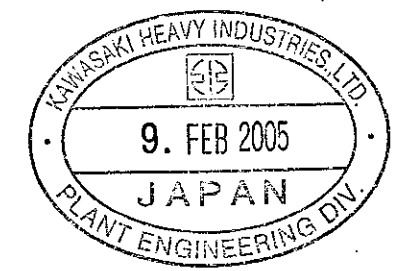
NOMINAL SIZE	d	H	D1	L	l	END FLANGE								
						BOLT HOLE	BOLT							
mm	In.							NO.	h	SIZE	g	l	f	
50	2	50	336	160	178	58	155	120	4	19	M16	96	16	2
65	2 1/2	65	375	180	190	73	175	140	4	19	M16	116	18	2
80	3	80	445	200	203	89	185	150	8	19	M16	126	18	2
100	4	100	523	225	229	109	210	175	8	19	M16	151	18	2
125	5	125	608	250	254	136	250	210	8	23	M20	182	20	2
150	6	150	710	250	267	163	280	240	8	23	M20	212	22	2
200	8	200	920	300	292	216	330	290	12	23	M20	262	22	2
250	10	250	1117	330	330	265	400	355	12	25	M22	324	24	2
300	12	300	1324	400	356	319	445	400	16	25	M22	368	24	1
350	14	337	1486	450	381	358	490	445	16	25	M22	413	26	3

NOTE (1) VALVE SIZE (mm) IDENTIFICATION.
(2) PIPE CUP & CONE.

KITZ

NO	NAME OF PARTS	QTY	MATERIALS	SPECIFICATIONS
JIS SPEC.				
1	BODY	1	STAINLESS STEEL	SCS13A
2	BONNET	1	STAINLESS STEEL	SCS13A
3	STEM	1	STAINLESS STEEL	SUS304
4	DISC	1	STAINLESS STEEL	SCS13A
7	GLAND	1	STAINLESS STEEL	SUS304
8	GLAND PACKING	1S (2)		
9	HAND WHEEL	1	DUCTILE IRON	FCD400
10	WHEEL NUT	1	CARBON STEEL	SS400
16	NAME PLATE	1	ALUMINUM	A1050F
19	GASKET	1	CERAMICS PTFE	
33	BONNET NUT	1S	STAINLESS STEEL	SUS304 (8)
34	GLAND NUT	2	STAINLESS STEEL	SUS304 (8)
35	BONNET BOLT	1S	STAINLESS STEEL	SUS304 (88)
36	GLAND BOLT	2	STAINLESS STEEL	SUS304 (88)
39	SET SCREW	1	CARBON STEEL	
41	GLAND BOLT PIN	2	STAINLESS STEEL	SUS403
42	YOKE SLEEVE	1	DUCTILE WI-RESIST	
43	WHEEL WASHER	1	STAINLESS STEEL	SUS403
46	GLAND FLANGE	1	STAINLESS STEEL	SCS13A
61	YOKE	1	DUCTILE IRON	FCD-5
62	YOKE NUT	8	STAINLESS STEEL	SUS304 (8)
63	YOKE BOLT	4	STAINLESS STEEL	SUS304 (88)
122	GREASE NIPPLE	1	CARBON STEEL	S20C
IS-1 SET				
10K CAST STAINLESS STEEL GATE VALVES				
BOLTED BONNET, OUTSIDE SCREW & YOKE, FLANGED ENDS.				
TEST PRESSURE	HYDROSTATIC	2.10 MPa	SHELL	1.54 MPa
	AIR	MPa	SEAT	0.59 MPa
THICKNESS	FACE TO FACE OR END TO END	ASME B16.10 CLASS 150		
	END CONNECTION	JIS B2220 10K		
	WALL THICKNESS	ASME B16.34 CLASS 150		
FIGURE		10UMAT		
DATE APPD	MAR. 15 '04	DRAWING NO	961-A20037	
APPD BY	S. MAITO	REV-02	MARK DATE BY	
CHKD BY	I. YAMADA	KITZ CORPORATION		
DSGND BY	H. KISHIMOTO			
DRAYD BY	H. HORIGOME			

FINAL



NOTE
1. QUANTITY : 1 SET / UNIT

Purchaser review and comments shall not be assumed to indicate other responsibility or liability for accuracy and completeness of this document or to alter any contractual terms and conditions.

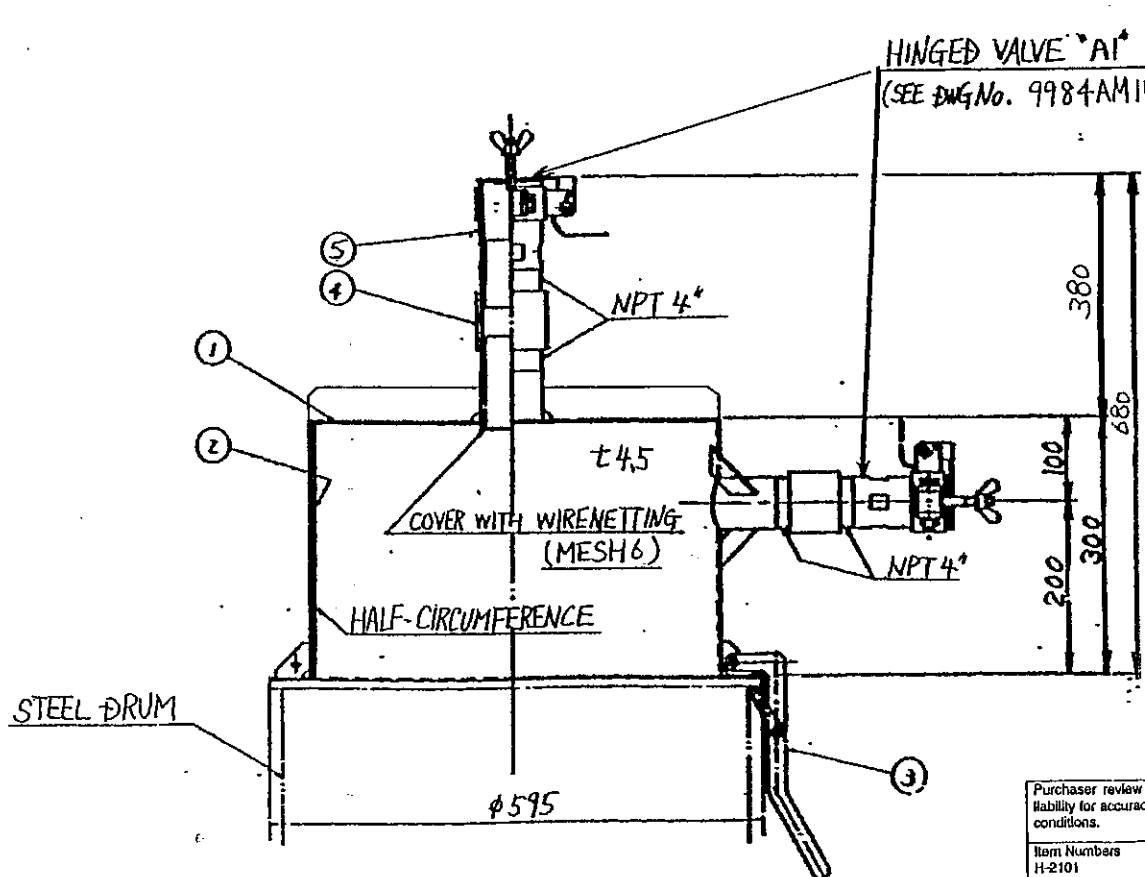
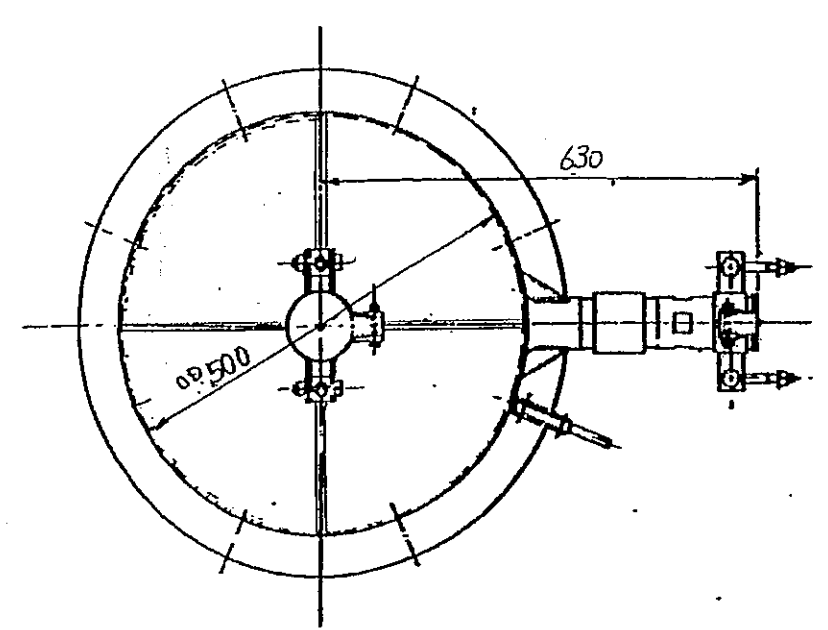
Item Numbers H-2101

Purchasers Disposition
 No Comments Comments as Noted Rejected Not reviewed

Date: 20. October 2004 Company: KITZ Initial: [Signature]

SDNL Code: A10 REQ. No.: 5777-2101-8626-01 Purchase Order No.: 04AA4H70

PART No.	NAME OF PART	No.FOR 1 SET	MATERIALS	REMARKS
FOR		NAME OF JOB		
DATE	TITLE			
2004.09.01	SLUICE VALVE			
FILE No.				
DRAWN	DESIGNED	CHECKED	APPROVED	SCALE
T.F.	T.F.	M.K.	H.O.	NON
OUR JOB No.				N-89984
SANKO AIR PLANT LTD.			9984AM08001	



HINGED VALVE "A1" "B1"
(SEE DWG No. 9984AM11001)

Purchaser review and comments shall not be assumed to indicate either responsibility or liability for accuracy and completeness of this document or to alter any contractual terms and conditions.

Item Numbers
H-2101

Purchaser Disposition
 No Comments
 Comments as Noted
 Rejected
 Not reviewed

Date: 28 October 04 Company: KHI Initial: [Signature]

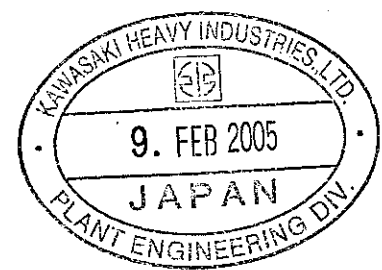
SDRL Code	REQ. No.	Purchase Order No.
A10	5777-21D1-B626-01	04AA4H70

REV. No.	DATE	DESCRIPTION	CHCD	APPD.
△				
△				
△				
△				

NOTES

- QUANTITY : 1 SET
- PAINTING : PRIMARY COAT 2 TIMES ANTICORROSIONIVE
FINISH COAT RAL7035
- INSIDE PAINTING:
1) SURFACE TREATMENT
TAKE OFF THE RUST, SLAG AND SPATTER BY POWER TOOL
2) PRIMARY COAT 2 TIMES ANTICORROSIONIVE

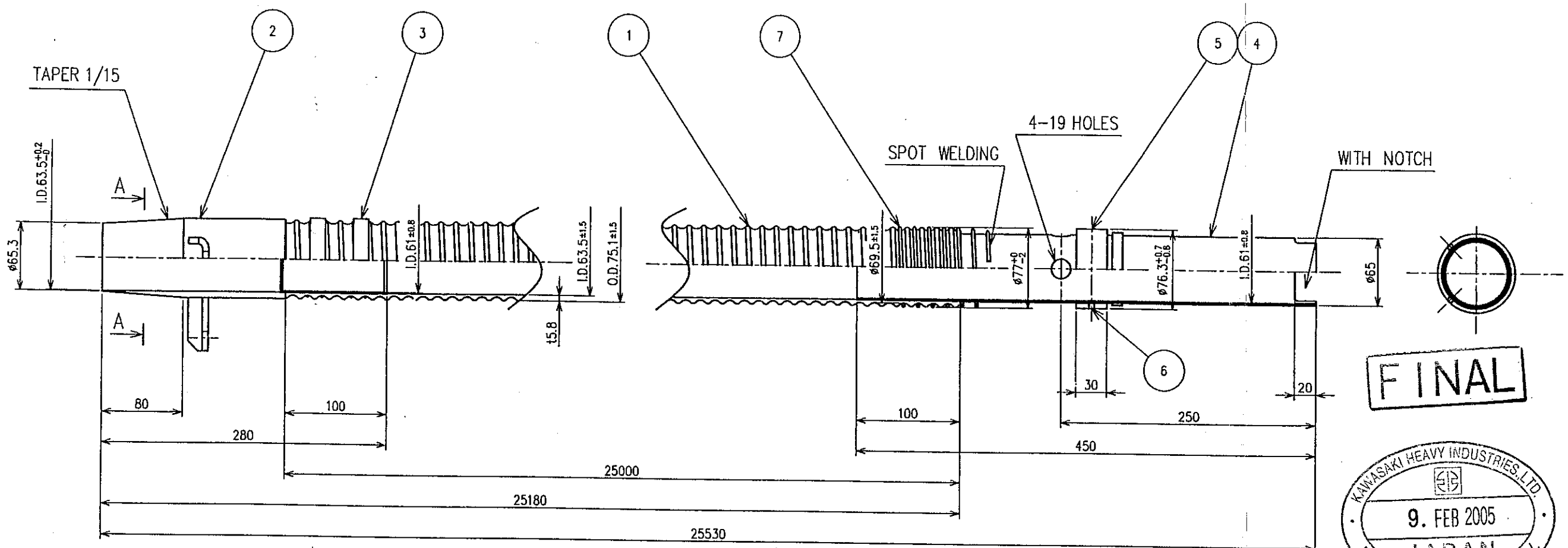
FINAL



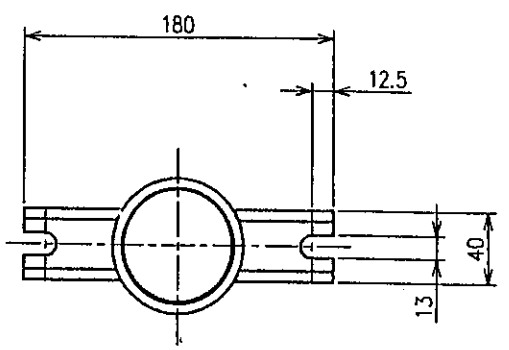
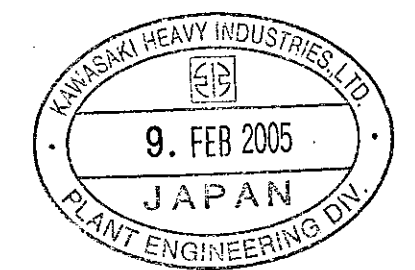
PART No.	NAME OF PART	No. FOR 1 SET	MATERIALS	REMARKS
5	HINGED VALVE "A1"	2	SS 400 STPg 370	4B
4	SOCKET	2	SS 400	4B
3	CLAMPING HANDLE	8	SS400	
2	LINING	1	RUBBER	15
1	CASE	1	SS400	

FLR		NAME OF JOB	
TITLE TOP HAT - TYPE			OUR JOB No. N-89984
PRIMARY SEPARATOR			PRES No.
DRAWN	DESIGNED	CHECKED	APPROVED
MT	MK	Jimura	[Signature]
SCALE 1/5		DATE 04.8.6	
SANKO AIR PLANT, LTD.		9984AM109001	

REV. No.	DATE	DESCRIPTION	CHCD	APPD.
△				
△				
△				
△				



FINAL



SECTION A~A

- NOTE**
- 1. QUANTITY : 2 SETS
 - 2. PAINTING : PRIMARY COAT
2 TIMES ANTICORROSIVE
FINISH COAT
RAL7035
 - 3. WEIGHT : 38Kg

Purchaser review and comments shall not be assumed to indicate either responsibility or liability for accuracy and completeness of this document or to alter any contractual terms and conditions.

Item Numbers
H-2101

Purchasers Disposition
 No Comments
 Comments as Noted
 Rejected
 Not reviewed

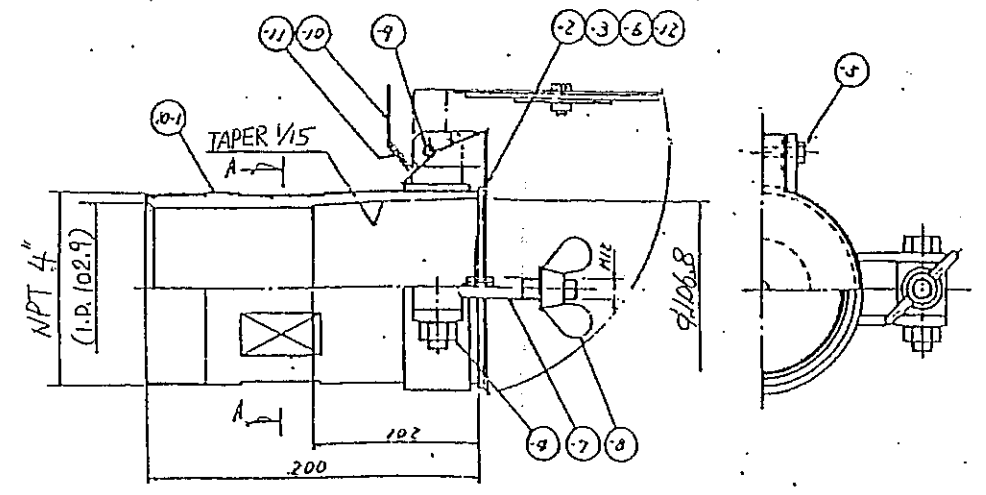
Date: 28 October 04 Company: KHI Initial: [Signature]

SDRL Code	REQ. No.	Purchase Order No.
A10	5777-21D1-B628-01	04AA4H70

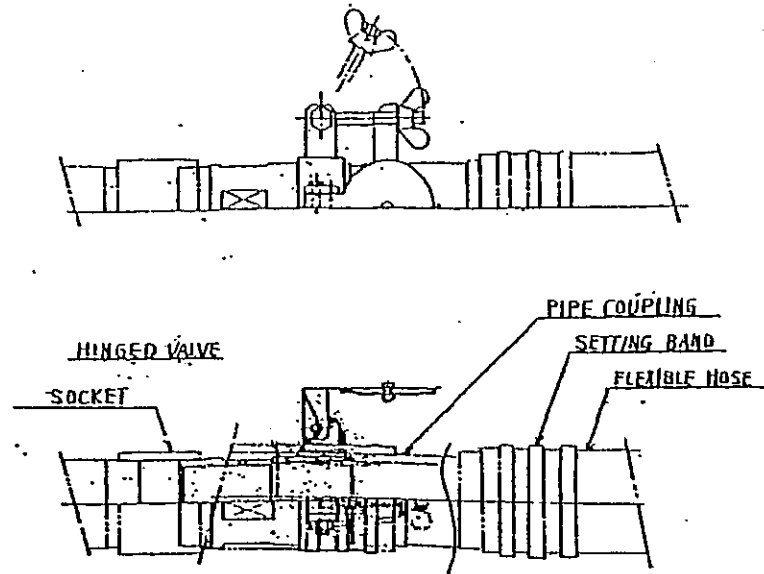
7	SPRING	1	SUS304	φ3	
6	HEXAGON SOCKET SET SCREW	2	SS400	M6x5L	
5	PRESSURE REGULATOR	1	SUS304		
4	NOZZLE	1	SUS304		
3	SETTING BAND	2	SS400(Zn)		
2	PIPE COUPLING	1	SS400 STPG370	21/2B Sch.80	
1	FLEXIBLE HOSE	1		21/2B	
PART No.	NAME OF PART	No.FOR 1 SET	MATERIALS	REMARKS	
FOR			NAME OF JOB		
DATE		TITLE			
2004.8.6		ASSEMBLY OF			
FILE No.		PICK-UP HOSE(2 1/2B)			
DRAWN	DESIGNED	CHECKED	APPROVED	SCALE	OUR JOB No.
T.F	T.F	M.K	H.O	1/3	N-89984
SANKO AIR PLANT LTD.				9984AM10001	△

NOTES
 1. QUANTITY : HINGED VALVE "A1" : 4 SETS
 HINGED VALVE "B1" : 4 SETS
 2. PAINTING : PRIMARY COAT
 2 TIMES ANTICORROSIVE
 FINISH COAT : RAL 7035
 3. WEIGHT : HINGED VALVE "A" : 5 KG
 HINGED VALVE "B" : 4 KG

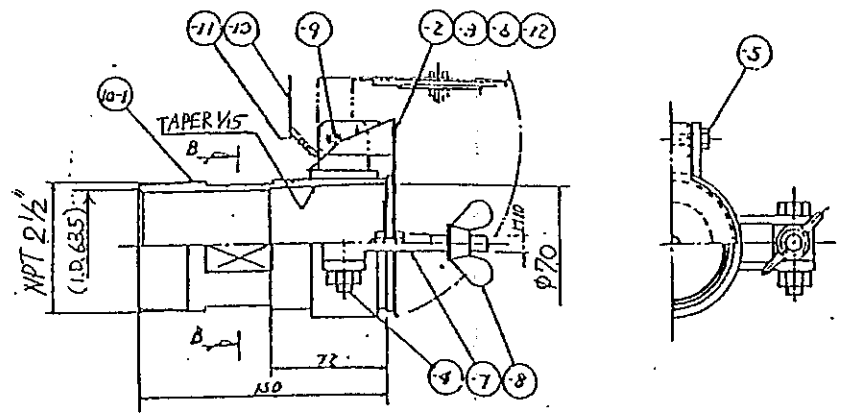
REV. No.	DATE	DESCRIPTION	CHGD	APPD.
△				
△				
△				
△				



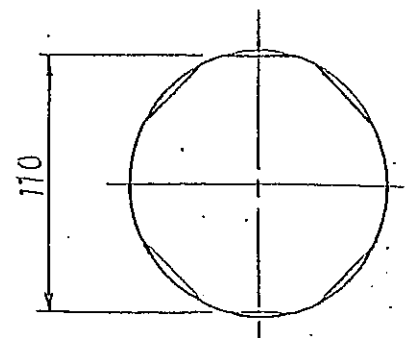
HINGED VALVE "A1"



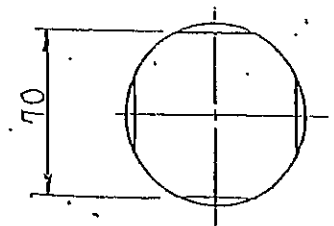
HOSE FITTING



HINGED VALVE "B1"



SECTION A~A



SECTION B~B

FINAL

Purchaser review and comments shall not be assumed to indicate either responsibility or liability for accuracy and completeness of this document or to alter any contractual terms and conditions.

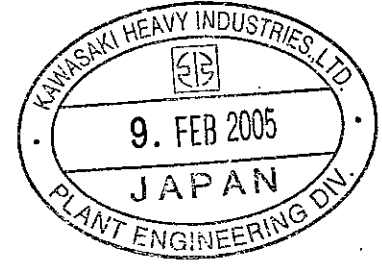
Item Numbers
H-2101

Purchaser's Disposition
 No Comments Comments as Noted Rejected Not reviewed

Date: 20 October 04 Company: KHI Initial: Adde

SDRIL Code: A10 REQ. No.: 5777-2101-8626-01 Purchase Order No.: 04AA4H70

PART No.	NAME OF PART	No. FOR 1 SET	MATERIALS	REMARKS
HINGED VALVE "B1"				
-12	SET PLATE	1	SS 400	
-11	RING CHAIN	1	SS 400	
-10	STOPPER PIN	1	SWRM4	RB 3
-9	SPRING	1	SUS 304	Y2
-8	WING NUT (P.W)	2	SS 400 (Zn)	M10
-7	HINGED BOLT	2		M10
-6	BOLT & NUT	1		M6 x 15f
-5	BOLT & NUT (S.W)	1		M6 x 45f
-4	BOLT & NUT (S.W)	2	SS 400 (Zn)	M10 x 50f
-3	PACKING	1	CR (BLACK)	43 x 100 x 10
-2	HINGE	1	SS 400	
20-1	BODY	1	SS 400 STP9-370	270 sch 80
HINGED VALVE "A1"				
-12	SET PLATE	1	SS 400	
-11	RING CHAIN	1	SS 400	
-10	STOPPER PIN	1	SWRM4	RB 3
-9	SPRING	1	SUS 304	Y2
-8	WING NUT (P.W)	2	SS 400 (Zn)	M12
-7	HINGED BOLT	2		M12
-6	BOLT & NUT	1		M6 x 15f
-5	BOLT & NUT	1		M6 x 50f
-4	BOLT & NUT	2	SS 400 (Zn)	M12 x 60f
-3	PACKING	1	CR (BLACK)	43 x 120 x 10
-2	HINGE	1	SS 400	
10-1	BODY	1	SS 400 STP9-370	4" sch 80
FOR: _____ NAME OF JOB: _____				
TITLE: <u>HINGED VALVE "A1", "B1"</u>				OUR JOB No.: <u>N-89984</u>
				PREP No.:
DRAWN: <u>MT</u>	DESIGNED: <u>M.K. Jimura</u>	CHECKED: _____	APPROVED: _____	SCALE: <u>1/2 1/3</u>
				DATE: <u>04.8.6</u>
SANKO AIR PLANT, LTD.				9984AM11001



REV. No.	DATE	DESCRIPTION	CHKD	APPD.
△				
△				
△				
△				

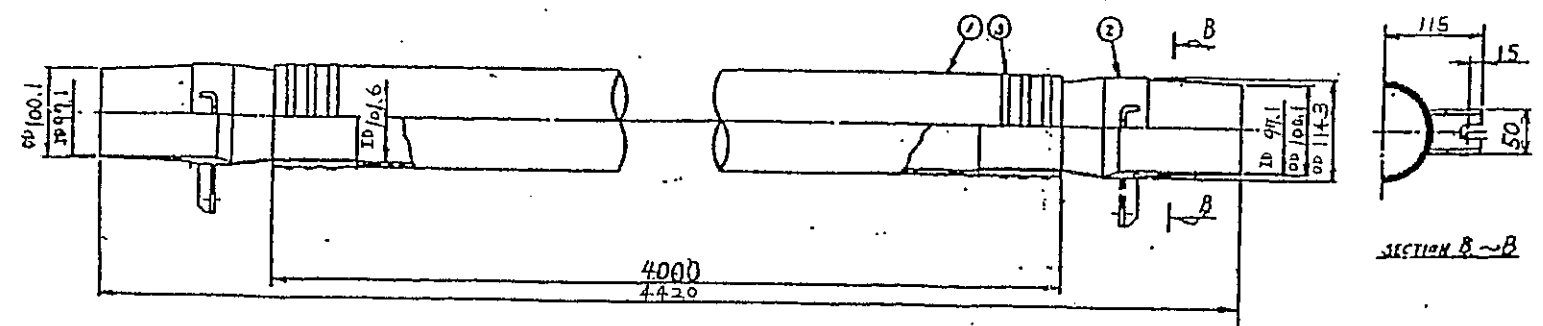
NOTES

1 QUANTITY
 CONNECTING HOSE "A" : 1 SET
 CONNECTING HOSE "B" : 1 SET

2. PAINTING : PRIMARY COAT 2 TIMES ANTICORROSIONE
 FINISH COAT RAL 7035

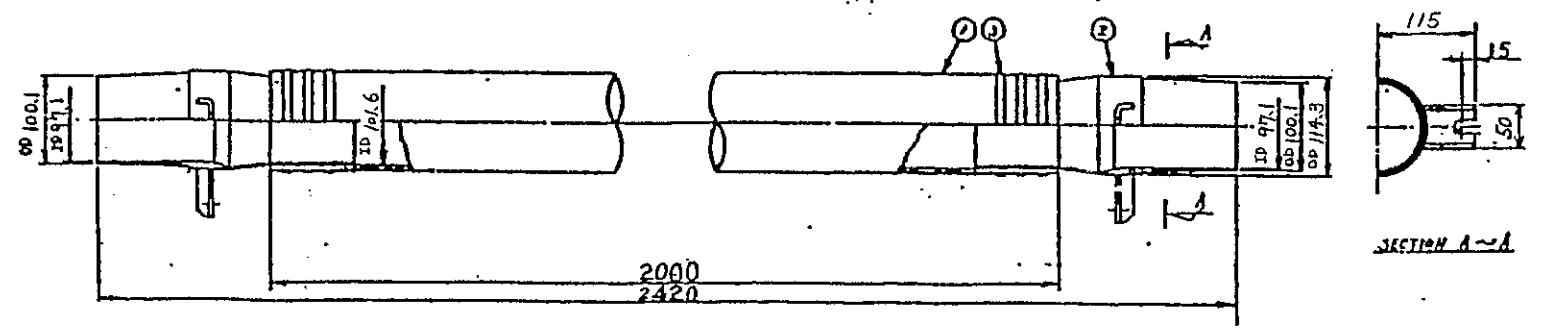
3 WEIGHT
 CONNECTING HOSE "A" : 17kg
 CONNECTING HOSE "B" : 20kg

CONNECT TO HINGED VALVE "A"



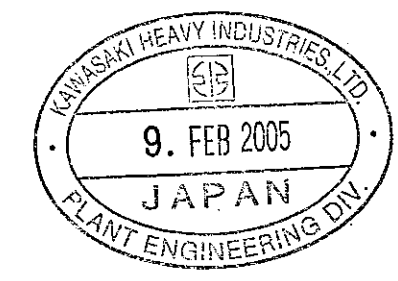
CONNECTING HOSE "B"

CONNECT TO HINGED VALVE "A"



CONNECTING HOSE "A"

FINAL



CONNECTING HOSE "B"		CONNECTING HOSE "A"	
PART No.	NAME OF PART	QTY FOR 1 SET	MATERIALS
3	SETTING BAND	6	SUS 304
2	PIPE COUPLING	2	SS 400 STP 370
1	FLEXIBLE HOSE	1	NATURAL RUBBER
3	SETTING BAND	6	SUS 304
2	PIPE COUPLING	2	SS 400 STP 370
1	FLEXIBLE HOSE	1	NATURAL RUBBER

Purchaser review and comments shall not be assumed to indicate either responsibility or liability for accuracy and completeness of this document or to alter any contractual terms and conditions.

Item Numbers
H-2101

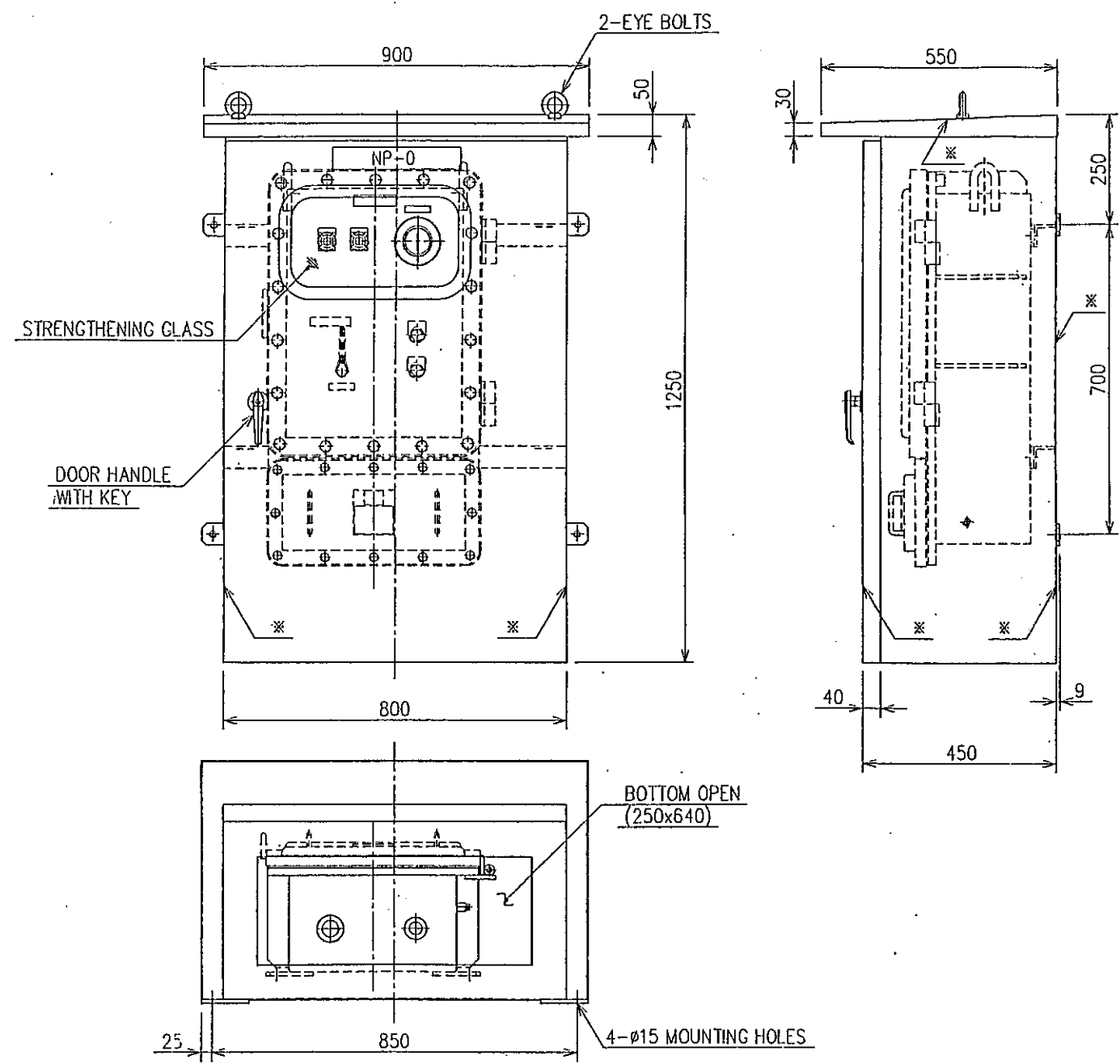
Purchaser's Disposition
 No Comments Comments as Noted Rejected Not reviewed

Date: 26 October 2004 Company: KHI Initial: [Signature]

SDRL Code	REQ. No.	Purchase Order No.
A10	5777-21D1-B628-01	04AA4H70

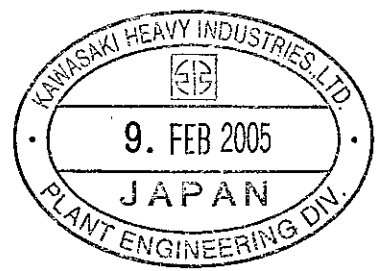
FOR	NAME OF JOB
TITLE	OUR JOB No. N-89984
ASSEMBLY OF CONNECTING HOSE "A" "B"	
PREP No.	
DATE	04.8.6
DRAWN: MIT DESIGNED: MK CHECKED: [Signature] APPROVED: N SCALE: N	
SANKO AIR PLANT, LTD. 9/9/84 AM 2:00:1	

REV. No.	DATE	DESCRIPTION	CHCD	APPD.
1	2004 10.22	REVISION		<i>T. Fujimori H. Okamoto</i>
△				
△				



NP-0 : ACRYL (4x50x300)
 LETTER : VACUUM EQUIPMENT
 CONSTRUCTION : WEATHER PROOF IP54
 MATERIAL : SS-400 (2.3)
 *(ADIABATIC MATERIAL t25mm ADHESIVE)
 COLOR
 OUT SIDE : ~~RAL7035(LIGHT GRAY)~~ RAL6021 (Pale Green)
 IN SIDE : ~~RAL7035(LIGHT GRAY)~~ RAL6021 (Pale Green)
 WEIGHT : APPROX 270kg
 QUANTITY : 1SET

FINAL



Purchaser review and comments shall not be assumed to indicate either responsibility or liability for accuracy and completeness of this document or to alter any contractual terms and conditions.

Item Numbers
H-2101

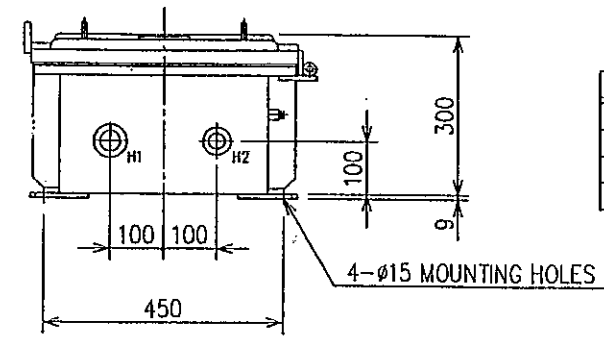
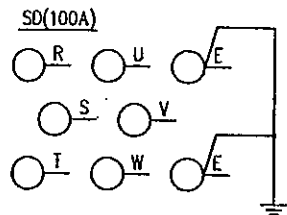
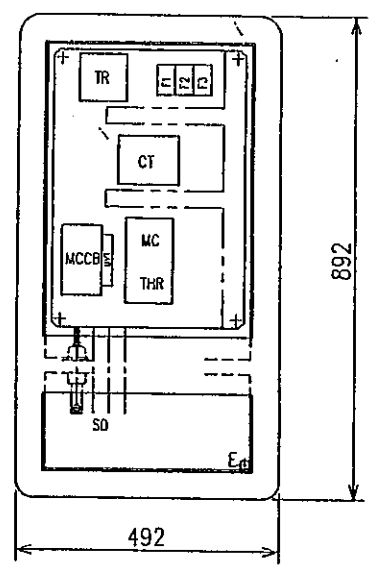
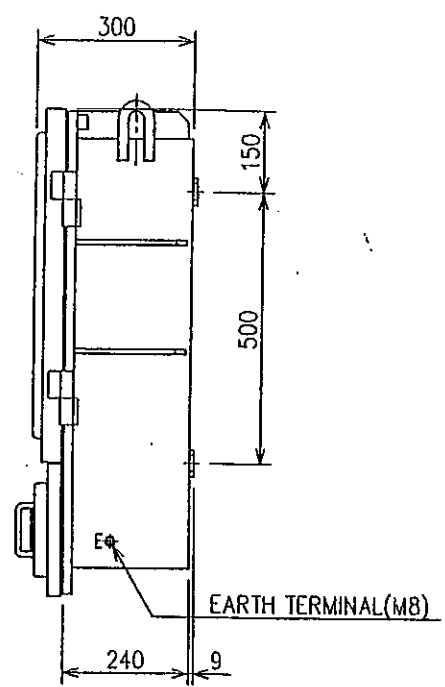
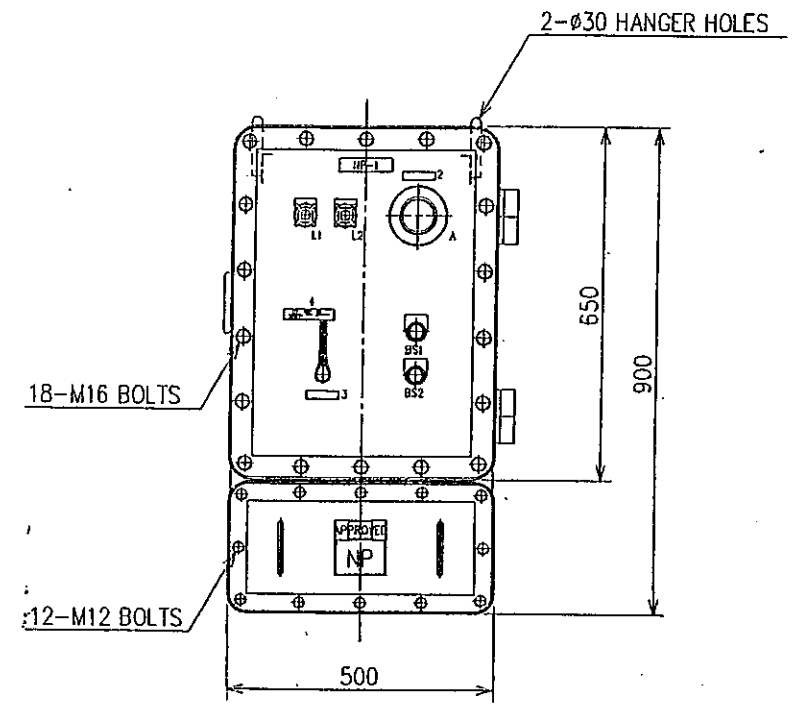
Purchaser's Disposition
 No Comments Comments as Noted Rejected Not reviewed

Date: *26 October 04* Company: *KHI* Initial: *Hold*

SDRL Code: A10 REQ. No.: 5777-21D1-8628-01 Purchase Order No.: 04AA4H70

PART No.	NAME OF PART	No.FOR 1 SET	MATERIALS	REMARKS
FOR	NAME OF JOB			
DATE	TITLE			
2004.08.30	SWITCH BOX (WATER PROOF CASE)			
FILE No.				
DRAWN	DESIGNED	CHECKED	APPROVED	SCALE
T.F.	T.F.	M.K.	H.O.	NON
OUR JOB No.:				
N-89984				
SANKO AIR PLANT LTD.			9984AM13001	

REV. No.	DATE	DESCRIPTION	CHCD	APPD.
1	2004 10.22	REVISION		T. Fujimura H. Okamura
△				
△				

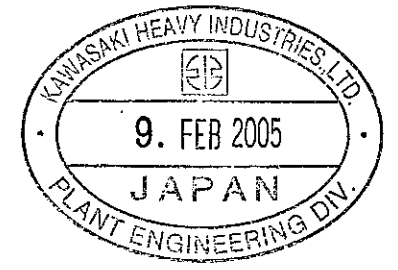


NO.	SIZE	SOCKET TYPE	CABLE	FROM
H1	PF 1 1/2"	NAWG-36-3	VSJ198-80mEg	POWER SOURCE
H2	PF 1 1/2"	NAWG-36-2	CV198g-9c	MOTOR

TYPE	G-5009-14
CERTIFICATE NO.	26712
EXPLOSION PROTECTED CONSTRUCTION	d2G4
COLOR (MUNSELL)	OUT SIDE: RAL7035 (LIGHT GRAY) INSIDE: RAL7035 (LIGHT GRAY)
WEIGHT	APPROX. 180kg
QUANTITY	1

△
RAL 6021
(Pale Green)
↓

FINAL



Purchaser review and comments shall not be assumed to indicate either responsibility or liability for accuracy and completeness of this document or to alter any contractual terms and conditions.

Item Numbers
H-2101

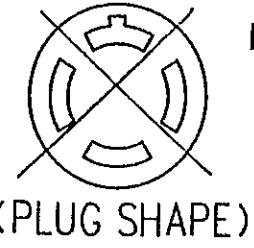
Purchaser's Disposition
 No Comments
 Comments as Noted
 Rejected
 Not reviewed

Date: 20 October 04 Company: KHV Initial: [Signature]

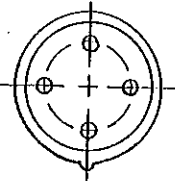
SORL Code: A10 REQ. No.: 6777-21D1-8626-01 Purchase Order No.: 04AA4H70

PART No.	NAME OF PART	No.FOR 1 SET	MATERIALS	REMARKS
FOR	NAME OF JOB			
DATE	TITLE			
2004.08.30	SWITCH BOX (CONTROL PANEL)			
FILE No.				
DRAWN	DESIGNED	CHECKED	APPROVED	SCALE
T.F.	T.F.	M.K.	H.O.	NON
OUR JOB No. N-89984				
SANKO AIR PLANT LTD.			9984AM13002	

POWER CABLE 10m
ATTACHMENT PLUG
(LOCKING TYPE)



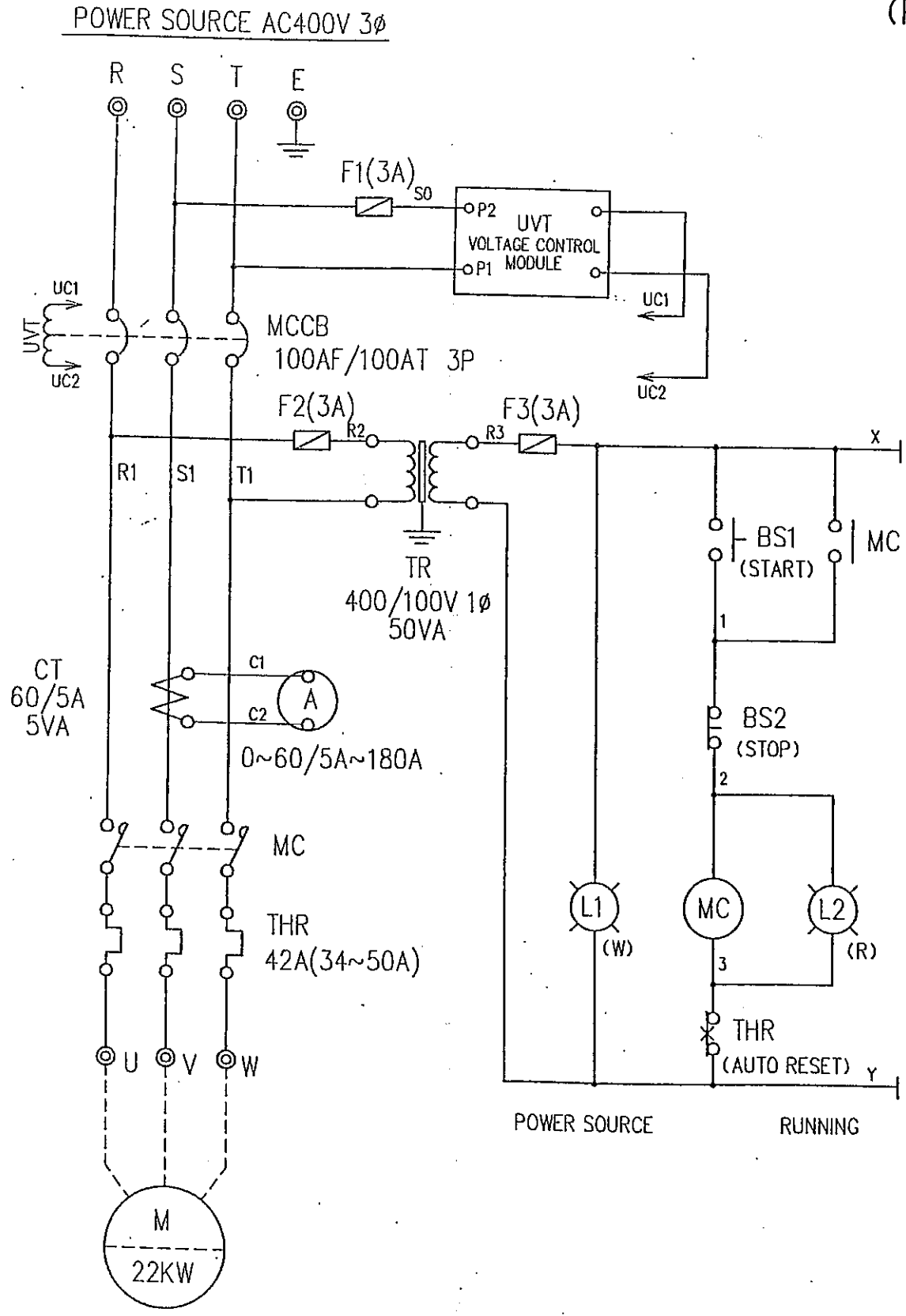
MODEL NUMBER : 41062RW
8579/12-406



(PLUG SHAPE)

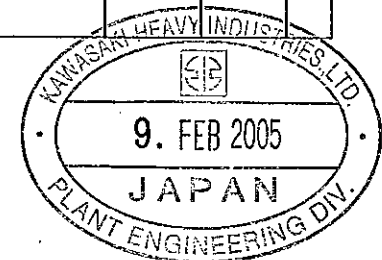
REV. No.	DATE	DESCRIPTION	CHCD	APPD.
1	2004/10.25	REVISION		T. Fujimori H. Okamura

FINAL



NAME PLATE LIST 銘板リスト				
NP NO. 番号	LETTER 記入文字	DESCRIPTION 仕様	REMARKS 備考	QTY 数量
NP-1	VACUUM EQUIPMENT	ACRYL 13x25x100		1
2	AMMETER	12x15x60		1
3	POWER SOURCE			1
4	OFF TRIP ON RESET	13x20x100		1
L1	POWER SOURCE	12		1
L2	RUNNING			1
BS1	START			1
BS2	STOP			1

PARTS LIST 部品リスト					
MARK 記号	PARTS NAME 名称	DESCRIPTION 仕様	TYPE 型式	MAKER メーカー	QTY 数量
L1	PILOT LAMP	AC100/18V 2W WHITE	PLG-W1	NAKAMURA	1
L2		AC100/18V 2W RED	PLG-R1		1
BS1	PUSH BUTTON SWITCH	1a 1b CONTACT GREEN	PBG-G1		1
BS2		1a 1b CONTACT RED	PBG-R1		1
A	AMMETER	3TIMES OVER SCALE 80m/m 0-60/5A	YS-BNAA	MIYUBISHI	1
CT	CURRENT TRANSFORMER	600V CLASS 60/5A 5VA	CW-SL		1
MCCB	CIRCUIT BREAKER	UVT-SLT(AC400V COIL) AC100AF/100AT 3P	NF100-SW		1
MC,THR	MAGNETIC SWITCH	3 ELEMENT AUTO RESET AC100V COIL THR: 42A(34~50A)	MSD-NS0KP		1
TR	TRANSFORMER	AC400/100V 1φ 50VA	DVSC	KASUGA	1
F1,2,3	PLUG FUSE	600V CLASS 30AF/3A	AFc-3	FUJI	3
S0	LEADING STUD	600V CLASS 100A	NSD-100	NAKAMURA	1SET



Purchaser review and comments shall not be assumed to indicate either responsibility or liability for accuracy and completeness of this document or to alter any contractual terms and conditions.

Item Numbers
H-2101

Purchasers Disposition
 No Comments
 Comments as Noted
 Rejected
 Not reviewed

Date: 2004.08.30 Company: KHJ Initial: [Signature]

SDRL Code: A10 REQ. No.: 5777-2101-8628-01 Purchase Order No.: D4AA4H70

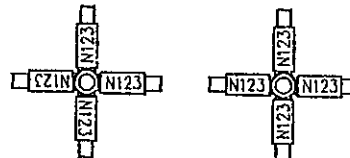
PART No.	NAME OF PART	No. FOR 1 SET	MATERIALS	REMARKS
FOR	NAME OF JOB			
DATE	2004.08.30	TITLE	PARTS LIST OF SWITCH BOX (CONTROL PANEL)	
DRAWN	T.F.	DESIGNED	T.F.	M.K.
CHECKED	M.K.	APPROVED	H.O.	NON
SCALE	NON	OUR JOB No.	N-89984	
SANKO AIR PLANT LTD.			9984AM13003	

I. GENERAL

This document covers the installation procedure of refractory lining, which will be applied at field, for H-2101 PRIMARY REFORMER and AUXILIARY BOILER for 1200 MTPD AMMONIA & UREA COMPLEX PROJECT in KERMANSHAH, IRAN.

II. REFERENCE DRAWINGS

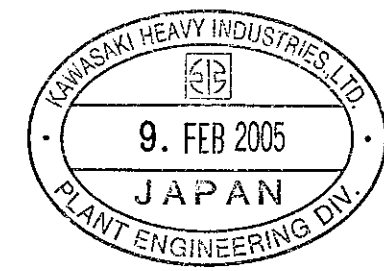
VENDOR DOC. NO.	TITLE
PRIMARY REFORMER	
J-04063-1A	RAD. SECTION LINING SCHEDULE
J-04063-1B	CONV. SECTION, TRANSFER DUCTING & STACK LINING SCHEDULE
J-04063-2A	LINING ASSEMBLY (1/3)
J-04063-2B	LINING ASSEMBLY (2/3)
J-04063-2C	LINING ASSEMBLY (3/3)
J-04063-3	LINING MATERIAL LIST
J-04063-4A	RAD. ARCH LINING DETAILS (1/2)
J-04063-4B	RAD. ARCH LINING DETAILS (2/2)
J-04063-5A	RAD. WALL No.1 & No.3 LINING DETAILS (1/3)
J-04063-5B	RAD. WALL No.1 & No.3 LINING DETAILS (2/3)
J-04063-5C	RAD. WALL No.1 & No.3 LINING DETAILS (3/3)
J-04063-6A	RAD. WALL No.2 LINING DETAILS (1/2)
J-04063-6B	RAD. WALL No.2 LINING DETAILS (2/2)
J-04063-7	RAD. WALL No.4 LINING DETAILS
J-04063-8A	RAD. FLOOR & TUNNEL WALL LINING DETAILS (1/4)
J-04063-8B	RAD. FLOOR & TUNNEL WALL LINING DETAILS (2/4)
J-04063-8C	RAD. FLOOR & TUNNEL WALL LINING DETAILS (3/4)
J-04063-8D	RAD. FLOOR & TUNNEL WALL LINING DETAILS (4/4)
J-04063-9	CATALYST TUBE, RISER TUBE AND PIGTAIL INSULATION DETAILS
J-04063-10	RAD. OUTLET MANIFOLD INSULATION DETAILS
J-04063-11	RAD. TO CONV. TRANSITION DUCT ROOF LINING DETAILS
J-04063-12	RAD. TO CONV. TRANSITION DUCT FLOOR & WALL LINING DETAILS
J-04063-13A	CONV. FLOOR, WALL & ROOF LINING DETAILS (1/12)
J-04063-13B	CONV. FLOOR, WALL & ROOF LINING DETAILS (2/12)
J-04063-13C	CONV. FLOOR, WALL & ROOF LINING DETAILS (3/12)
J-04063-13D	CONV. FLOOR, WALL & ROOF LINING DETAILS (4/12)
J-04063-13E	CONV. FLOOR, WALL & ROOF LINING DETAILS (5/12)
J-04063-13F	CONV. FLOOR, WALL & ROOF LINING DETAILS (6/12)
J-04063-13G	CONV. FLOOR, WALL & ROOF LINING DETAILS (7/12)
J-04063-13H	CONV. FLOOR, WALL & ROOF LINING DETAILS (8/12)
J-04063-13I	CONV. FLOOR, WALL & ROOF LINING DETAILS (9/12)
J-04063-13J	CONV. FLOOR, WALL & ROOF LINING DETAILS (10/12)
J-04063-13K	CONV. FLOOR, WALL & ROOF LINING DETAILS (11/12)
J-04063-13L	CONV. FLOOR, WALL & ROOF LINING DETAILS (12/12)

REVISION	MANUFACTURE SPECIFICATIONS OF LOCAL PANEL		O/# 430109G	
Specific Item	Designations		Special specifications	
1. Construction	Installation	<input type="checkbox"/> Indoor type <input type="checkbox"/> Outdoor type <input checked="" type="checkbox"/> With a water proof case		
	Type	<input checked="" type="checkbox"/> Wall mount <input type="checkbox"/> Self standing		
2. Power source	Power circuit	<input checked="" type="checkbox"/> AC400V 50Hz <input type="checkbox"/> DC V		
	Control circuit	<input checked="" type="checkbox"/> AC100V 50Hz <input type="checkbox"/> DC V		
3. Painting	Process	<input checked="" type="checkbox"/> Maker standard		
	Gloss	<input checked="" type="checkbox"/> Gloss		
	Explosion case	Outside	<input type="checkbox"/> 7.5BG 6/1.5 <input checked="" type="checkbox"/> RAL7035(LIGHT GRAY)	
		Inside	<input type="checkbox"/> 7.5BG 6/1.5 <input checked="" type="checkbox"/> RAL7035(LIGHT GRAY)	
	Housing	Outside	<input type="checkbox"/> 7.5BG 6/1.5 <input checked="" type="checkbox"/> RAL7035(LIGHT GRAY)	
		Inside	<input type="checkbox"/> 7.5BG 6/1.5 <input checked="" type="checkbox"/> RAL7035(LIGHT GRAY)	
4. Color of wire	Power circuit	<input checked="" type="checkbox"/> Yellow		
	Control circuit	<input checked="" type="checkbox"/> AC circuit Yellow		
		<input type="checkbox"/> DC circuit Yellow		
		<input checked="" type="checkbox"/> CT secondary circuit Yellow		
		<input checked="" type="checkbox"/> Ground Green		
5. Wiring materials	Power circuit	<input checked="" type="checkbox"/> 1V14sq		
	Control circuit	<input checked="" type="checkbox"/> H1V1.25sq		
6. Name plate	Material	<input checked="" type="checkbox"/> Acryl		
	Base color	<input checked="" type="checkbox"/> White		
	Frame	<input checked="" type="checkbox"/> Non-framed		
	Letter	<input checked="" type="checkbox"/> Rounded-off Gothic Black		
	Mounting	<input checked="" type="checkbox"/> Setscrew(M3) <input checked="" type="checkbox"/> Ring fixed		
7. Wire mark	Power circuit	<input checked="" type="checkbox"/> No		
	Control circuit	<input checked="" type="checkbox"/> Yes		
	Indication	 Inside Panel Terminal Board		
8. Identification of phase	Indication	<input checked="" type="checkbox"/> Vinyl cap		
	Power circuit	<input checked="" type="checkbox"/> Yes 1st phase: Red 2nd phase: White 3rd phase: Blue		
	Control circuit	<input checked="" type="checkbox"/> No		
9. Crimp-style terminal	Type	Inside panel <input checked="" type="checkbox"/> Fork type only when <input type="checkbox"/> type clamp is provided, otherwise round type		
		Terminal board <input checked="" type="checkbox"/> Round type with insulating sleeve		
10. Terminal block	Acryl cover	<input checked="" type="checkbox"/> Uncovered		
11. Surface bolts	Materials	<input checked="" type="checkbox"/> SS-400		
12. Remarks		<input checked="" type="checkbox"/> Tropical treatment <input checked="" type="checkbox"/> Water proof case (Inside adiabatic material t25mm adhesive)		

△
RAL 6010 (Pale Green)
↓

REV. No.	DATE	DESCRIPTION	CHCD	APPD.
△1	2004/0.22	REVISION		
△				
△				

FINAL



Purchaser review and comments shall not be assumed to indicate either responsibility or liability for accuracy and completeness of this document or to alter any contractual terms and conditions.

Item Numbers
H-2101

Purchasers Disposition
 No Comments Comments as Noted Rejected Not reviewed

Date: 28 October 2004 Company: KHJ Initial: [Signature]

SDRL Code: A10 REQ. No.: 5777-2101-8628-01 Purchase Order No.: 04AA4H70

PART No.	NAME OF PART	No.FOR 1 SET	MATERIALS	REMARKS
FOR			NAME OF JOB	
DATE	TITLE			
2004.08.30	LOCAL PANEL OF SWITCH BOX (CONTROL PANEL)			
FILE No.				
DRAWN	DESIGNED	CHECKED	APPROVED	SCALE
T.F.	T.F.	M.K.	H.O.	NON
SANKO AIR PLANT LTD.				OUR JOB No. N-89984
				9984AM13004

TITLE

INSTRUCTION MANUAL

CUSTOMER : Kawasaki Heavy Industries, LTD.
 : Namvaran Consulting Engineers
 : M.W. Kellogg Limited
 CLIENT : KPIC
 PLANT : 1200 MTPD Ammonia Plant / Kermanshah, Iran



Purchaser review and comments shall not be assumed to indicate either responsibility or liability for accuracy and completeness of this document or to alter any contractual terms and conditions.

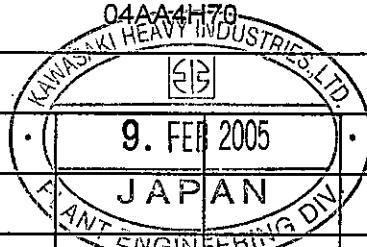
Item Numbers
H-2101

Purchasers Disposition

No Comments Comments as Noted Rejected Not reviewed

Date	Company	Initial
<u>07, December '04</u>	<u>KHI</u>	<u>[Signature]</u>

SDRL Code	REQ. No.	Purchase Order No.
E10	5777-21D1-B626-01	04AA4H70



REPRO	COPY	No.	DATE	DESCRIPTION	DRAWN	CH'D	APP'D
	8	1	2004. 12. 2	REVISION	T. FUJINAGA	M. KAWATA	H. OKAMURA
	11	0	2004. 11. 19	ORIGINAL	T. FUJINAGA	M. KAWATA	H. OKAMURA
	6	CUSTOMER (KHI)		SSK No. 4 2 2 6 0 1 4			
		CUSTOMER (NCE)					
				SAP No. N-89984			
	1	SSK		DOCUMENT No. N-89984-M01			
	1	SAP					

SANKO AIR PLANT LTD.

QUALITY CONTENTS

	Page
1. VACUUM EQUIPMENT FOR CATALYST REMOVAL	
(1) OUTLINE OF EQUIPMENT	1
(2) OPERATION PROCEDURE	1
(3) CHECKING DURING OPERATION	2
(4) CLOGGING	2
(5) AIR RATE ADJUSTMENT	3
(6) TRANSPORT ADJUSTMENT	3
(7) SAFETY DEVICE	3
2. ANLET ROOTS BLOWER BH TYPE USER' S MANUAL	4~18
3. HOW TO KEEP GOOD CUSTODY	19~20
4. SIEMENS MOTOR INSTRUCTION	21~36 20~55

1. Outline of Equipment

- (1) The primary reformer vacuum cleaner is used to take out catalyst from reforming tubes, in the reformer.

This equipment consists of the following items:

Assembly of pick-up hose (suction nozzle) to take out catalyst from the catalyst Top Hat-type primary separator to separate the taken-out catalyst and air from each other; Connecting hose "A" "B" such as transmission pipes and air pipes; Bag filter to filter the separated air; Roots blower to produce vacuum condition necessary for taking out the catalyst; Motor to drive the blower; and Control panel for starting the motor.

- (2) Assembly of equipment

Refer to drawing No. 9984AM01001

2. Operation Procedure

- (1) Before starting operation

- (a) Check to see that the equipment and the piping are as shown on the GENERAL ASSEMBLY.
(b) Check to see that all joints in the piping are completely tightened up. Note that, if bolt or nut, slip coupling or Hinged Valve is not sufficiently tightened up, air will be sucked through that portion, making transport impossible.
(c) Avoid unreasonable bending a flexible hose.

Note that, if the hose is bent at a radius less than the allowable minimum radius, the hose may be deformed permanently or clogged.

	<u>Hose dia.</u>	<u>allowable mini. bending radius</u>
Pick-up hose	2 1/2 B	195R
Connecting hose "A" "B"	4 B	950R

- (d) When starting, the suction nozzle should be kept out of the reformer tube. If it remains in contact with catalyst when starting, it may be clogged.
(e) Check to see that no bolt, nut or tool is left in the piping. Note that, if any foreign substance remains in the piping when starting, it may break the filter cloth in the bag filter and enter the blower, causing a trouble to occur.
(f) For the blower, refer to the Roots Blower Instruction Manual.

- (2) Starting

- (a) Connect the metal connector at the end of the cable attached to the control panel to the mating connector.
(b) Turn on the switch provided on the control panel. (Power supply on)
(c) Depress ON button provided on the control panel front. (Motor on)
Then, the motor will start to revolve and attain normal revolution within about five seconds.
(d) When the blower attains normal revolution, the equipment is ready to transport. Operate and insert the suction nozzle into the reformer tube and start transport.
(e) When transport is completed, depress OFF button provided on the control panel front to stop the blower transferring to the next reformer tube.

(f) Repeat (c) through (d) and start transport again. After each cycle of transport, operate the shaker ten times or so to clear the bag filter.

If the cleaning operation is neglected, the suction pressure will become abnormal, thereby safety valve be operated to make transport impossible. Note that the cleaning operation will not be effective if it is performed while the blower is in operation. It should be performed while the blower is in operation.

It should be performed after the blower is stopped. The dust should be discharged through the manhole.

(g) When the entire transport is completed, turn off the power supply.

This equipment is used infrequently, and the apparatus should be stored in a room of low humidity. Take care especially on the blower and the motor.

3. Checking During Operation

(1) Check to see that transport is smoothly done.

(a) If transport of catalyst is made too much at a time, clogging may occur.

(b) If transport of catalyst is made too little, it will waste time and be uneconomical.

(c) For the adjustment of the rate of transport, refer to 6.

(2) Check the rate of transport

For the rate of transport, refer to 5.

(3) Check the blower suction pressure.

(a) Previously measure the pressure after the blower attains normal revolution.

(b) Previously measure the pressure while the equipment is in constant transport operation. If the pressure during transport is higher than the ordinary pressure, it indicates that the cloth in the bag filter is clogged with dust.

4. Clogging

(1) Cause of clogging

(a) The secondary air suction port provided at the end of the suction nozzle is buried in the catalyst and fails to suck the secondary air necessary for transport.

(b) The flexible hose is bent or deformed severely.

(c) Catalyst transport is performed beyond the capacity.

(2) Prevention of clogging

(a) Prevent the secondary air suction port of the suction nozzle from being buried in the catalyst.

(b) Avoid unreasonably bending or deforming the flexible hose.

(c) Keep the rate of transport at a value suited for this equipment.

(3) Remedy of clogging

(a) Immediately stop the blower.

(b) Investigate the cause of clogging, then disconnect the clogged portion, and take out catalyst therefrom.

(c) Check to see that any other apparatus is abnormal as the result of clogging, then restart transport. After a clogging trouble has been experienced, take adequate action to prevent occurrence of the same trouble.

5. Air Rate Adjustment

- (1) Operate the sluice valve present in the piping between the bag filter and the roots blower.
 - (a) When the valve is opened, the rate of air sucked from the suction nozzle is reduce, that is, the air rate become low. But, at too wide opening, air is excessively sucked through the sluice valve, and no air is sucked from the suction nozzle, thereby making transport impossible.
 - (b) If the air rate from the suction nozzle is top high, the catalyst may strike the wall of the separator and break when it is separated in the separator. Moreover, the rubber transport tube may rapidly wear.
 - (c) The transport tube is of antiwear rubber.

6. Transport Adjustment

- (1) Adjust the pressure regulator mounted at the secondary air suction nozzle.

When the air suction port is throttled by means of the pressure regulator, the intake rate is reduced and catalyzer transport is increase. When the air suction port is widened, the air intake rate is increased and catalyzer transport is decreased. The pressure regulator adjustment should be made in accordance with the service condition at the site.

7. Safety Device

In the event the piping is clogged with catalyst the blower pressure will become excessive because there is no air suction elsewhere, and thereby the motor be overloaded an burnt out. As a safety means against this, a safety valve is provided. The safety valve is set to operate at a blower pressure of +250 to 400 mmAq.

At this pressure, the safety valve operates to suck air through it and prevent the motor from being overloaded. In the event the safety valve operates, promptly stop the blower. Investigate the cause before resuming the operation.

ANLET Roots Blower BH BH-C BH-AC BH-CT Type **User's Manual**

First of all, we would like to thank you for purchasing the Anlet Roots Blower BH (-C) Type. We have paid strict attention to every detail in the production of this machinery to ensure your safety. However, there always remains a possibility that an accident could occur through incorrect operation. Therefore, we stress the importance of fully reading this user's manual before proceeding with any operations.

It is of the utmost importance that this users' manual be placed in a location where it may easily be seen by the machine's operator.

 **CAUTION**

This document details essential operation, maintenance and inspection information. In order to guarantee safety, it is important that this document be fully read before using the Anlet Roots Blower. There are some tables to be filled in with face plate values etc., and this should be done when unpacking the machinery.






ANLET CO., LTD.

Contents

1. Regarding Warning Messages	1
2. Foreword	1
3. Product Specification	1
4. Mounting	2
5. Operation	4
6. Maintenance and Inspection	6
7. Breakdown Causes and Countermeasures	10
8. Configuration	11
9. Repairs and Warranties	12
10. The Warranty Service Network	13

1. Regarding Warning Messages


This user's manual uses the three message types shown below to divide possible causes of major accidents into different levels of seriousness. The contents of these messages should be fully understood in order that every possible effort may be made to prevent the occurrence of any accidents.

 DANGER	The contents of these messages deal with the occurrence of accidents posing a very real danger of the loss of life or very serious injury.
 WARNING	The contents of these messages deal with the occurrence of accidents that could possibly cause loss of life or serious injury.
 CAUTION	The contents of these messages deal with the possibility of injury or material damages.

2. Foreword

As soon as the blower is accessible, the following items should be investigated.

1. Is the machinery as ordered? Check the face plate. Pay special attention to 50Hz and 60Hz designations.
2. Was there any damage during shipment? Have any nuts or bolts become loose?
3. Can all accessory items be accounted for? (See Section 8-2, page 12 regarding standard accessory items.)
If parts are damaged or missing, please contact the Anlet representative from whom you purchased the machinery, or alternatively, please contact your nearest Anlet Sales or Branch office.

 CAUTION	Check whether the machinery is for use with 50Hz or 60Hz power supplies. In V-belt types, any variations in frequency will cause a corresponding change in rotational speed.
--	--

3. Product Specification

Refer to the face plate and to delivery documents regarding this blower's discharge pressure, suction volume, rotation speed, electric motor voltage, current and other electrical performance values.


Other specifications are shown in the table on the right.


Standard Specifications		
Gas Employed, Temperature	Clean Air	-15 to 40°C
Discharge Pressure	Atmosphere Pressure	
Highest Suction Pressure →	BH Type	-350 mmHg (54.7 kPa)
	BH-AG Type	-400 mmHg (48 kPa)
	BH-C Type	-450 mmHg (41.3 kPa)
	BH-CT Type	-450 mmHg (41.3 kPa)
Installation Location	Indoors	
Temperature of Surroundings	-15 to 40°C	

4. Mounting

1. Mounting Location

- (1) This blower is for indoor use. If it is to be used outside the building, a hut or something similar must be provided to protect it from the elements.
- (2) Try to ensure that as much space as possible is left free around the machine to allow for easy dismantling and inspection etc.
- (3) Ensure that the suction pipe is positioned so that it may freely take in fresh air.
- (4) When the blower room is small, make sure that its internal temperature stays below 40°C. Since blower motor life will be reduced at temperatures above this, it is important that a ventilating fan be provided. Set an appropriate air flow volume to keep the room temperature below this level.

 WARNING	Take great care to avoid dropping the blower if it is to be suspended, carried or moved. Bad support can lead to injuries.
--	--

 CAUTION	Do not install in any location where acids, alkalis, organic solvents, paints or any other organic or corrosive gasses may be present. These could lead to fires or cause gas poisoning during the performance of essential maintenance. The blower must not be installed in any location with a large amount of people passing through it or anywhere that children may easily enter.
--	--


2. Electrical Wiring


Before connecting pipes, make the machine perform an inching operation and check the rotation direction. (* Rotation should be counter clockwise when viewed from the pulley side). All wiring and grounding work should be carried out by a qualified electrician fully obeying all electrical equipment standards and internal wiring regulations etc.

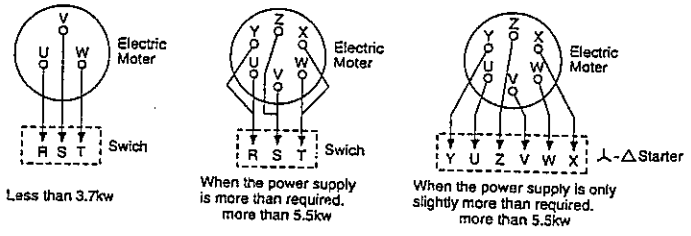
- (1) Use wiring of a material suitable for the electric motor's rating.
- (2) Earth leakage breakers and overload protection equipment must be provided in order to prevent electric motor scorching.
- (3) An earth must be provided in order to prevent electrical shocks.
- (4) Wire connections should be securely fastened.


Wiring should only be completed after using a phase sequence indicator or similar equipment to investigate phase rotation.

* Please refer to a wiring diagram. These diagrams will be marked on the inside of the terminal box and in other similar locations.

 WARNING	It is not simply a violation of electrical regulations to have a non-qualified person carry out wiring and grounding work, it is also inherently dangerous and is, therefore, highly inadvisable. Imperfect wiring can lead to earth leakage, fires and other serious consequences. Also, it is required by law that earth leakage breakers and overload protection equipment be provided in order to prevent electric shocks or fires.
--	---

 CAUTION	<p>If star-time is too long when operating in star-delta (conect 6 line), motor start-up torque will be insufficient and the machine will experience start-up difficulties. If such a problem arises, carry out a direct input start-up or adjust the star-time to a level of about five seconds.</p>
--	---



 CAUTION	<p>Grounding work should be carried out carefully and the earth wire should not be allowed to come into contact with gas pipes, water pipes, lightning rods or telephone earth wires. Faulty grounding can be the cause of electric shocks.</p>
--	---

3. Piping

- (1) Remove anti-dust seals from the blower's suction and discharge pipes before commencing any piping work.
- (2) Flexible joints and pipe supports should be provided so that the weight of the piping is not transferred directly onto the blower. Also, if pipe supports are to be employed, they should be used in conjunction with anti-vibration mats in order to prevent any pipe vibration being transmitted to the support face.
- (3) The pipes used should be made of steel. PVC pipes can be warped by heat from the discharged air and can also be a source of operation noise.
- (4) A catch valve should be provided to prevent reverse rotation from sucking foreign objects into the blower.

4. Precautions to be Taken When Using an Inverter


Please contact us when the machine is to be inverter driven as we will be able to advise on gearing ranges etc. Failure to do this could result in damage to the machinery.

5. Operation

Carry out the following inspections and checks when the blower is running.


1. Piping

- (1) Inspect piping connection areas.
- (2) Open valves fully and make sure that no pressure is being lost from them.

 CAUTION	<p>Do not operate with a closed suction / discharge side valve. If the machine is operated in this condition, there will be an instantaneous overload with the resulting possibility of major damage being caused.</p>
--	--

2. Power Supply


Check connections, voltage, frequency etc.

 CAUTION	<p>Do not operate at any voltage other than the regulation voltage. Operation at incorrect voltages can lead to fires or electric shocks.</p>
--	---

3. Manual Operation Check


Rotate the blower pulley by hand and confirm that there are no problems with any of the internal components.

If foreign objects have somehow entered the machine, the pulley will not rotate, there will be resistance to motion or there may be a sensation of grinding. In any of these cases, disconnect piping, inspect and clean the internals.

 WARNING	<p>The switch must be in the "STOP" position and the power supply must be cut when carrying out a manual operation check. Take care that fingers etc. are not caught up in the V-belt or pulley. A belt cover must be in place when operating this machinery. Failure to do so will expose a risk of objects being pulled in by rotating components, and this in turn could possibly result in injury.</p>
--	--

4. Direction of Rotation

The rotation should be counter clockwise when viewed from the pulley side. Make sure it is in the direction of the arrow.

 CAUTION	<p>It is very important to confirm the direction of rotation before any operation is attempted. If the rotation is the reverse direction to that indicated above, switch the two distribution leads. Note that the direction of rotation can change when electrical work on the control panel etc. is carried out. Carry out an inching operation to check the direction of rotation. Operation in the reverse direction can lead to foreign objects being sucked in at the discharge end, and this in turn can lead to a breakdown.</p>
--	--

5. Setting the Safety Valve


Adjust the safety valve to about 1.1 times the normal vacuum level while, at the same time, keeping it below the maximum vacuum level. (BH: 350mmHg, BH-AC: 400mmHg, BH-C and BH-CT: 450mmHg). This valve must not be used to adjust the air volume.

6. Lubrication Oil

- (1) While the blower is stopped, confirm that the oil level line on the gear cover is in the middle of the oil level gauge. An oil change should be carried out every three months. All models up to the BH200 will require full replacement every three months. Models above the BH250 will require full replacement every month.
- (2) The bearing grease employed must be a heat-resisting grease. The specified grease should be added at least once every three months.
- (3) Refer to Section 6 Maintenance and Inspection regarding gear oil and bearing grease types.

7. Start-Up Noise

It is possible that there will be a generation of noise immediately after start-up due to the viscosity of the lubrication oil. However, this should disappear after 10 to 20 seconds.


 CAUTION	<p>Pay attention to any abnormalities (in sound, pressure, current, temperature etc.) that occur during operation. If such an abnormality should occur, immediately stop the machine and investigate its cause. Failure to do so could result in serious damage bring done.</p>
--	---

8. The Silencer

- (1) A discharge silencer is necessary.
 - (2) The discharge silencer is a special accessory component.
- Choose a silencer to match the required amount of sound damping.

9. Air Volume Adjustment


Adjust air volume by using pulley size changes etc. to modify the rotation speed.

 CAUTION	<p>When the air volume is large, use an air volume regulation valve to draw fresh air or adjust the rotation speed downwards to avoid increasing the vacuum level in the blower. Do not use the suction side valve to adjust the air volume. Closing the valve will lead to a pressure increase and this could result in serious damage .</p>
--	---

10. Current Level

Increases in suction or discharge pressures will lead to an increase in the current level. Therefore, operating pressure and current level should be confirmed and both should be checked for any changes.

- (1) Causes of suction side pressure increases;
 - The suction piping is narrow or long.
 - There is an increase in resistance to suction due to a blockage in the piping or something similar.
 - The filters etc. are clogged.
- (2) Causes of discharge side pressure increases;
 - The discharge piping is narrow or long.
 - The discharge side sluice valve is contracted.
- (3) Components touching due to bad bearings or low rotor clearance, gear scorching and reverse rotation can also cause current level increases.

 CAUTION	<p>Do not touch the blower, the electric motor or the discharge piping etc. during operation. Temperatures here can be very high and burns can result.</p>
--	--


6. Maintenance and Inspection

1. Inspection Work

- (1) Check for damage of the suction silencer, the safety valve, the belt cover, the v-belt and the discharge pressure gauge.
- (2) Inspect the flexible joint alignment condition, inter-flange dimensions and the state of the piping etc.
- (3) Check blower room temperature and ventilation and inspect the state of the noise proofing etc.

2. Inspection Standards

Inspection Cycle	Inspection Cycle						Remarks
	Testing	Daily	Three Year	One Year	Two Years	Four Years	
Remove the Foreign Object in Piping	●						
Tightness of All Connection Points	●		●				Blow, popping etc.
Valve Condition	●	●					
Chuck Valve Operation	●						
Electrical Line Connection	●		●				Middle of level gauge (while stopped)
Gear Oil Level	●	●					
Oil Leakage	●	●					direction of the arrow
Rotation Direction	●						
Pressure	●	●					
Vacuum Gauge Replacement	●		●				
Current - Voltage	●	●					Bated current and voltage (noted on face - plate)
Air Volume	●	●					
Noise	●	●					
Vibration	●	●					
Temperature	●	●					Suction gus, below, moter etc.
V-Belt Tension - Condition	●		●				Initial extension, retensioning needed.
Gear - Bearing Smoothness	●	●					Loose
Bearing Grease Supply			●				
Gear Oil Change			●				All oil
V-Belt Replacement				●			Initial extension, retensioning needed.
Bearing - Oil Seal Replacement					●		
Cleaning of Case Inside					●		
Vacuum Gauge Replacement				●			
Gear Replacement						●	
Suction /Discharge Silencer Replacement						●	
AC/AFD Replacement						●	

 CAUTION	It is important to have the correct dress and safety equipment (helmet, safety shoes, gloves etc.) for inspections.
--	---

3. Inspection Methods

(1) Vacuum Safety Valve



CAUTION

The vacuum safety valve should be adjusted before attempting regular operation.

The vacuum safety valve cannot be used in the role of a pressure regulating valve. A different adjustment valve should be provided in this case.

Gradually contract the suction side sluice valve in order to carry out an operation check on the vacuum safety valve. Confirm that the safety valve draws air when the sluice valve has been contracted to the point that the set pressure has been raised by about 10%. Setting of the valve will need to be performed again if it doesn't operate or if it operates too soon.

- Adjusting Screw
 - { Turn clockwiseincrease the pressure setting.
 - { Turn counter clockwise decrease the pressure setting.
- Lock Nut
 - { Turn clockwiselock the adjusting bolt.
 - { Turn counter clockwise rotate the bolt to loosen it.

When locking with the lock nut (turn clockwise), use a spanner or something similar to hold the adjusting bolt in position while the lock nut is being tightened.

Gradually contract the suction side sluice valve and re-check the operation of the safety valve.

The 10% pressure increase i.e. when the specification pressure is -400mmHg;

$$-400\text{mmHg} \quad \times 1.1 \quad = -440\text{mmHg}$$

$$\text{Specification pressure} \times 10\% \text{ Raise} = \text{Safety valve operation pressure}$$

When setting of the safety valve has been completed, fully open the suction side sluice valve.

(2) Lubrication Oil

① Gear Oil Change

Place an oil receiving dish underneath the gear cover. Remove the drain plug from the underside and allow all the oil to flow out. The oil will flow out quicker if the top-side oil cap is removed also. Confirm that all the oil has been removed and replace the drain plug. Use a funnel when pouring in fresh oil, and fill up to a point at the middle of the level gauge. (See page 10 regarding replenishment volumes.)

- If there is too much oil → Oil leakage or oil temperature rises could occur.
- If there is too little oil → Timing gear scorching, heating or noise emission could occur.

All models up to the BH200 will require full replacement every three months. Models above the BH250 will require full replacement every month.

Inspections before the recommended replacement times should be concentrated on.

- Oil level checks
- Oil dirt checks

② Bearing Grease Supply

(a) Use a grease pump at each of the four grease nipples to top up the grease to the rated amount. (See page 10 regarding replenishment volumes.)

Note that it is better to add grease immediately after stopping the machine.

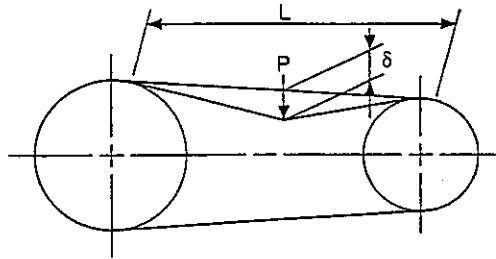
- (b) Operate for about 15 minutes after adding the grease and confirm that excess grease is being expelled from the housing drain.
- (c) Remove this expelled grease when the blower is stopped.

(3) The V-Belt

If the v-belt is over tensioned, the bearings will heat up. If, on the other hand, it is too loose, v-belt damage will occur at a much earlier time.

Tensioning Procedure

- ① Find the belt span (L).
(The length of belt not in contact with either pulley)



- ② Apply a load P (kgf) as noted below to the center of the belt span in a perpendicular direction.

Belt Type	3V	5V
Load P (kgf)	3	9

The above values are for new belts. Reduce the load by about 12% when retensioning.

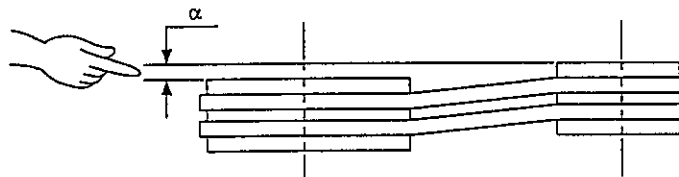
- ③ Tension the belt so that the amount of sag (δ) in the loaded belt conforms to the equation shown below. (It is convenient to use tension meter.)

$$\delta = 0.016 \times L \text{ (mm)}$$

- ④ When replacing V-belt, always replace with new parts.
- ⑤ Anti-slip wax or grease should not be applied to the v-pulley or the v-belt.

Adjustment First adjustment 16 to 24 hours after operation start-up.
 Second adjustment 48 to 72 hours after operation start-up.
 Third adjustment 1 week after operation start-up.

Levelness a : at least 1mm/m



⚠ CAUTION

Rapid start-up of the blower in automatic operation set-ups is dangerous when inspections are being carried out. Therefore, always turn the machine off at the switch and cut the power supply when blower inspections are to be performed.

(4) Internal Cooling Silencer (-C models)

Examine for blockages in the element. Clean or replace if there is a large amount of dirt. Replacements will need to be performed more frequently when the blower is installed in a location with high levels of humidity or temperature.

3. Regarding Components Which Wear

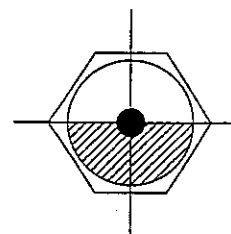
(1) Gear oil and bearing grease types.

Bearing Grease	Toshiba Silicon Grease TSK-540IL	
Gear Oil	Mild EP Gear Oil 460 (Fuji Kyosan)	Omula 460 (Showa Shell)
	Super Gear Oil 460 (Idemitsu Oil)	Bon Nock M460 (Nisseki)
	Super Gear Lube SP460 (Mitsubishi Oil)	Cosmo Gear SE460 (Cosmo)
	SP Gear Roll 460 (General)	Mobil Gear 634 (Mobil)
	Spaltan EP460 (Esso)	Ledakutas 460 (JOMO)

- Add grease once every three months.
- Models BH50 to 200 require full gear oil changes every three months. The period for models BH250 to 300 is one month.

(2) Gear Oil and Bearing Grease Supply Volume

Model	Gear Oil Volume (l)	Bearing Grease Volume (g)
BH50 • 65	0.49	15
BH80 • 100	0.85	42
BH125 • 125A (-C)	2.1	68
→ BH150 • 150A (-C)	3.3	87
BH200 • 200A (-C)	5.2	107
BH250 • 250A (-C)	5.5	248
BH300 (-C)	6.0	356



* Fill gear oil to the middle of the oil level gauge while the blower is stopped.

(3) Table of Bearings, Oil Seals, O-Rings and V-Seals

Model	Bearings (4)	Oil Seals (2)	Oil Stop Collar Oil Rings (2)	V-Seals (2)	Collar LA Oil Seal (1)
BH50	6306W₁-ZZ	S 30-50-8	G 65	AVC30	
BH65					
BH80	6309W₁-ZZ	S 45-68-9	G 95	AVC45	
BH100 (-C)					
BH125 (-C)	6311W₁-ZZ	S 55-78-9	G 115	AVC55	
BH125A (-C)					
→ BH150 (-C)	6312W ₁ -ZZ	S 60-82-9	G 135	AVC60	
BH150A (-C)					
BH200 (-C)	6313W₁-ZZ	S 65-82-10	G 145		
BH200A (-C)					
BH250 (-C)	6318W₁-ZZ	S 90-115-13	G 195 (4)		
BH250A (-C)					
BH300 (-C)	6320W₁-ZZ	S 100-125-13	G 205 (4)		
					G 65-88-6
					G 90-115-5
					S 100-125-13

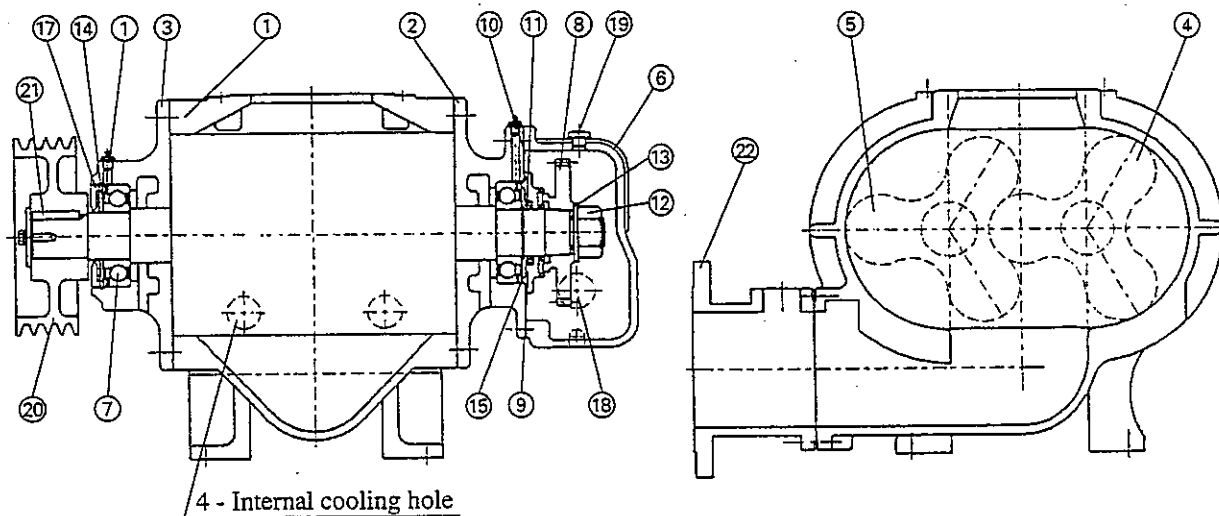
7. Breakdown Causes and Countermeasures

Abnormality	Cause	Countermeasure
Will not rotate	Faulty electric motor or bad connections.	Carry out an inspection of the electric motor and the connections.
	Rotor sticking	Rotate by hand, perform an inching operation.
	Inclusion of foreign objects	Remove the foreign object(s).
Strange noise or vibrations	V-belt is slipping	Retension or replace the v-belt.
	Insufficient gear oil	Add oil.
	Insufficient bearing grease	Add grease.
	Attachment of foreign matter	Clean the internals.
	Contact between internal components	Carry out an inspection of internal components.
	Pressure abnormality	Remove the source of the pressure abnormality.
	Safety valve operation	Investigate whether the safety valve operates at the set pressure.
	Contact between the belt cover and pulley	Remove the contacting area.
	Looseness in the fixing area	Tighten the loose component(s).
Abnormal Heat Emission	Insufficient room ventilation	Provide better ventilation to lower the temperature.
	Increase in suction pressure	Remove the source of the suction pressure increase.
	Blockage of the air element	Clean the air element.
Oil Leakage	Too much oil added	Adjust to the middle of the level gauge while the blower is stopped.
	Looseness in the fixing area	Tighten the loose component(s).
	Gasket damage	Replace the gasket.
Insufficient Air Volume	Leakage from piping	Remove the leak in the piping.
	Safety valve operation	Readjust the safety valve.
	Blockage of the air filter	Clean the air filter.
	Increase in discharge pressure	Remove the source of the discharge end pressure increase.
	Increase in suction pressure	Remove the source of the suction end pressure increase.
	V-belt is slipping	Retension or replace the v-belt.
Suction Pressure Increase	Valve closure	Fully open the valve.
	Blockage of the air filter	Clean the air filter.
	Clogging of the suction pipe	Remove of the blockage.

8. Configuration

1. Assembly Section Drawing

This drawing shows the BH (-C) model, other models will have slight differences.



2. Standard Accessories

All Models (Motor Set)

Base 1 piece
 Belt Cover 1 piece
 Foundation Bolt 1 assy
 V-Belt 1 assy
 V-Pulley 1 assy

-C Models Internal Cooling Silencer 1 system (2 systems in -CT models)
 Internal Cooling Piping 1 system

No.	Component Name	Material	Parts	No.	Component Name	Material	Parts
1	Casing	FC200	1	13	Conical Spring Washer	SPC	2
2	Housing R	FC200	1	14			
3	Housing L	FC200	1	15	Snap Ring S	N63CA	2
4	Rotor Shaft A	FCD500	1	16	Grease Nipple	BsBM	4
5	Rotor Shaft B	FCD500	1	17	Collar L	FC200	2
6	Gear Cover	FC200	1	18	Oil Seal LA	NBR	1
7	Bearing	SUJ2	4	19	Oil Level Gauge	Plastic	1
8	Timing Gear	SCM415	2	20	Oil Cap	Plastic	1
9	Oil Stop Collar	FC200	2	21	Blower Pulley	FC200	1
10	Collar O-Ring	NBR	2	22	Pulley Stop Key	S45C	1
11	Oil Seal	NBR	2	23			
12	Gear Stop Nut	SS400	2	24			


9. Repairs and Warranties


In the event of blower repair, a request should be made to the Anlet retail outlet where the purchase was made, or to plant manufacturer. We pledge to carry out the following repairs free of charge. However, this guarantee only applies to machines which are used in Japan.

1. The warranty period of this product extends for one year from the delivery date.
2. Damage incurred during shipment overseas is considered as being outside the range of the warranty.
3. In the event that, even though correctly operating the machine during this warranty period, breakdown or damage results from deficiencies in design or construction, overseas shipping and installation costs for any replacement machines will be borne by the customer.
4. It is our policy not to dispatch technical personnel overseas.
5. Payment will be required for the following repairs and also for the replacement of wearing components *.
 - (1) Breakdown or damage after the warranty period has expired.
 - (2) Breakdown or damage caused by incorrect operation or storage.
 - (3) Breakdown or damage caused by fire, natural disasters or other acts of God.
 - (4) Breakdown or damage caused by the use of components other than those recommended by this company.
 - (5) Breakdown or damage caused by repair or modification with components other than those manufactured or recommended by this company.
 - (6) Compensation for production losses caused by breakdown of this company's products.
 - (7) Damage or breakdown of other installations caused by breakdown of this company's products.
 - (8) Breakdown or damage caused by use beyond the machines specified operation range or by operation in situations which the machine was not intended for.
 - (9) Breakdown or damage or injury caused by solvents or by the inclusion of solid foreign objects.
 - (10) Breakdown or damage caused by overloading etc. due to natural closing of the valve.
 - (11) Accidents caused by corrosion or rusting.
6. This company will not compensate for the costs of damages other than those caused by breakdowns during the operation of this product.

* Wearing components consist of lubrication greases, v-belts, pressure gauges or any other parts that can be expected to be worn from their original shape.

We recommend the provision of spare blower(s) for use in emergency breakdown situations.

 WARNING	If any abnormality is noticed while using this product, immediately stop operation, cut the power supply, and check for any damage. (See Chapter 7. Breakdown Causes and Countermeasures). If damage has been done, this company or the retail outlet where the purchase was made should be contacted directly. You will be asked to provide face plate values and a description of the damage (or abnormality). Continued operation of the blower after an abnormality has been noticed could lead to electric shock, fire or other serious consequences.
--	--

 WARNING	Repairs should only be performed by specialized repair technicians. Incorrect repair can lead to electric shock, fire or other serious consequences.
--	--

10. The Warranty Service Network

Hokkaido, Tohoku region	Sendai Branch Office Shiwa-cho 15-25, Wakabayashi-ku, Sendai-shi, Japan 984 Tel: (022) 238-5491
Kanto region	Tokyo Sales Office Honcho 2-27-5, Nishi-Arai, Adachi-ku, Tokyo, Japan 123 Tel: (03) 3854-1311
	Yokohama Branch Office Third Floor, Sugiyama Building, Futatsuya-cho 1, Kanagawa-ku, Yokohama-shi, Japan 221 Tel: (045) 412-3611
Shizuoka region	Shizuoka Branch Office Motemune 1-20-23, Shizuoka-shi, Japan 421-01 Tel: (054) 257-3131
Hokuriku region	Hokuriku Branch Office Minami Shinbo-cho 39-7, Kanazawa-shi, Japan 920 Tel: (0762) 23-2248
Chubu region	Nagoya Sales Office Meieki Minami 5-11-23, Nakamura-ku, Nagoya-shi, Japan 450 Tel: (052) 323-2311
Kansai region	Osaka Sales Office Shichikenyu 5-10, Higashi Osaka-shi, Japan 577 Tel: (06) 746-7111
Chugoku region	Hiroshima Branch Office Nishihara 8-33-20, Asaminami-ku, Hiroshima-shi, Japan 731-01 Tel: (082) 871-3941
Shikoku region	Takamatsu Branch Office Imasato-cho 2-12-7, Takamatsu-shi, Japan 760 Tel: (0878) 35-1301
Kyushu, Okinawa region	Fukuoka Branch Office Hirao 2-19-4, Chuo-ku, Fukuoka-shi, Japan 810 Tel: (092) 522-7151

On opening the packaged machine, the following important values should be copied from the face-plate into the table below. This page should then be stored carefully.

Model	
Production Number	
Rotation Speed	min-1 rpm
Discharge Pressure	mm Aq kgf/cm ²
Air Volume	m ³ /min
Motor Output	kW
V-Belt Size	
Date of Purchase	
Purchased from...	

How to keep good custody

A. Custody

To be avoided from wet and keep dry place.

B. Rust prevention procedure

1. To be greased inside of Blower.
2. Seal discharge flange and suction flange with gam tape after inserting desiccant.
(reference plan)
3. Please custody releasing v-belt from machine.
4. Wrap whole body with plastic sheet desiccant under the cover.

C. 1. Rust Prevention: Oil (Ferro Guard #1009)

Maker United specialtace Company

2. Desiccant: Unslaked lime

(HI-DRY)

Maker Kiyu Sangyo Company

Quantity

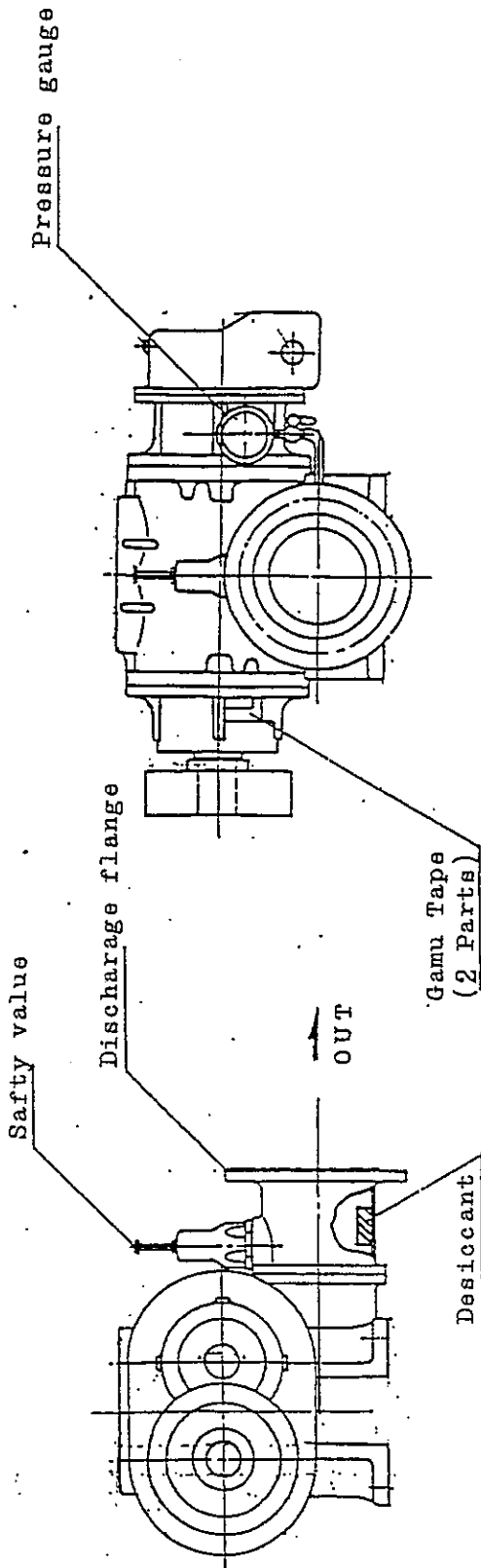
Discharge flange: 500g

D. How to maintenance

1. Charge desiccant every other six-month.
2. Turn Blower or Motor ten times by hand by in order to prevent from rusting of gear and permanent strain of baling.
3. When rust arise please clear in early tern.

E. Special matters to be taken cave of when it is reused.

1. Take off the desiccant.
2. Confirm its timing softly by hand.
3. Charge gear oil completely.
4. Supply bearing oil.
5. Attach v-belt on and adjust the tension.
6. Confirm Meg measurement of Motor.
7. Confirm direction of rotation and start.



Drehstrommotoren

→ 1LG4

1LG6

Moteurs triphasés
Motores trifásicos
Motori trifasi
Trefasmotorer
Třífázové motory
Трёхфазные двигатели

1LP4
1PP4

1LP6
1PP6

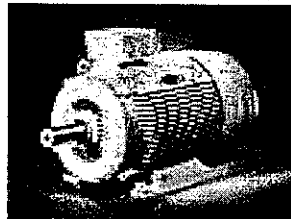
Betriebsanleitung / Instructions

Bestell-Nr./Order No.: 3503700000057

Ausgabe / Edition N14-0105

DEUTSCH/ENGLISH/FRANCAIS/ESPANOL/ITALIANO/SVENSKA/ČESKY/ПО РУССКИ

→ 200L
BG 180M ... 315L



Baugrößen (BG)
Frame sizes (BG)
Désignation de carcasse (BG)
Tamaños constructivos (BG)
Grandezze (BG)
Storlekar (BG)
Konstrukční velikosti (BG)
Конструктивные размеры (BG)

Bauformen / Types of construction / Formes de construction / Formas constructivas / Forme costruttive / Monteringsätt / Konstrukční tvary / Конструктивные формы

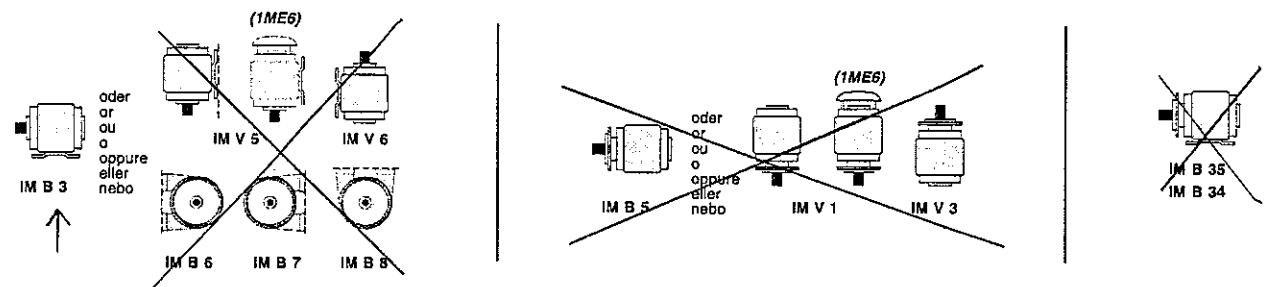


Fig. 1

Alle Rechte vorbehalten. All rights reserved. Tous droits réservés. Reservados todos los derechos. Tutti i diritti riservati. All rätt förbehålls. Veškerá práva vyhrazena. Все права защищены законом.

DEUTSCH

Allgemeine Hinweise

⚠️ WARNUNG Zu beachten sind die Angaben und Anweisungen in allen gelieferten Betriebs- und sonstigen Anleitungen. Dies ist zur Vermeidung von Gefahren und Schäden unerlässlich! Eine zusätzliche Sicherheitsinformation (gelb) liegt bei, die ergänzende Angaben zur Sicherheit für elektrische Maschinen enthält. Diese Sicherheitsinformation ist deshalb eine Ergänzung für alle weiteren noch gelieferten Betriebs- und sonstigen Anleitungen.

Weiterhin sind die jeweils geltenden nationalen, örtlichen und anlagenspezifischen Bestimmungen und Erfordernisse zu berücksichtigen!

Sonderausführungen und Bauvarianten können in technischen Details abweichen! Bei eventuellen Unklarheiten wird dringend empfohlen, unter Angabe von **Typbezeichnung und Fabriknummer** beim Hersteller rückzufragen, oder die Instandhaltungsarbeiten von einem der SIEMENS - Servicezentren durchführen zu lassen.

HINWEIS: Fig. 2 ... (Ersatzteile) s. Anhang auf Seite 29

1 Beschreibung

1.1 Anwendungsbereich

Die Motoren können in staubiger oder feuchter Umgebung aufgestellt werden. Die Isolierung ist tropenfest. Bei sachgemäßer Lagerung oder sachgemäßer Aufstellung im Freien sind normalerweise gegen Witterungseinflüsse keine besonderen Schutzmaßnahmen an den Motoren notwendig.

Meßflächenschalldruckpegel bei 50Hz (DIN EN 21 680 Teil 1)
1LG4, 1LG6 ca. 60 bis 76 dB(A)

1.2 Aufbau und Arbeitsweise

1LG4- und 1LG6- Motoren sind in Grundausführung eigengekühlt mit Lüfter. Wahlweise können 1LG-Motoren zudem ohne Eigenlüfter (z.B. als Lüftermotoren mit Kühlung durch einen auf dem Wellenende angeordneten Sonderlüfter) oder fremdbelüftet (Option G17) ausgeführt werden. 1PP4 und 1PP6-Motoren sind selbstgekühlt ohne Lüfter.

Bei Fußmotoren sind die Füße am Motorgehäuse angegossen, wahlweise können angeschraubte Füße geliefert werden. (Option K11 / s. Fig. 2).

Ein Umsetzen der Füße am Motorgehäuse, z. B. zwecks Veränderung der Klemmenkastenlage, ist bei den Optionen K09,

General note**WARNING**

The data and recommendations specified in all the instructions supplied, and in all other related instructions,

must always be observed in order to avoid **hazardous situations** and the risk of possible injury or damage.

These instructions are augmented by supplementary instructions (yellow), which contain additional information on the safety measures for electrical machines and devices. The latter instructions thus augment all submitted instructions and all other related instructions.

Furthermore, the **pertinent national, local and plant-specific regulations and requirements** should be kept in mind!

Special designs and other versions may vary in technical details! In doubt, be sure to contact the manufacturer, quoting the **type designation and serial number**, or have maintenance work done by one of SIEMENS Service Centres.

NOTE: Fig. 2 ... (Spare Parts) see Annex page 29

1 Description**1.1 Application**

The motors are suitable for operation in dusty and damp environments. The insulation is tropicalized. If they are properly stored or installed outdoors, special weatherproofing measures are not usually required.

Measuring-surface sound-pressure level at 50 Hz

(DIN EN 21 680 Part 1)

1LG4, 1LG6 approx. 51 to 76 dB(A)

1.2 Construction and mode of operation

The 1LG4 and 1LG6 motors are standardly self-ventilated with own fans. In addition to that the 1LG motors are optionally either without an own fan (such as fan motors with cooling by means of a separate fan arranged on the shaft end) or with external cooling (option G17). The 1PP4 and 1PP6 motors are equipped with own cooling without any fan.

The feet on foot-mounted motors are cast integrally with the motor casing or they can be optionally bolted onto the casing (option K11 / see fig. 2).

Rearranging the feet (e.g. for changing the position of the terminal box) is possible for options K09, K10 and K11. The bores and surfaces, necessary for this purpose, are already machined in a corresponding way.

Where motors with brake are concerned (e.g. option G26), take into consideration also the brake operating instructions!

These instructions are valid in addition to the operating instructions of the given motor type. They are not valid for motors of EEx e series.

2 Operation**WARNING**

Before starting any work on the machine, be sure to isolate it from the power supply.

2.1 Transport, storage

The motors should always be lifted at both **lifting eyes** during transport.

**WARNING**

For lifting machine sets (such as built-on gearboxes, fan units), always use the lifting eyes or lifting pegs provided! Machine sets may not be lifted by

suspending the individual machines! Check the lifting capacity of the hoist!

If, after delivery, the motors are stored for more than 3 years under favourable conditions (kept in a dry place free from dust and vibration) prior to commissioning, the bearings should be regreased.

Under unfavourable conditions, this period is considerably shorter.

If necessary, the insulation resistance of the winding should be checked, see Section 2.5.

2.2 Installation

After installation, **screwed-in lifting eyes** should either be removed or tightened down.

In the case of **motors with shaft end facing upwards or downwards**, measures must be taken to ensure that no water can penetrate into the upper bearing.

In the case of **terminal boards** with 6 terminals, the top part of the terminal box can be turned through 4 x 90 degrees. For terminal boards with 9 terminals, it can be turned through 180 degrees.

Quiet running

Stable foundations or mounting conditions, exact alignment of the motors and a well-balanced transmission element are essential for quiet vibration-free running. If necessary, shims should be inserted under the motor feet to prevent strain, or the whole rotor and transmission element should be balanced.

2.3 Balancing, transmission elements

A suitable device should always be used for fitting and removing the transmission elements (coupling halves, pulleys, pinions) (Fig. 7).

As standard, the rotors are dynamically balanced with the half featherkey inserted.

The type of balance is marked on the drive end of the shaft (shaft end face):

(H = balanced with half featherkey)

(F = balanced with whole featherkey)

When fitting the transmission element, keep the type of balance in mind!

Balance with half featherkey

Poor running characteristics can arise in the case of transmission elements having a length ratio of hub length l to length of shaft end $l_M < 0.8$ and running at speeds of > 1500 rev/min (see Fig. 8). If necessary, re-balancing should be carried out, e.g. the part of the featherkey T_p that protrudes from the transmission element and above the shaft surface should be cut back.

The usual measures should be taken to guard transmission elements from touch. If a motor is started up without transmission element attached, the featherkey should be secured to prevent it being thrown out.

**WARNING**

featherkey should be secured to prevent it being thrown out.

2.4 Electrical connection

Check to see that system voltage and frequency agree with the data given on the rating plate. Voltage or frequency deviations of $\pm 5\%$ (for 1ME6, frequency deviations of $\pm 3\%$) from the rated values are permitted without the necessity of derating the output. Connection and arrangement of the terminal links must agree with the diagram provided in the terminal box. Connect the earthing conductor to the terminal with the marking

Wherever terminal clips are used (for example, to DIN 46282), arrange the conductors so the clips are virtually level, i.e. not tilted when tightened. This method of connection means that the ends of single conductors must be bent in the shape of a U or be fitted with a cable lug (see Fig. 3.1). This also applies to the green-yellow protective earthing conductor and the outer earthing conductor (see Fig. 3.2).

Please refer to Fig. 4 for tightening torques for terminal bolts and nuts (except for terminal strips).

2.5 Checking the insulation resistance

The insulation resistance of the windings must be measured prior to initial startup of the machine, after long periods of storage or standstill (approx. 6 months).



WARNING

While the measurement is being taken and immediately afterwards, some of the terminals carry dangerous voltages and must not be touched.

Insulation resistance

- The minimum insulation resistance of new, cleaned or repaired windings with respect to ground is 10 MOhm.
- The critical insulation resistance R_{crit} is calculated first by multiplying the rated voltage U_N , e.g. 0.69 kV AC, with the constant factor (0.5 MOhm/kV):

$$R_{crit} = 0.69 \text{ kV} \cdot 0.5 \text{ MOhm/kV} = 0.345 \text{ MOhm.}$$

Measurement

The minimum insulation resistance of the windings to ground is measured with 500 V DC. The winding temperature should then be $25^\circ\text{C} \pm 15^\circ\text{C}$.

The critical insulation resistance should be measured with 500 V DC with the winding at operating temperature.

Checking

If the minimum insulation resistance of a new, cleaned or repaired machine, which has been stored or at standstill for a prolonged period of time, is less than 10 MOhm, this may be due to humidity. The windings must then be dried.

After long periods of operation, the minimum insulation resistance may drop to the critical insulation resistance. As long as the measured value does not fall below the calculated value of the critical insulation resistance, the machine may continue in operation. If it does, the machine must be stopped immediately.

The cause must be determined, and the windings or winding sections repaired, cleaned or dried as necessary.

2.6 Commissioning

NOTE: Where the torque is very uneven (the drive of a piston-type compressor, for example), the inevitable result is a non-sinusoidal motor current, whose harmonics can lead to excessive system perturbation or excessive electromagnetic interference.

In the case of converter-fed motors, high-frequency current or voltage harmonics in the motor cables can give rise to electromagnetic interference. That is why the use of shielded cables is recommended.

Before commissioning, check that:

- The minimum insulation resistances are adhered to
- The rotor turns freely without rubbing
- The motor is properly assembled and aligned
- The transmission elements are correctly adjusted (e.g. belt tension) and the transmission element is suitable for the given operating conditions
- All electrical connections, mounting screws and connecting elements are properly tightened and fitted
- All protective conductors are properly installed
- Any auxiliaries that may be fitted (brakes, speedometer, separate fan) are in working order
- Touch protection guards are installed around moving and live parts
- The maximum speed n_{max} (see rating plate) is not exceeded.

NOTE: The maximum speed n_{max} is the highest operating speed permitted for short periods. It should be kept in mind that motor noise and vibration are worse at this speed, and bearing life is reduced.



CAUTION

After motor installation, the brake, if fitted, should be checked for proper functioning.

It is not possible to formulate a complete check list. Other checks may also be necessary!

3 Maintenance

Safety precautions



WARNING

Before starting any work on the motor or other equipment, particularly before opening covers over

live or moving parts, the motor must be properly isolated from the power supply. Besides the main circuits, any additional or auxiliary circuits that may be present must also be isolated.

The usual "5 safety rules" (as set forth in DIN VDE 0105) are:

- Isolate the equipment
- Take effective measures to prevent reconnection
- Verify equipment is dead
- Earth and short-circuit
- Cover or fence off adjacent live parts

The precautions listed above should remain in force until all maintenance work is finished and the motor has been fully assembled.

NOTE: Where motors are fitted with closed condense water openings, these should be opened from time to time to allow any accumulated condense water to be drained away.

Condense water openings should always be at the lowest point of the motor!

Fitting new bearings, grease lifetime, type of grease

Under normal operating conditions, with horizontally mounted motors and coolant temperatures up to 40°C , the grease lifetime should be:

- approx. 40,000 operating hours for speeds of 1500 rpm
- approx. 20,000 operating hours for speeds of 3000 rpm

Irrespective of the number of operating hours, the grease should be renewed every 3 years because of ageing. In this case the bearings should be dismantled, washed and newly greased. The modifications with additional greasing are to be maintained according to instructions on the lubricating data plate.

In the case of motors operating under special conditions, such as vertical motor position, frequent operation at maximum speed n_{max} , heavy vibration, sudden load changes and frequent reversing operation, the bearing should be changed at considerably more frequent intervals than at the operating hours stated above.

The motors are standardly equipped with radial ball bearings of 62 ... series or with option K36 - radial ball bearings of 63 ... series which are provided with a cover plate (ZC3 version).

The cover plate is arranged on that side of the bearing facing the frame (stator).

NOTE: Notice the cover plate arrangement and the bearing clearance when changing the bearings because standard modifications can differ from special motors!

The cover plate material should withstand temperatures from -20°C to $+150^\circ\text{C}$, e.g. polyacryl-rubber (ACM).

Type of grease for standard machines: (Fa. ESSO / UNIREX N3); grease lifetime and lubrication intervals are valid for this type of grease only.

Compensatory greases must conform to DIN 51825-KL3N at least. In this case the lubrication intervals at $KT > 25^\circ\text{C}$ are to be reduced.

Special greases are introduced on the lubricating data plate.

Avoid mixing different types of grease!

Dismantle the motor to the extent necessary. Pull off the bearing with a suitable device (see Fig. 6). Clean the journal! Clean the bearing, or obtain a new one, and pack it with fresh grease.

Pack the bearing cavities flush with grease! The cover plate or endshield is kept free of grease to prevent overgreasing.

Heat bearings evenly to about 80-100 °C and press on. Heavy blows (such as with a hammer, ...) should be avoided.

Any worn sealing elements (such as shaft sealing ring, etc.) should also be renewed.

If springless radial shaft sealing rings are used, the replacement sealing rings must also be of the springless type.

Regreasing device

In the case of motors with regreasing device, take note of the information given on the lubricating data plate!

Joint sealing

When reassembling machines with degree of protection IP55 or higher (see rating plate), the bright surfaces of the joint between the motor frame and the endshields should be coated with a suitable non-hardening sealing compound (such as Hylomar, Curil).

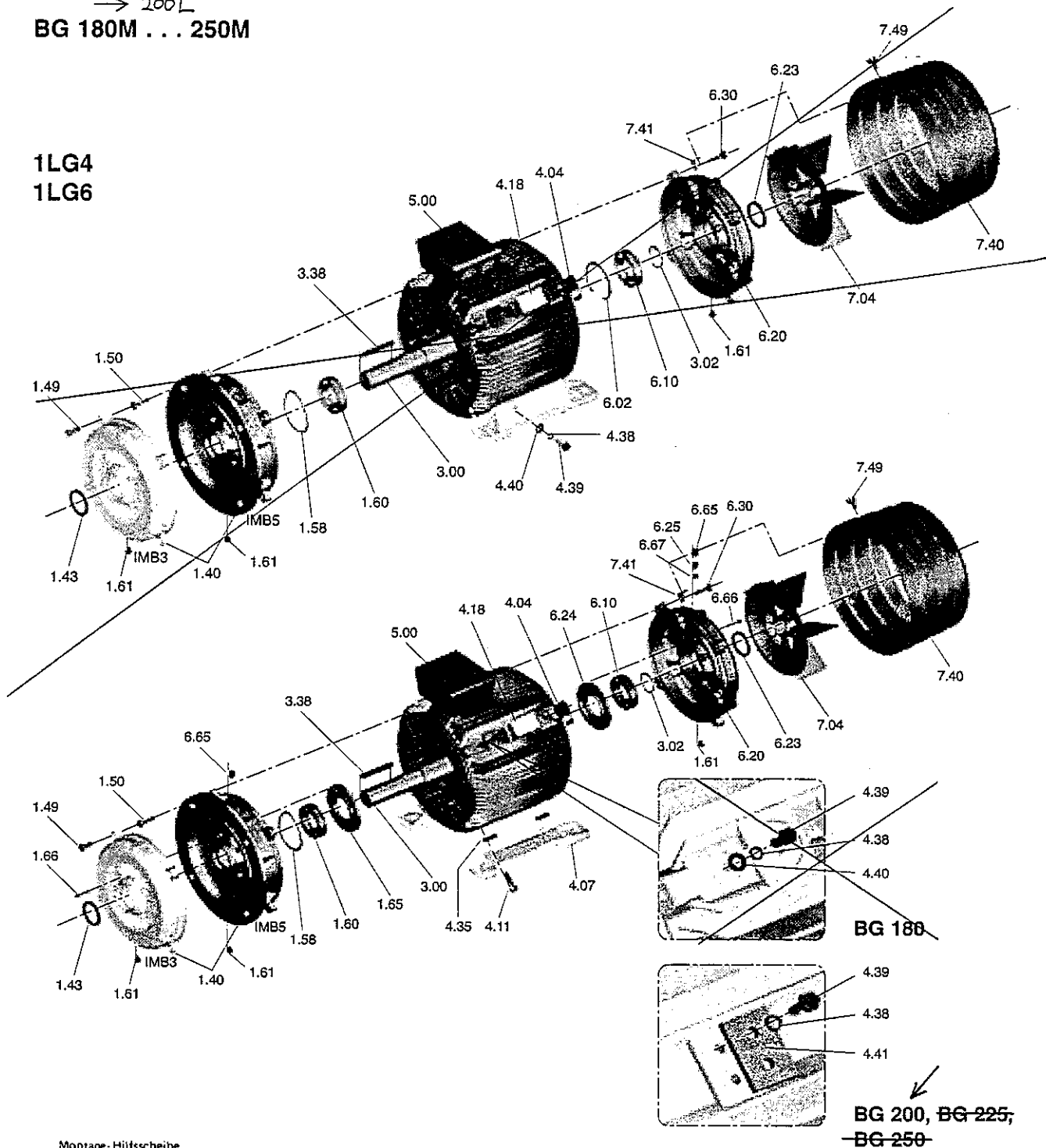
Plastic fan (frame sizes 180M ... 315L)

Plastic fans have two cast-on tabs that snap into the ring groove on the shaft to prevent axial movement. Before the fan is pulled off the shaft, these two tabs must be disengaged (screwdriver) and held temporarily in that position, e.g. by inserting packing. In the disc at the root of the blades, there are two openings for the claws of an extractor whose central screw should press against the hub. On delivery, these openings may be covered by a film of plastic and later on they should be punched.

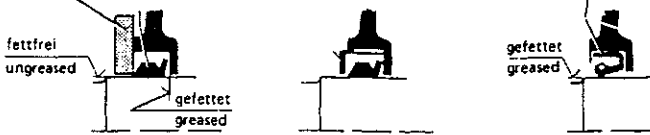
A suitable device should be used for pulling the fan off and pressing it back on. Hammer blows must be avoided to protect the bearings.

→ 200L
BG 180M . . . 250M

1LG4
1LG6



Montage-Hilfsscheibe
Disc used as a fitting tool



Montagehinweise
Fitting instructions

1) nur für besondere Betriebsverhältnisse
for special operating conditions

Fig. 2 +

BG 280S . . . 315L

1LG4
1LG6

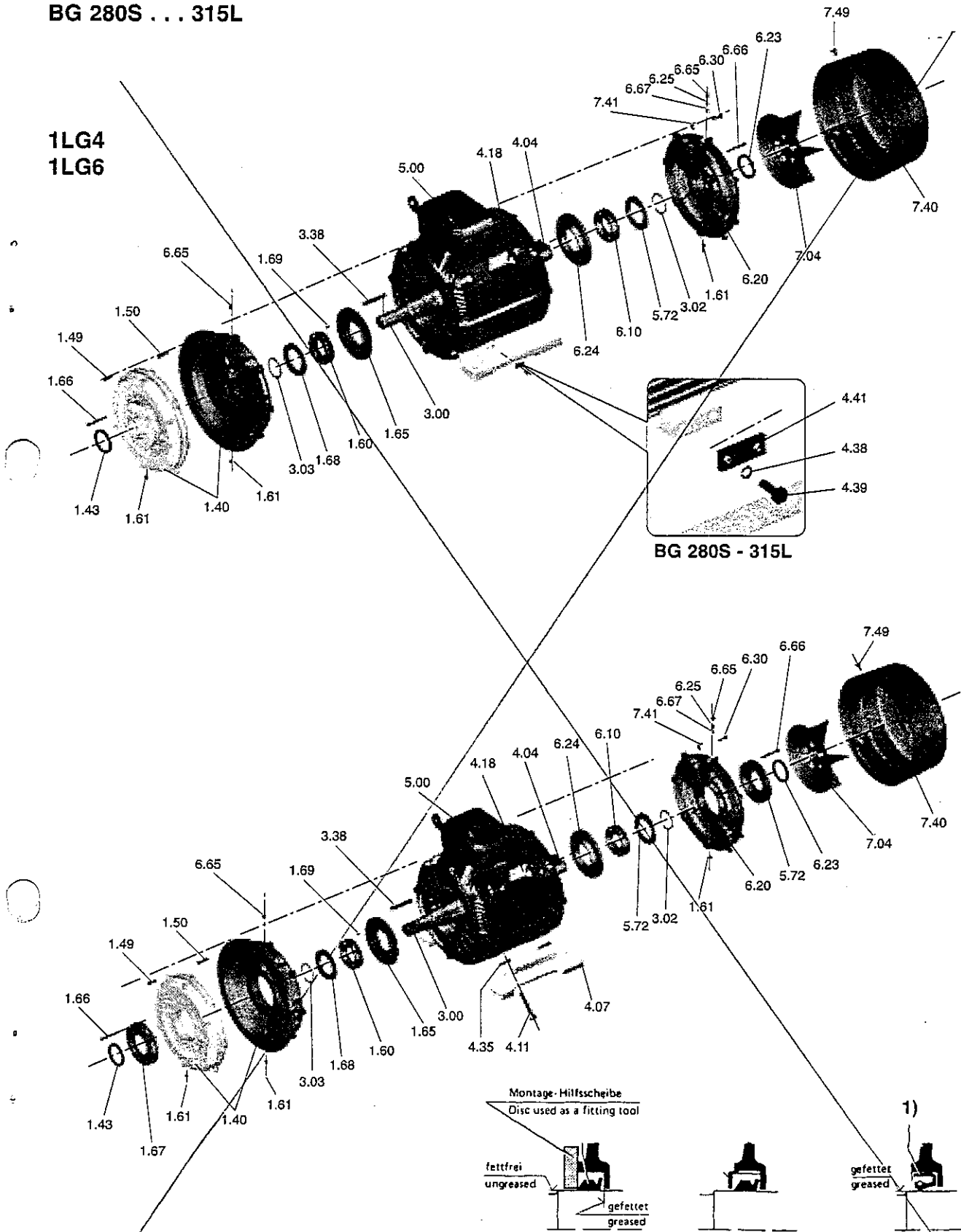
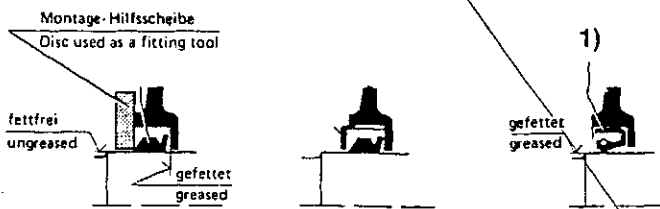
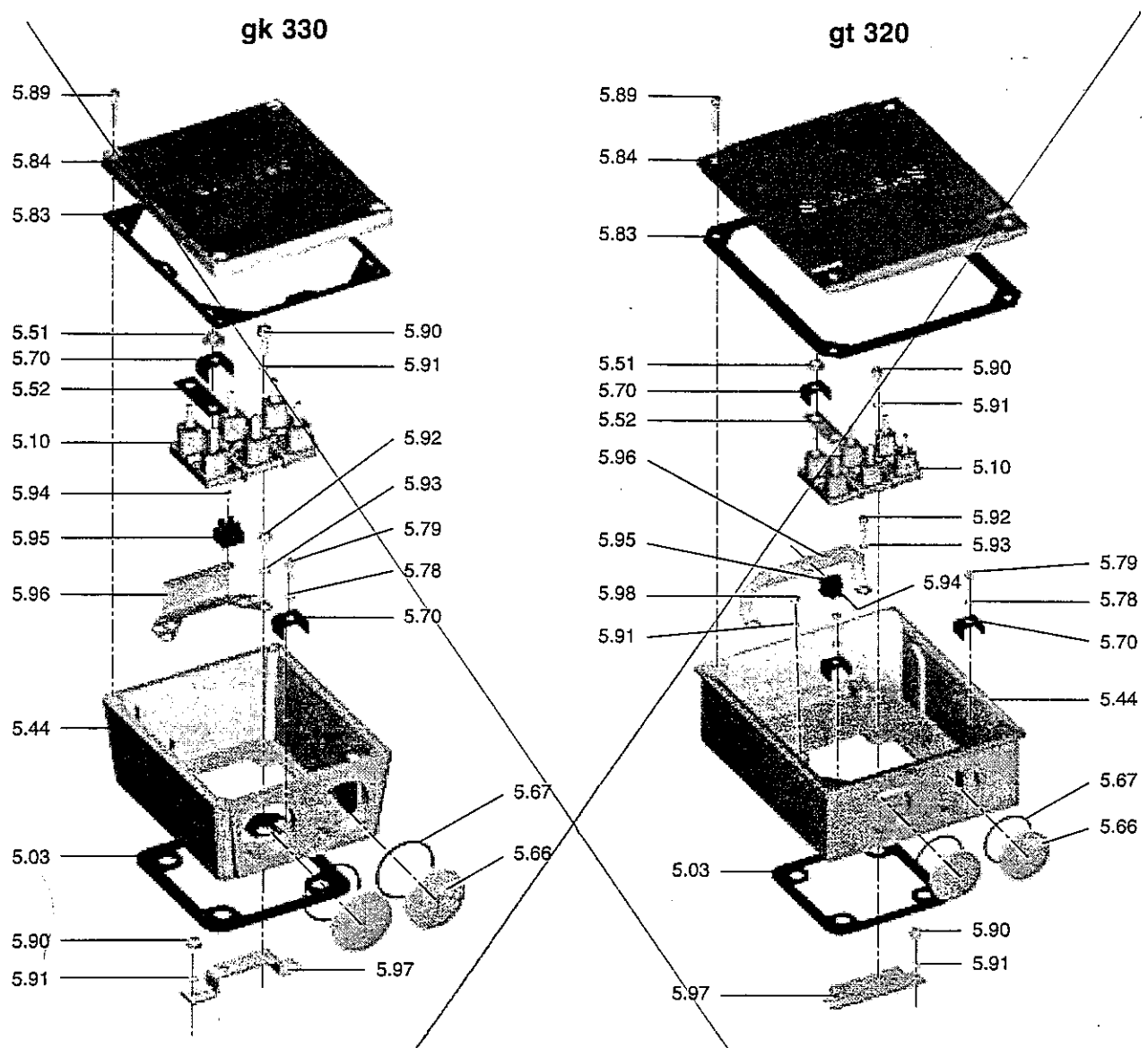


Fig./3 +



Montagehinweise
Fitting instructions

1) nur für besondere Betriebsverhältnisse
for special operating conditions



Normteile sind nach Abmessung, Werkstoff und Oberfläche im freien Handel zu beziehen.

Standard commercially available parts are to be purchased in accordance with the specified dimensions, material and surface finish.

Les pièces normalisées peuvent être obtenues dans le

commerce d'après leurs dimensions, le matériau et l'état de surface.

Las piezas estándar se comprarán en comercios del ramo según las dimensiones, material y superficie especificados.

Le parti standard sono reperibili sul mercato secondo le dimensioni, il materiale e la finitura della superficie.

Normeradedetaljer kan erhållas i öppna handeln, och skall specificeras beträffande storlek, material och ytbehandling.

Normované díly lze podle rozměrů, materiálu a povrchu zakoupit volně v obchodech.

Стандартные детали можно купить в магазинах согласно размерам, материалу и поверхности.



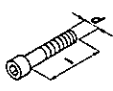


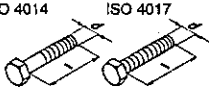



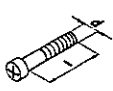



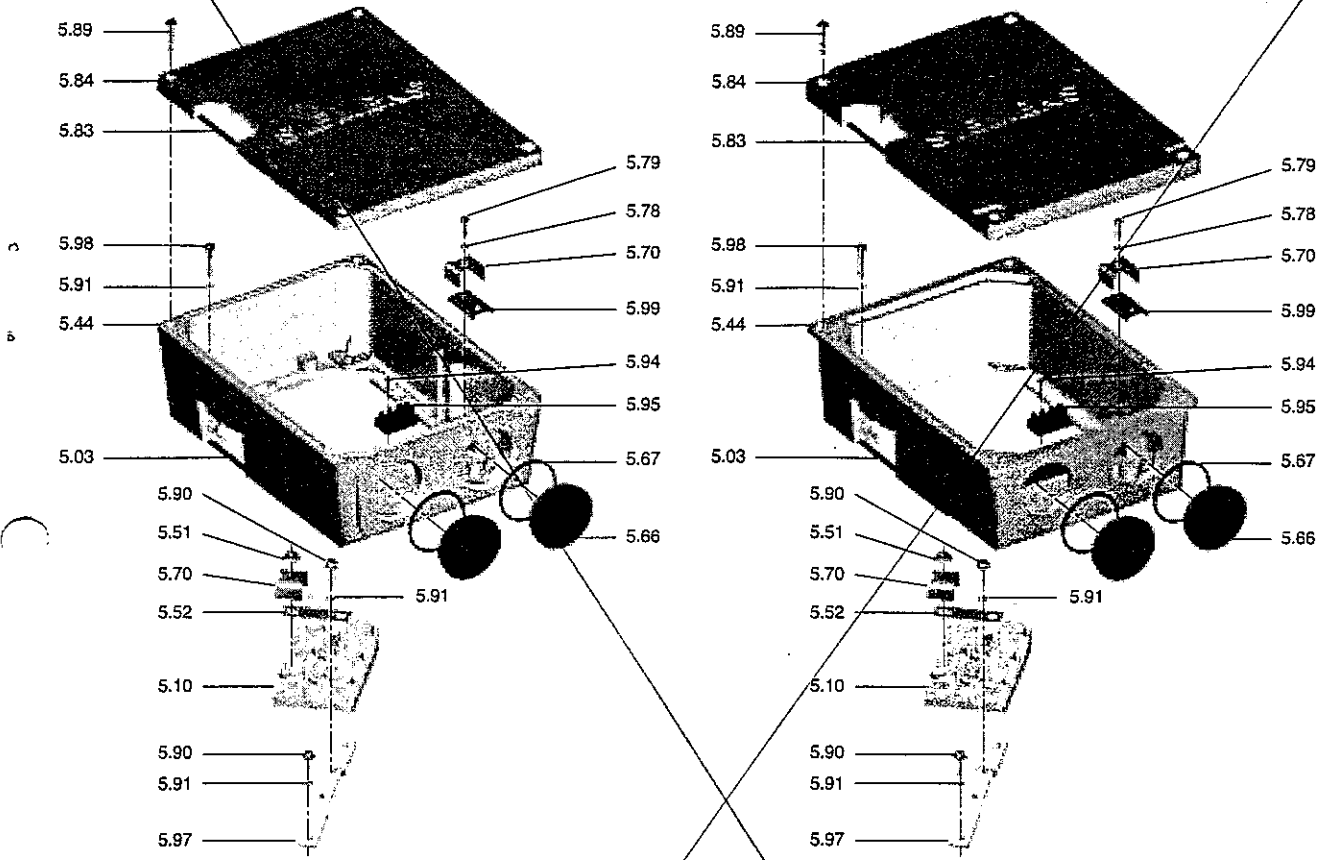
4.38	5.78			1.49	DIN 912			3.38	DIN 6885	
5.91	5.93	DIN 128		1.66	ISO 4762					
5.21	5.32			4.11						
				8.30						
				6.25						
3.02		DIN 471		1.50	DIN 931			5.53	DIN 936	
3.03				4.39	ISO 4014				ISO 4035	
				5.79						
				5.90	DIN 933			5.66	EN 50262	
				5.92	ISO 4017			5.67		
				5.98						
6.02		DIN 472		5.31						
					DIN 7985					
					ISO 7048					
4.04		DIN 580		4.40	DIN 125					
				5.36						
								DIN 625		
								Lagertyp:		
								Type of bearing:		
								Type de roulement:		
								Tipo de cojinete:		
								Tipo di cuscinetto:		
								Lagertyp:		
								Typ ložiska:		
								Тип подшипника:		

Fig. 2a

gk 430

gt 420



Normteile sind nach Abmessung, Werkstoff und Oberfläche im freien Handel zu beziehen.

Standard commercially available parts are to be purchased in accordance with the specified dimensions, material and surface finish.

Les pièces normalisées peuvent être obtenues dans le

commerce d'après leurs dimensions, le matériau et l'état de surface.

Las piezas estándar se comprarán en comercios del ramo según las dimensiones, material y superficie especificados.

Le parti standard sono reperibili sul mercato secondo le dimensioni, il materiale e la finitura della superficie.

Normerade detaljer kan erhållas i öppna handeln, och skall specificeras beträffande storlek, material och ytbehandling.

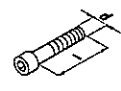
Normované díly lze podle rozměrů, materiálu a povrchu zakoupit volně v obchodech.

Стандартные детали можно купить в магазинах согласно размерам, материалу и поверхности.

4.38	5.78	
5.91	5.93	DIN 129
5.21	5.32	



1.49	DIN 912	
1.66	ISO 4762	
4.11		
6.30		
6.25		



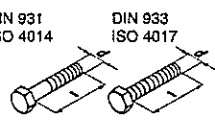
3.38	DIN 6885	
------	----------	--



3.02	DIN 471	
3.03		



1.50	DIN 931	DIN 933
4.39	ISO 4014	ISO 4017
5.79		
5.90		
5.92		
5.98		
5.31		



5.53	DIN 936	
	ISO 4035	



6.02	DIN 472	
------	---------	--



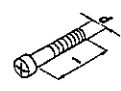
5.66	EN 50262	
5.67		



4.04	DIN 580	
------	---------	--



4.40	DIN 125	
5.36		

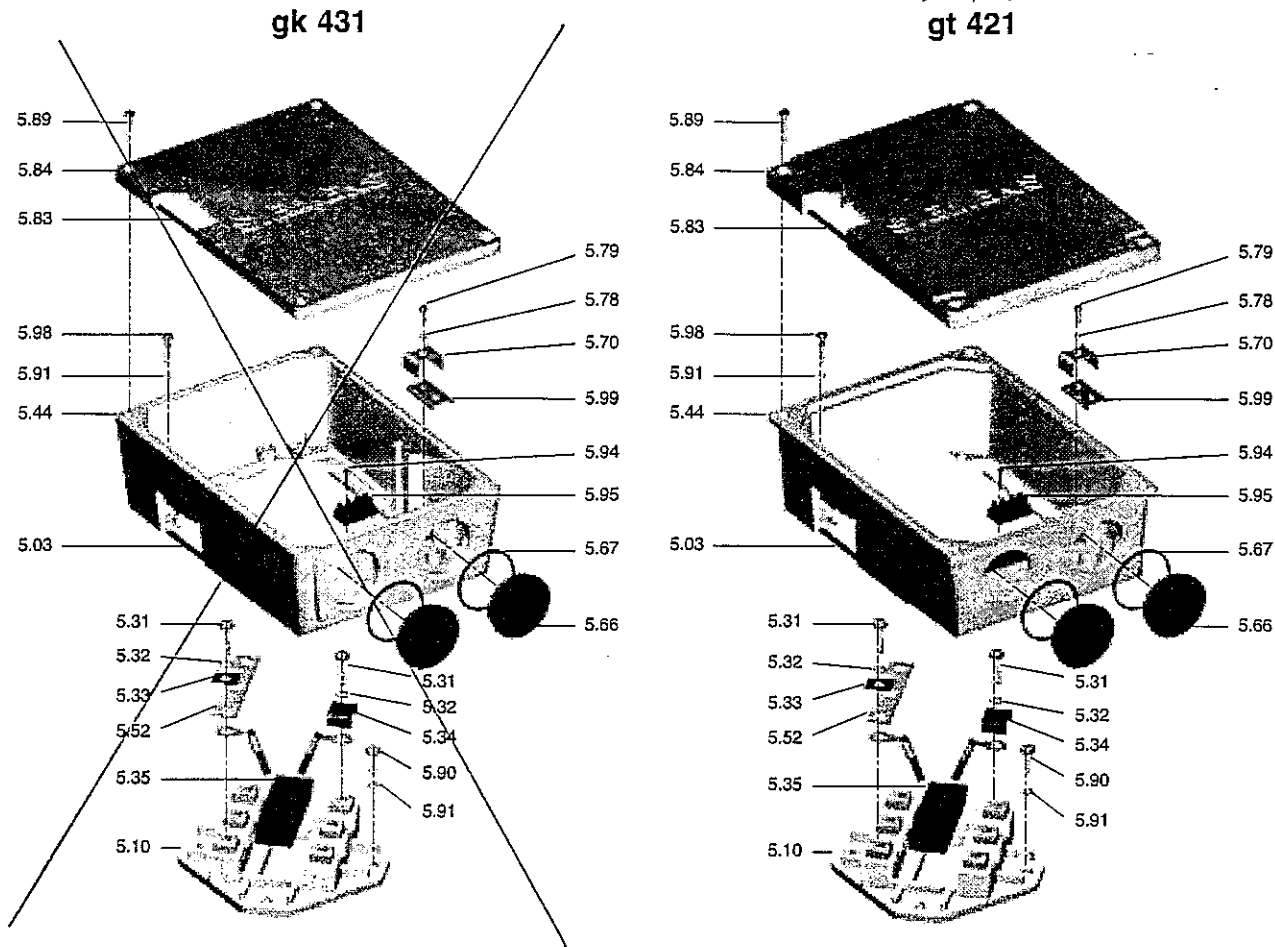


1.60	DIN 625	
6.10	Lagertyp:	
	Type of bearing:	
	Type de roulement:	
	Tipo de cojinete:	
	Tipo di cuscinetto:	
	Lagertyp:	
	Typ ložiska:	
	Тип подшипника:	



Fig. 2b

→ 451
gt 421



Normteile sind nach Abmessung, Werkstoff und Oberfläche im freien Handel zu beziehen.

Standard commercially available parts are to be purchased in accordance with the specified dimensions, material and surface finish.

Les pièces normalisées peuvent être obtenues dans le

commerce d'après leurs dimensions, le matériau et l'état de surface.


Las piezas estándar se comprarán en comercios del ramo según las dimensiones, material y superficie especificados.


Le parti standard sono reperibili sul mercato secondo le dimensioni, il materiale e la finitura della superficie.


Normerade detaljer kan erhållas i öppna handeln, och skall specificeras beträffande storlek, material och ytbehandling.


Normované díly lze podle rozměrů, materiálu a povrchu zakoupit volně v obchodech.

Стандартные детали можно купить в магазинах согласно размерам, материалу и поверхности.

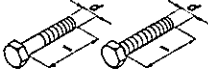
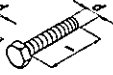
4.38	5.78	DIN 128	
5.91	5.93		
5.21	5.32		

3.02	DIN 471	
3.03		


6.02	DIN 472	
------	---------	---

4.04	DIN 580	
------	---------	---


1.49	DIN 912 ISO 4762	
1.66		
4.11		
6.30		
6.25		


1.50	DIN 931 ISO 4014	
4.39		
5.79		
5.90		
5.92		
5.98		
5.31	DIN 933 ISO 4017	
5.90		

	DIN 7985 ISO 7048	
--	----------------------	--

4.40	DIN 125	
5.36		

3.38	DIN 6885	
------	----------	---

5.53	DIN 936 ISO 4035	
------	---------------------	---

5.66	EN 50262	
5.67		


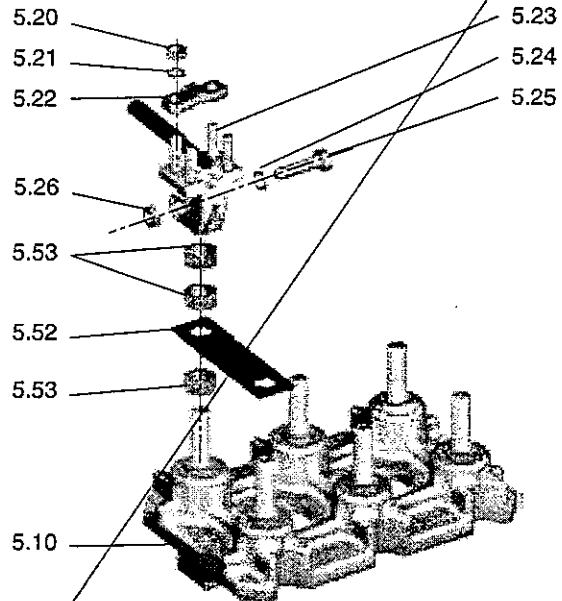
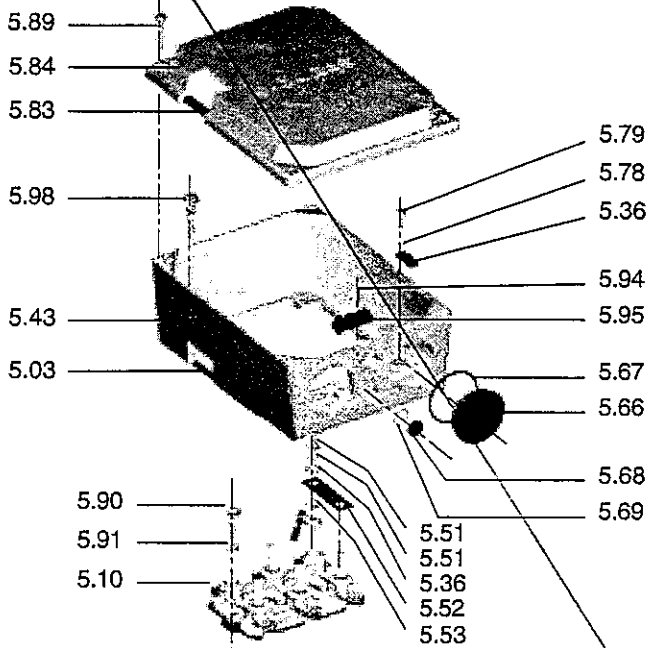
1.60	DIN 625	
6.10	Lagertyp:	
	Type of bearing:	
	Type de roulement:	
	Tipo di cojinate:	
	Tipo di cuscinetto:	
	Lagertyp:	
	Typ ložiska:	
	Тип подшипника:	

Fig. 2c

gt 520

gt 540



- for cable arrangements without lugs only terminal board (5.10) from gt 540 possible

- für Kabelschuhlosen Anschluß! nur Klemmenbrett (5.10) aus gt 540 zulässig

Normteile sind nach Abmessung, Werkstoff und Oberfläche im freien Handel zu beziehen.

Standard commercially available parts are to be purchased in accordance with the specified dimensions, material and surface finish.

Les pièces normalisées peuvent être obtenues dans le

commerce d'après leurs dimensions, le matériau et l'état de surface.

Las piezas estándar se comprarán en comercios del ramo según las dimensiones, material y superficie especificados.

Le parti standard sono reperibili sul mercato secondo le dimensioni, il materiale e la finitura della superficie.

Normerade detaljer kan erhållas i öppna handeln, och skall specificeras beträffande storlek, material och ytbehandling.

Normované díly lze podle rozměrů, materiálu a povrchu zakoupit volně v obchodech.

Стандартные детали можно купить в магазинах согласно размерам, материалу и поверхности.

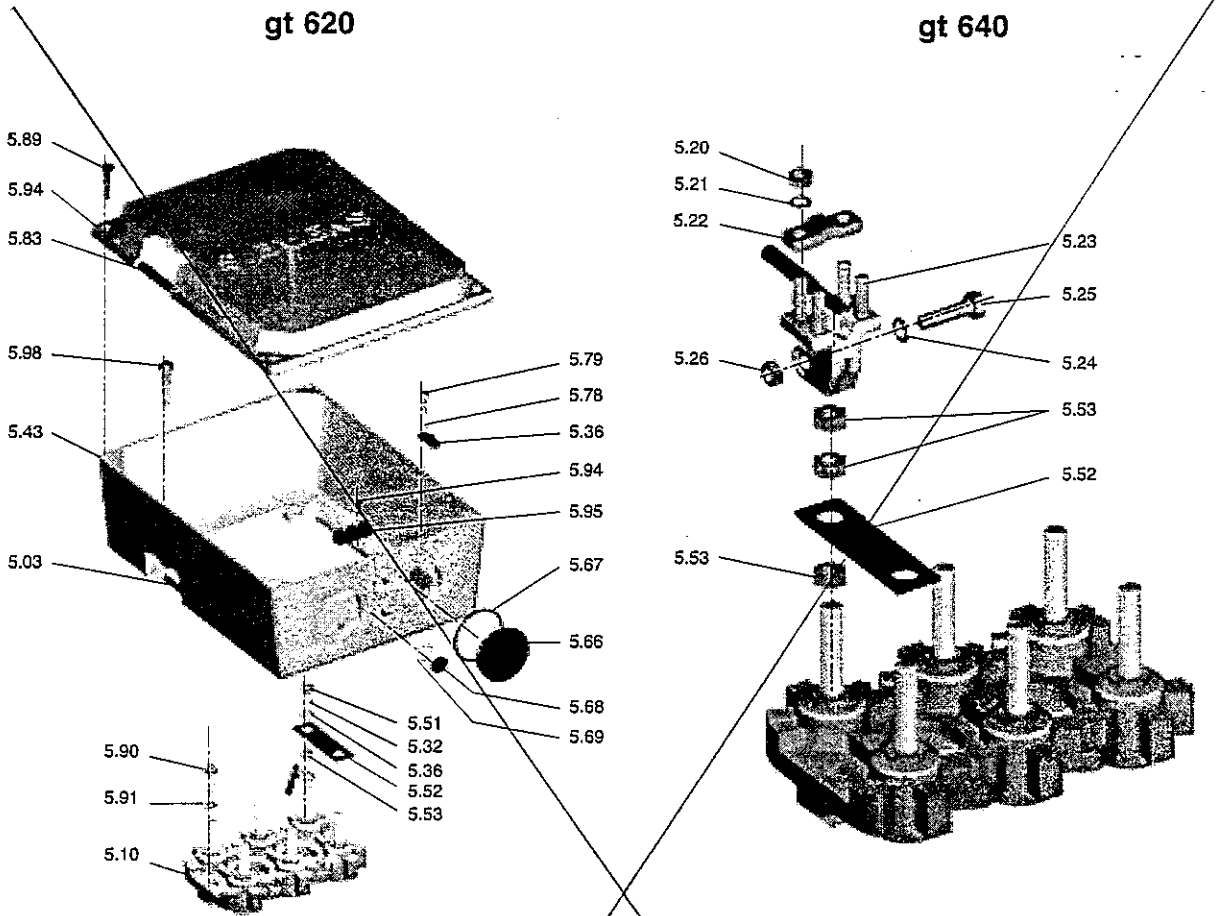
4.38	5.78		
5.91	5.93	DIN 128	
5.21	5.32		
3.02		DIN 471	
3.03			
6.02		DIN 472	
4.04		DIN 580	

1.49		DIN 912	
1.66		ISO 4762	
4.11			
6.30			
6.25			
1.50		DIN 931	
4.39		ISO 4014	
5.79		DIN 933	
5.90		ISO 4017	
5.92			
5.98			
5.31			
		DIN 7985	
		ISO 7048	
4.40		DIN 125	
5.36			

3.38		DIN 6885	
5.53		DIN 936	
		ISO 4035	
5.66		EN 50262	
5.67			
1.60		DIN 625	
6.10		Lagertyp:	
		Type of bearing:	
		Type de roulement:	
		Tipo de cojinete:	
		Tipo di cuscinetto:	
		Lagertyp:	
		Typ ložiska:	
		Тип подшипника:	

Fig. 2d

13
21



- for cable arrangements without lugs only terminal board (5.10) from gt 640 possible
- für Kabelschuhlosen Anschluß! nur Klemmenbrett (5.10) aus gt 640 zulässig

Normteile sind nach Abmessung, Werkstoff und Oberfläche im freien Handel zu beziehen.

Standard commercially available parts are to be purchased in accordance with the specified dimensions, material and surface finish.

Les pièces normalisées peuvent être obtenues dans le

commerce d'après leurs dimensions, le matériau et l'état de surface.





Las piezas estándar se comprarán en comercios del ramo según las dimensiones, material y superficie especificados.

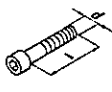
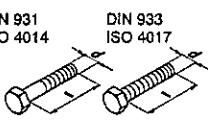
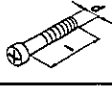

Le parti standard sono reperibili sul mercato secondo le dimensioni, il materiale e la finitura della superficie.

Normeradedetaljer kan erhållas i öppna handeln, och skall specificeras beträffande storlek, material och ytbehandling.

Normované díly lze podle rozměrů, materiálu a povrchu zakoupit volně v obchodech.

Стандартные детали можно купить в магазинах согласно размерам, материалу и лоявренности.

4.38	5.78	DIN 128	
5.91	5.93		
5.21	5.32		
3.02		DIN 471	
6.02		DIN 472	
4.04		DIN 580	

1.49	DIN 912	
1.66	ISO 4762	
4.11		
6.30		
6.25		
1.50	DIN 931	
4.39	ISO 4014	
5.79	DIN 933	
5.90	ISO 4017	
5.92		
5.98		
5.31		
	DIN 7985	
	ISO 7048	
4.40	DIN 125	
5.36		





3.38	DIN 6885	
5.53	DIN 936 ISO 4035	
5.66	EN 50262	
5.67		
1.60	DIN 625	
6.10	Lagertyp:	
	Type of bearing:	
	Type de roulement:	
	Tipo de cojinete:	
	Tipo di cuscinetto:	
	Lagertyp:	
	Typ ložiska:	
	Тип подшипника:	

Fig. 2c

Anschließbare Querschnitt je nach Klemmengröße (ggf. reduziert durch Größe der Leitungseinführungen)

Conductor cross-sections connectable to the various terminals (may be reduced by size of cable entries)

Sections raccordables suivant la taille de la borne (réduction éventuelle par la taille des entrées de câbles)

Sección conectable según tamaño del borne (en caso dado, más pequeña debido al tamaño de las entradas de línea)

Diametri dei collegamenti a sec. delle misure dei morsetti (eventualmente sono ridotte le dimensioni delle aperture per i conduttori)

Anslutningsbara ledarareor för olika klämstorlekar (ev. reducerat med hänsyn till genomföringens storlek)

Připojovací průřez podle velikosti svorek (v daném případě omezený velikostí průchodek vedení).

Соединительное сечение согласно размеру зажимов (в данном случае ограниченное размеров проходных изоляторов линии).

... 25 mm ²	... 10 mm ²	... 25 mm ²	... 25 mm ²	... 25 mm ²
Bei Anschluß mit DIN- Kabelschuh ist dieser nach unten abzuwinkeln	Anschluß eines einzelnen Leiters mit Klämbügel.	Anschluß von zwei etwa gleich dicken Leitern mit Klämbügel.	Bei Anschluß mit DIN- Kabelschuh unter äußerem Erdungswinkel.	Bei Anschluß mit DIN- Kabelschuh.
If connections are made with DIN cable lugs, bend the cable lugs downwards.	Connecting a single conductor with a terminal clip.	Connecting two conductors of almost equal thickness with a terminal clip.	If connections are made with DIN cable lugs, under the outer earthing angle.	If connections are made with DIN cable lugs.
Lorsque le raccordement est réalisé par cosses DIN, celles-ci doivent être pliées vers le bas.	Raccordement d'un seul conducteur à une Borne à étrier.	Deux conducteurs de diamètre à peu près équivalents, raccordés à une borne à étrier.	Lorsque le raccordement est réalisé par cosses DIN, à une équerre extérieure de mise à la terre.	Lorsque le raccordement est réalisé par cosses DIN.
Si la conexión se efectúa con terminales para cables DIN, habrá que doblarlos hacia abajo.	Conexión de un solo conductor con un estribo.	Conexión de dos conductores de diámetro aproximadamente igual, con un estribo.	Si la conexión se efectúa con terminales para cables DIN, bajo el angular exterior de puesta a tierra.	Si la conexión se efectúa con terminales para cables DIN.
Nel collegamento con capocorda conforme alle norme DIN, questo va piegato verso il basso.	Allacciamento di ogni singolo conduttore con morsetto di serraggio.	Allacciamento di due conduttori di stesso o pressoché identico spessore con morsetto di serraggio.	Nel collegamento con capocorda conforme alle norme DIN, sotto angolare di messa a terra esterno.	Nel collegamento con capocorda conforme alle norme DIN.
Vid anslutning med kabelsko anl. DIN skall denna böckas nedåt.	Anslutning av en ankeleddare med klämbügel.	Anslutning av två ungefär lika tjocka ledare med klämbügel.	Vid anslutning med kabelsko anl. DIN under extern jordningsvinkel.	Vid anslutning med kabelsko anl. DIN.
Připojení pomocí kabelového oka DIN je třeba je ohnout směrem dole.	Připojení jednotlivého vodiče U-tímanem.	Připojení dvou vodičů stejného průřezu s U-tímanem.	Připojení kabelovým okem DIN pod vnějším uzemňovacím úhlem.	Připojení kabelovým okem DIN.
Присоединение с помощью кабельного наконечника DIN надо обогнуть вниз.	Присоединение отдельного провода хомутом в форме U.	Присоединение двух проводов одинакового сечения с хомутом в форме U.	Присоединение кабельным наконечником DIN под внешним заземляющим хомутом.	Присоединение кабельным наконечником DIN.

Fig. 3.1

Fig. 3.2

Anziehdrehmomente für Schraubenverbindungen der elektrischen Anschlüsse - Klemmenbrettanschlüsse (außer Klemmenleisten)

Tightening torques for screwed electrical connections - terminal board connections (except for terminal strips)

Couples de serrages des bornes de la plaque à bornes (ne concerne pas les borniers)

Pares de apriete para uniones atornilladas de las conexiones eléctricas en la placa de bornes (exceptuando las regletas de bornes).

Coppie di serraggio per le viti di attacco di collegamenti elettrici / dei portamorsetti (escluse morsettiere)

Åtdragningsmoment för de elektriska anslutningarnas skruvförband (utom på kontaktpintlar)

Utahovací momenty pro šroubové spoje elektrických připojení - připojení na svorkových deskách (mimo svorkovnicové lišty).

Затяжные моменты для винтовых соединений электрических присоединений - присоединение на зажимных платах (кроме зажимной планки).

	Gewinde- \varnothing / Thread- \varnothing / du filetage \varnothing de la rosca / Diametro del filetto \varnothing Gangdiameter / Závit \varnothing / Диаметр резьбы	M4	M5	M6	M8	M10	M12	M16
	Anziehdrehmoment Tightening torque Couple de serrage Par de apriete Coppie di serraggio Åtdragningsmoment Utahovací moment Затяжной момент	min МИН N m макс МАКС	0,8	1,8	2,7	5,5	9	14
		1,2	2,5	4	8	13	20	40

Die obigen Anziehdrehmomente gelten soweit keine anderen Werte angegeben sind!

The above values of tightening torque are applicable unless alternative values are given elsewhere.

Les couples de serrage indiqués ci-dessus sont valables pour autant qu'aucune valeur spécifique ne soit donnée.

Estos pares de apriete rigen mientras no se indiquen otros.

Le coppie di serraggio indicate qui di sopra sono valide se non sono indicati altri valori.

Ovanstående åtdragningsmoment gäller om ej andra värden angivits!

Výše uvedené utahovací momenty platí, pokud nejsou uvedeny jiné hodnoty.

Вышеприведенные моменты действуют в случае, что не приведены другие значения.

Fig. 4

Lagerwechsel / **Changing bearings** / Remplacement des roulements / Cambio de cojinetes
Sostituzione del cuscinetto / Lagerbyte / Výměna ložiska / Замена подшипника

Zwischenscheibe (Schutz der Zentrierung im Wellenende)
Spacer washer (to protect centring bore in shaft end)
Rondelle (protection du centrage en bout d'arbre)
Disco intermedio (protege el centrado en el extremo del eje)
Spessore (protezione delle centratura null'estremità d'albero)
Distansbricka (skydd av centrerings i axeltappen)
Vložená podložka (ochrana středního díku na konci hřídele)
Промежуточная подкладная шайба (защита центрального отверстия в конце вала)

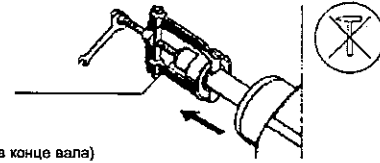
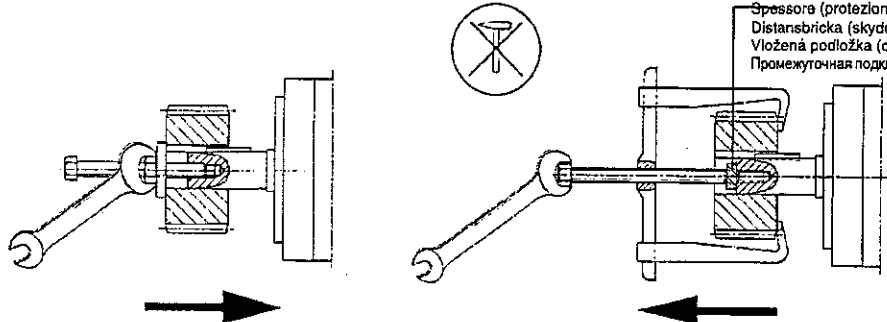


Fig. 6

Auf- und Abziehen von Abtriebs-elementen / **Pressing on and pulling off drive elements** / Emmanchement et extraction d'organes de transmission / Calado y extracción de elementos de accionamiento / Calettamento ed estrazione degli elementi di azionamento / På- och avdragning av drivdon / Nasazování a stahování přenosových členů / Установка и стягивание элементов передачи

Zwischenscheibe (Schutz der Zentrierung im Wellenende)
Spacer washer (to protect centring bore in shaft end)
Rondelle (protection du centrage en bout d'arbre)
Disco intermedio (protege el centrado en el extremo del eje)
Spessore (protezione delle centratura null'estremità d'albero)
Distansbricka (skydd av centrerings i axeltappen)
Vložená podložka (ochrana středního díku na konci hřídele)
Промежуточная подкладная шайба (защита центрального отверстия в конце вала)



Zum Aufziehen von Abtriebs-elementen (Kupplung, Zahnrad, Riemenscheibe usw.), Gewinde im Wellenende benutzen und - sofern möglich - Abtriebs-elemente nach Bedarf erwärmen. Zum Abziehen geeignete Vorrichtung verwenden. Es dürfen beim Auf- und Abziehen keine Schläge (z.B. mit Hammer oder ähnlichem) oder größere als die laut Katalog zulässigen radialen oder axialen Kräfte über das Wellenende auf die Motorlager übertragen werden.

Use the tapered hole provided in the end of the shaft for fitting drive components such as couplings, gearwheels, belt pulleys, etc. and, if possible, heat the components as necessary. Use a suitable puller tool for removing the components. Do not strike the components, e.g. with a hammer or similar tool, when fitting or removing them and do not exert more than the maximum value of radial or axial force - according to the catalog - transmitted to the motor bearings through the shaft extension.

Pour monter les organes de transmission (accouplements, roues dentées, poulies à courroie, etc.), utiliser le taraudage du bout d'arbre. Au besoin et lorsque cela est possible, chauffer les organes de transmission. Pour le démontage, utiliser un dispositif approprié. Aucun coup (par ex. marteau) supérieur aux efforts axiaux et radiaux admissibles mentionnés au catalogue ne doit être transmis par l'arbre aux roulements en cours de montage ou de démontage.

Para calar los elementos de accionamiento (acoplamientos, rueda dentada, polea, etc.) utilizar la rosca en el extremo del eje y - siempre que sea posible - calentar convenientemente dichos elementos. Utilizar el dispositivo adecuado para la extracción. Durante las operaciones de calado o extracción no golpear (p. ej. con martillo o similar) ni ejercer sobre los cojinetes del motor a través del extremo del eje fuerzas axiales o radiales superiores a las admisibles según catálogo.

Per calettare gli elementi di azionamento (giunti, ruote dentate, pulegge, ecc.), utilizzare il foro filettato nell'estremità d'albero e, se possibile, riscaldare gli elementi di azionamento. Per l'estrazione vanno adoperati attrezzi adatti. Sono da evitare colpi o martellate, e forze radiali o assiali trasmesse dall'estremità d'albero ai cuscinetti che siano maggiori di quelle consentite sec. il catalogo.

Använd axeltappens gänga vid pådragning av drivdon (koppling, kugghjul, remskiva etc) och värm om möjligt upp drivdonen om så behövs. Använd lämpliga verktyg för avdragningen. Några slag (t.ex. med hammare o.dyl.) får aldrig förekomma vid på- och avdragning, och radiala och axiella krafter som är större än de som anges i katalogen får inte överföras till motorlagren via axeltappen.

Pro nasazování přenosových členů (spojka, ozubené kolo, řemenice atd.) používat závit na konci hřídele a - pokud je to možné - přenosové členy podle potřeby nahřát. Pro stahování používat vhodný přípravek. Při nasazování a stahování se nesmí používat žádné údery (např. kladivem apod.) nebo větší radiální nebo axiální síly, než jsou přípustné podle katalogu, které se přenášejí přes konec hřídele na ložiska motoru.

Для установки элементов передачи (муфта, шестерня, ременный шкив итд.) применять резьбу в носке вала и - если возможно - подогреть элементы передачи по потребности. Для стягивания применять удобное приспособление. При установке и стягивании запрещается применять удары (например молотом итп.) или радиальные или осевые усилия превышающие значения допускаемые согласно каталогу, которые передаются через носок вала в подшипники двигателя.

Fig. 7

Auswuchtung mit halber Paßfeder / **Balancing with half featherkey**
Equilibrage avec demi-clavette / **Equilibrado con media claveta**
Equilibratura con mezza chiave / **Balansering med halv kil**
Vyvázení s polovinou pera / **Балансировка с половиной шпонки**

Nabenlänge / **Hub length** / Longueur du moyeu / Longitud del cubo / Lunghezza mozzo / Navälängd / Délka náboje / Длина ступицы

Herausragender Teil der Paßfeder T_p
Protruding section of featherkey T_p
Partie saillante T_p de la clavette
Parte saliente de la claveta T_p
Parte sporgente della chiave T_p
Nedslipning av den del av kilen T_p
Přední část zalícovaného pera T_p
Выступающая часть пригнанной T_p

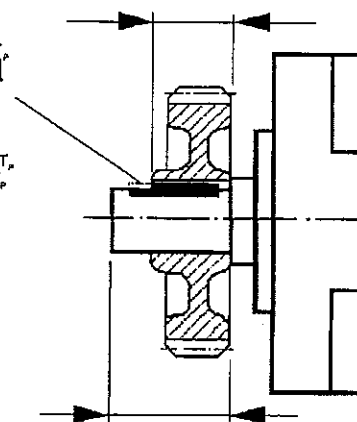


Fig. 8

Länge des Wellenendes l_w / **Length of shaft** l_w / Longueur du bout d'arbre l_w / Longitud del extremo del eje l_w
Lunghezza l_w dell'estremità d'albero / Axeltappens längd l_w / Délka konce hřídele l_w / Длина носка вала l_w

ANHANG / APPENDIX / APPENDICE / ANEXO / APPENDICE / BILAGA / DODATEK / ДОПОЛНЕНИЕ

DEUTSCH

Ersatzteile, vom Werk lieferbar
(s. Bestellbeispiel)

- 1.00 Lagerung AS
 - .40 Lagerschild
 - .43 Wellendichtring
 - .58 Federscheibe
 - .60 Wälzlager
 - .61 Verschlussstopfen
 - .65 Lagerdeckel
 - .67 Ausserer Lagerdeckel
 - .68 Schleuderscheibe
 - .69 Druckfeder
- 3.00 Lüfter, komplett
- 4.00 Ständer, komplett
 - .07 Gehäusefuß (BG180 rechts, links)
 - .18 Leistungsschild
 - .35 Scheibe
 - .40 Scheibe
 - .41 Erdungflasche
- 5.00 Klemmenkasten, komplett
 - .03 Dichtung (BG200 Schnurdichtung)
 - .10 Klammerbrätt, komplett
 - .33 Unverdrehbare Unterlage
 - .34 Klammbügel
 - .35 Gummistopfen
 - .44 Klammenkasten-Oberteil
 - .51 Mutter
 - .52 Schaltbügel
 - .70 Klammbügel
 - .71 Ausserer Lagerdeckel
 - .72 Schleuderscheibe
 - .83 Dichtung
 - .84 Klammenkasten-Deckel
 - .89 Schraube
 - .94 Schraube
 - .95 Klemme
 - .96 Tragschiene
 - .97 Strebekomplett
 - .99 Kontaktblech
- 6.00 Lagerung BS
 - .10 Wälzlager
 - .20 Lagerschild
 - .23 Wellendichtring
 - .24 Lagerdeckel
 - .65 Schmiemippel
 - .66 Gummibuchse
 - .67 Schmierrohr
- 7.00 Beflüchtung, komplett
 - .04 Lüfter
 - .40 Lüfterhaube
 - .41 Winkel
 - .49 Schraube

Auf- und Abziehvorrichtungen für Wälzlager, Lüfter und Abtriebs Elemente sind nicht lieferbar!

ENGLISH

Spare parts, available from the works
(see specimen orders)

- 1.00 Bearing assembly, drive end
 - .40 Endshield
 - .43 Shaft sealing ring
 - .58 Resilient preloading disc
 - .60 Rolling-contact bearing
 - .61 Plug
 - .65 Cover of bearing
 - .67 Outer bearing cap
 - .68 Grease slinger
 - .69 Compression springs
- 3.00 Rotor, complete
- 4.00 Stator, complete
 - .07 Body footing (BG 180 - left, right)
 - .18 Rating plate
 - .35 Disc
 - .40 Disc
 - .41 Earthing terminal
- 5.00 Terminal box, complete
 - .03 Gasket (frame sizes 200: cord-type gasket)
 - .10 Terminal board, complete
 - .33 Not-twist shim
 - .34 Terminal clip
 - .35 Rubber plug
 - .44 Upper part of terminal box
 - .51 Nut
 - .52 Stirrup
 - .70 Terminal clip
 - .71 Outer bearing cap
 - .72 Grease slinger
 - .83 Gasket
 - .84 Cover for terminal box
 - .89 Screw
 - .94 Screw
 - .95 Clip
 - .96 Supporting bar
 - .97 Brace complete
 - .99 Contact washer
- 6.00 Bearing assembly, non-drive end
 - .10 Rolling-contact bearing
 - .20 Endshield
 - .23 Shaft sealing ring
 - .24 Cover of bearing
 - .65 Nipple
 - .66 Rubber bush
 - .67 Lubrication pipe
- 7.00 Ventilation accessories, complete
 - .04 Fan
 - .40 Fan cowl
 - .41 Angle
 - .49 Screw

Mounting and extracting devices for rolling-contact bearings, fans and out elements are not available.

FRANÇAIS

Places de rechange, livrables par l'usine
(voir exemple de commande)

- 1.00 Paillet côté entraînement
 - .40 Plaque-palier
 - .43 Bague d'étanchéité
 - .58 Rondelle élastique
 - .60 Roulement
 - .61 Bauchons
 - .65 Couverture de palier
 - .67 Couvercle extérieur de palier
 - .68 Disque de projection
 - .69 Ressort de compression
- 3.00 Rotor, complet
- 4.00 Stator, complet
 - .07 Pied du corps (BG 180 - gauche, droit)
 - .18 Plaque signalétique
 - .35 Disque
 - .40 Disque
 - .41 Borne de mise à la terre
- 5.00 Boîte à bornes, complète
 - .03 Joint (torique sur HA 200)
 - .10 Plaque à bornes, complète
 - .33 Plaquette arrêtée en rotation
 - .34 Etrier de serrage
 - .35 Passe-câble en caoutchouc
 - .44 Partie supérieure de la boîte à bornes
 - .51 Ecrou
 - .52 Barret droite
 - .70 Etrier de serrage
 - .71 Couvercle extérieur de palier
 - .72 Disque de projection
 - .83 Joint
 - .84 Couvercle de la boîte à bornes
 - .89 Vis
 - .94 Vis
 - .95 Bornier pour circuit auxiliaire
 - .96 Lardon porteur
 - .97 Étau complet
 - .99 Tôle de contact
- 6.00 Paillet côté opposé à l'entraînement
 - .10 Roulement
 - .20 Plaque-palier
 - .23 Bague d'étanchéité
 - .24 Couvercle de palier
 - .65 Graisseur
 - .66 Douille en caoutchouc
 - .67 Tube de graissage
- 7.00 Ventilation, complète
 - .04 Ventilateur
 - .40 Capot du ventilateur
 - .41 Équerre
 - .49 Vis

Les dispositifs d'ammanchement et d'extraction pour roulements, ventilateurs et organes de transmission ne sont pas livrables.

ESPAÑOL

Piezas de recambio; suministro desde
fábrica (véase ejemplo de pedido).

- 1.00 Cojinete del LA
 - .40 Escudo portacojinetes
 - .43 Retén
 - .58 Arandela de resorte
 - .60 Rodamiento
 - .61 Tapón
 - .65 Cubierta del cojinete
 - .67 Tapa exterior del cojinete
 - .68 Anillo de engrase
 - .69 Muelles de presión
- 3.00 Rotor, completo
- 4.00 Estator, completo
 - .07 Pedestal del cuerpo (BG180 - izquierdo, derecho)
 - .18 Placa de características
 - .35 Arandela
 - .40 Disco
 - .41 Borne de puesta a tierra
- 5.00 Caja de bornes, completa
 - .03 Junta (en BG 200 obturación trenzada)
 - .10 Placa de bornes, completa
 - .33 Suplemento fijo
 - .34 Estribo
 - .35 Tapón de goma
 - .44 Parte superior de la caja de bornes
 - .51 Tuerca
 - .52 Brida
 - .70 Estribo
 - .71 Tapa exterior del cojinete
 - .72 Anillo de engrase
 - .83 Junta
 - .84 Tapa de la caja de bornes
 - .89 Tornillo
 - .94 Tornillo
 - .95 Abrazadera
 - .96 Listón de soporte
 - .97 Sostén completo
 - .99 Plancha de contacto
- 6.00 Cojinete del LCA
 - .10 Rodamiento
 - .20 Escudo portacojinete
 - .23 Retén
 - .24 Cubierta del cojinete
 - .65 Aceitera
 - .66 Casquillo de goma
 - .67 Tubo de lubricación
- 7.00 Ventilación, completa
 - .04 Ventilador
 - .40 Tapa del ventilador
 - .41 Angular
 - .49 Tornillo

No se suministran los dispositivos para extraer y calar los rodamientos, el ventilador y los elementos de accionamiento.

ANHANG / APPENDIX / APPENDICE / ANEXO / APPENDICE / BILAGA / DODATEK / ДОПОЛНЕНИЕ

ITALIANO	SVENSKA	ČESKY	ПО РУССКИ
Parti di ricambio, fornibili dalla fabbrica (vedi esempio)	Reservdelar, tillgängliga från fabriken (se Beställningsexempel)	Náhradní díly, které dodává výrobce (viz příklad objednávky)	Запасные части, поставляемые производителем (смотри пример заказа)
1.00 Supporto lato comando	1.00 Lager för axeltappsidan (A-sidan), komplett	1.00 Uložení AS	1.0 Установка AS
.40 Scudo di supporto	.40 Lagersköld	.40 ložiskový štít	.40 подшипниковый щит
.43 Anello torico	.43 Tätningsring	.43 těsnící kroužek hřídele	.43 уплотняющее кольцо вала
.58 Rondella elastica	.58 Fjäderbricka	.58 pružná podložka	.58 упругая шайба
.60 Cuscinetto a rotolamento	.60 Rullningslager	.60 valivé ložisko	.60 подшипник качения
.61 Tappo di chiusura	.61 Förseglingspropp	.61 uzavírací zátka	.61 запорная пробка
.65 Copricuscinetto	.65 Lageröverfall	.65 ložiskové víko	.65 колпак подшипника
.67 Copricuscinetto esterno	.67 Yttre lagerlock	.67 ložiskové víko vnější	.67 наружная крышка подшипника
.68 Disco centrifugo	.68 Avkastare	.68 odstředivkač	.68 центробежная шайба
.69 Molla da compressione	.69 Spiralfjäder	.69 Tlačná pružina	.69 пружина сжатия
3.00 Rotore, completo	3.00 Rotor, komplett	3.00 Rotor úplný	3.00 Ротор полный
4.00 Statore, completo	4.00 Stator, komplett	4.00 Stator úplný	4.00 Статор полный
.07 Plede del corpo (BG 180 - sinistro, destro)	.07 Kroppens fot (BG 180 - vänstre fot, högre fot)	.07 patka statoru (BG180 - pravá, levá)	.07 пятя статора (BG180 - правая, левая)
.18 Targhetta	.18 Märklåt	.18 výkonostní štětka	.18 табличка мощностей
.35 Disco	.35 Bricka	.35 podložka	.35 шайба
.40 Disco	.40 Skiva	.40 podložka	.40 шайба
.41 Morsetto di messa a terra	.41 Jordledningens klemmer	.41 uzemňovací spojka	.41 заземляющая муфта
5.00 Scatola morsetti, completa	5.00 Uttagsslåda, komplett	5.00 Svorkovnice úplná	5.00 Клеммник полный
.03 Guarnizione (nei BG200 guarnizione a corda)	.03 Tätning	.03 těsnění (BG200 těsnící šňůra)	.03 набивка (BG200 уплотняющий шнур)
.10 Morsettieria completa	.10 Kopplingsplint, komplett	.10 svorková deska úplná	.10 зажимная плата полная
.33 Supporto antirivisione	.33 Underlägg, arreterat	.33 pevná podložka proti pootočení	.33 жесткая шайба против поворота
.34 Morsetto di serraggio	.34 Klämbygel	.34 upínací úrmen	.34 зажимный хомут
.35 Tappo in gomma	.35 Gummiplogg	.35 gumová zátka	.35 резиновая пробка
.44 Parte superiore della scatola morsetti	.44 Anslutningslåda, överdell	.44 skříň svorkovnice	.44 коробка клеммника
.51 Dado	.51 Mutter	.51 malice	.51 гайка
.52 Ponticello diritto	.52 Bygel	.52 propojka	.52 соединитель
.70 Morsetto di serraggio	.70 Klämbygel	.70 U-lfmen	.70 хомут в форме U
.71 Copricuscinetto esterno	.71 Yttre lagerlock	.71 ložiskové víko vnější	.71 наружная крышка подшипника
.72 Disco centrifugo	.72 Avkastare	.72 odstředivkač	.72 центробежная шайба
.83 Guarnizione	.83 Tätning	.83 těsnění	.83 набивка
.84 Coperchio della scatola morsetti	.84 Lock till uttagsslåda	.84 víko skříň svorkovnice	.84 колпак коробки клеммника
.89 Vite	.89 Skruv	.89 šroub	.89 винт
.94 Vite	.94 Skruv	.94 šroub	.94 винт
.95 Morsettieria per circuito	.95 Klämma	.95 svorka	.95 зажим
.96 Lista portante	.96 Bärlist	.96 nosná lišta	.96 несущая планка
.97 Montante completo	.97 Full stråva	.97 opěrka úplná	.97 поддержка полная
.99 Lamiera di contatto	.99 Kontaktpiät	.99 kontaktní plech	.99 контактный пистовой металл
6.00 Supporto opposto al lato comando	6.00 Lager för fläktsidan (B-sidan)	6.00 Uložení BS	6.00 Установка BS
.10 Cuscinetto a rotolamento	.10 Rullningslager	.10 valivé ložisko	.10 подшипник качения
.20 Scudo di supporto	.20 Lagersköld	.20 ložiskový štít	.20 подшипниковый щит
.23 Anello torico	.23 Axeltätning	.23 těsnící kroužek hřídele	.23 уплотняющее кольцо вала
.24 Copricuscinetto	.24 Lageröverfall	.24 ložiskové víko	.24 колпак подшипника
.65 Nippolo di lubrificazione	.65 Smörjkopp	.65 mazací hlavice	.65 смазочная головка
.66 Bussola in gomma	.66 Gummihylsa	.66 gumové pouzdro	.66 резиновое втулка
.67 Tubo di lubrificazione	.67 Smörjrör	.67 mazací trubka	.67 смазочная трубка
7.00 Ventilazione completa	7.00 Fläktkytning, komplett	7.00 Ventilace úplná	7.00 Вентиляция полная
.04 Ventola	.04 Fläkt	.04 ventilátor	.04 вентилятор
.40 Cuffia della ventola	.40 Fläktkåpa	.40 kryt ventilátoru	.40 кожух вентилятора
.41 Angolare	.41 Vinkel	.41 úhelník	.41 угольник
.49 Vite	.49 Skruv	.49 šroub	.49 винт

Non sono fornibili i dispositivi di estrazione / calentamiento per i cuscinetti, ventilatori ed azionamenti.

På- och avdragare för rullningslager, fläkt och drivdon kan ej erhållas.

Nasazovací a stahovací přípravky pro valivé ložiska, ventilátory a přenosové členy se nedodávají!

Приспособления для установки и стягивания подшипников качения, вентиляторы и элементы передачи не поставляются.

Bestellbeispiel / Order example
 Exemple de commande
 Ejemplo de pedido
 Esempio di ordinazione
 Beställningsexempel
 Příklad objednávky
 Пример заказа

1LG4183-4AA60
 Nr. UC 0008/012783001
 1.40 Lagerschild

Siemens AG

Bereich Automatisierungs- und Antriebstechnik
Standard Drives
Postfach 3269
91050 Erlangen

Siemens AG

Automation & Drives
Standard Drives
Postbox 3269
91050 Erlangen

TITLE

INSPECTION PROCEDURE

CUSTOMER : Kawasaki Heavy Industries, LTD.
 : Namvaran Consulting Engineers
 : M. W. Kellogg Limited
 CLIENT : KPIC
 PLANT : 1200 MTPD Ammonia Plant / Kermanshah, Iran



Purchaser review and comments shall not be assumed to indicate either responsibility or liability for accuracy and completeness of this document or to alter any contractual terms and conditions.

Item Numbers
H-2101

Purchasers Disposition

No Comments Comments as Noted Rejected Not reviewed

Date	Company	Initial
9. Nov. 2004	KHI	H-Fi.

SDRL Code	REQ. No.	Purchase Order No.
-	5777-21D1-B626-01	04AA4H70

REPRO	COPY	No.	DATE	DESCRIPTION	DRAWN	CH'D	APP'D
	6	1	2004. 11. 5	REVISION	T. FUJINAGA	M. KAWATA	H. OKAMURA
	11	0	2004. 9. 24	ORIGINAL	T. FUJINAGA	M. KAWATA	H. OKAMURA
	6	CUSTOMER (KHI)		SSK No.	4 2 2 6 0 1 4		
	3	CUSTOMER (NCE)		SAP No.	N-89984		
	1	SSK	DOCUMENT No. N-89984-101				
	1	SAP					

SANKO AIR PLANT LTD.

Vacuum Equipment For Catalyst Removal Inspection Manual

1. Scope

This inspection manual applies to vacuum equipment for catalyst removal for primary reformer furnace.

2. Machines to be inspected

Model	Quantity	Item No.
VACUUM PRODUCER (BAG FILTER)	1	H-2101
TOP-HAT TYPE PRIMARY SEPARATOR	1	
HINGED VALVE "A1" (4B)	4	
HINGED VALVE "B1" (2 1/2B)	4	
PICK-UP HOSE (2 1/2B)	2	
CONNECTING HOSE "A" (4B)	1	
CONNECTING HOSE "B" (4B)	1	

3. Inspection

Items	In-house	Witnessed By customer	Confirmation With report	Remarks
1) Quantity	○	-	-	
2) Appearance	○	-	-	
3) Inside finish	○	-	-	
4) Coating	○	# △	# □	* 1)
5) Dimensions	○	# △	# □	* 1)
6) Air tightness	○	-	# □	* 1)
7) No load running test	○	# △	# □	* 1)
8) Material	-	-	□	* 1)

(Notes)

1) Symbol description

○: In-house inspection.

△: Inspection witnessed by customer.

□: Inspection to be confirmed with the report of inspection results in-house inspection.

2) All inspections shall be performed at room temperature.

*1) Inspection records to be submitted

4. Inspection criteria

Judgements shall be based on drawings approved by customer.

4.1 Quantity inspection

Check with drawings approved by customer.

4.2 Inspection of appearance

The requirements in the drawings are fulfilled.

a) that welded parts are uniform and free from cracks.

b) that machined surfaces have no detrimental scratches and are uniformly finished.

The edges shall be chamfered or rounded, and shall be free from burrs.

c) that no oil used in the production process or dust remains on both inside and outside surfaces.

4.3 Inspection of inner surface finishing

Visually check that the inside finish is as specified in drawings.

4.4 Inspection coating

a) Check that the outside iron surface is conditioned as specified by customer and coated with material specified by customer or equivalent.

b) Coated surface shall be smooth and uniform, and free from creases, cracks, or blisters.

Note: Inner surface and the mating surfaces, flange gasket surface of all equipment shall not be coated.

4.5 Inspection of dimension

a) Check that dimensions are as specified in drawing.

b) Measuring instruments: calipers, scale

4.6 Inspection of air-tightness

Test pressure: 45 kPa

a) When soapy water is applied on the pressurized surface, it is confirmed that bubbles show or not.

b) No leak. (Except for leakage from the gland packing.)

4.7 No load inspection

Check that on-off operation of the VACUUM PRODUCER.

4.8 Material inspection

Check that the material is as specified in the drawings.

a) If requested by customer, material inspection shall be performed by confirmation using Material Certificate.

Unless otherwise requested by customer, Material Certificate shall be submitted only for stainless steel products.

MANUFACTURER'S TEST REPORT OF ROOT'S BLOWER

SGS

プロフ試験成績書

Customer Messrs
御注文主

Independent Technical Inspection Co.
Independent Technical Inspection Co.
بالتقنية المستقلة للتفتيش

Manf's Order No.

弊社受注番号 K227-17089

User

Reviewed Hold

Test Date

試験日 Nov.8.2004

納入先

Witnessed

Test Method

試験方法 JIS B 8341

Service Name

Inspector's Name

SPECIFICATION FOR BLOWER

プロフ仕様

Source of Electricity

電源周波数 50 Hz

Manf's Type 型式	BH150	Bore 口径	吐出 Discharge 150 A	Manf's Serial No. 製造番号	8380
Capacity 空気量	m ³ /min 24.1	Suc.Press. 吸込圧力	kPa -40.5	Dis.Press. 吐出圧力	kPa -15
				Speed 回転速度	min ⁻¹ 1550

SPECIFICATION FOR MOTOR

電動機仕様

Manf's Type 型式	Ex nAII T3	Out Put 出力	22 kW	Manf's Serial No. 製造番号	-
Poles 極数	4 P	Frequency 周波数	50 Hz	Phases 相数	3Phases
Current 電流	40.5 A	Driving System 駆動方式	Belt Drive Vベルト掛式	Maker 製造者	

LOAD CHARACTERISTICS

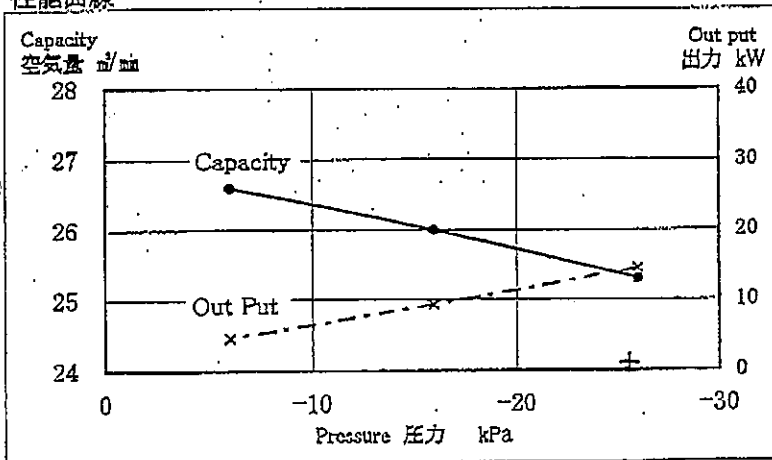
負荷特性

空気量は吸込側換算

Speed 回転速度	Suction Pressure 吸込圧力	Discharge Pressure 吐出圧力	Capacity 空気量	Voltage 電圧	Current 電流	Out Put 出力
min ⁻¹	kPa	kPa	m ³ /min	V	A	kW
1548	-26	0	25.3	400	26.7	14.5
1551	-16	0	26.0	400	17.1	9.3
1554	-6	0	26.6	400	8.7	4.7

PERFORMANCE CURVE

性能曲線

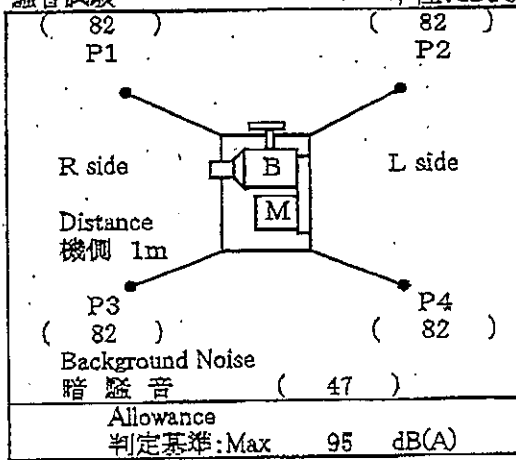


NOISE TEST

騒音試験

Unit

単位: dB(A)



VIBRATION TEST

振動試験

Peak to Peak 両振幅

Unit

単位: μm

Housing L ハウジングL			Housing R ハウジングR		
V(垂直)	H(水平)	A(軸)	V(垂直)	H(水平)	A(軸)
22	28	18	18	32	16
Allowance 判定基準: Max 73 μm					

TEMPERATURE TEST

温度試験

Unit

単位: °C

Suction Temp 吸込温度	Hours Run 時間後	Housing L 測定値	Housing R 測定値
24	2.0 Hr	51	52
Allowance 判定基準: Max 100 °C			

Result
結果

Good

Check
検査印

S. Egawa

Test By
検査印

T. Yamashita

Reviewed 24 NOV 2004 by

ANLET CO., LTD.
株式会社 アンレット

Witnessed By
 Reviewed By T. Fujinaga
SANKO AIR PLANT LTD.
Date 2004.11.1



Werksprüfzeugnis (2.3)

[1]

Seite 1 von 1

Hersteller : Siemens AG Automation and Drives Standard Drives	Besteller : [2] SIEMENS AG Winter-Guenther-Str.11 D-90441 Nuernberg		
Anschrift : Siemens Elektromotory s.r.o. Markova 952, CZ-744 11 Frenstat	Kunde :		
LAZ : 124732	BZ-Pos: 10	AKZ: 4504133175	Pos. 10

SIEMENS



III 3G EEx nA II T3



3- [MOT.]	[ILG4 207-4AA90-Z]	[200L]	UC [0410/058940501]	IM [B3]	Th. CL [F]					
V	Hz	Ex nA II T3	A	kW	cos	l/min	Ia/In	Te s	Certif.No	IP
400 D	50		40,5	22	0,86	1465				55
690 Y			23,5							

IEC/EN 60034 EN 50021/IEC 60079-15 Gew./Wt. 205

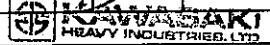
ALT 1500m

KT/COOLANT TEMP. -30..+45°C

SGS
Independent Technical Inspection Co.
وفاة الى تميم وبنه وسرزاب شكره
Reviewed Hold
Witnessed
Inspector's Name: *[Signature]*
NOV 26 2004

Messdaten	Mot. Nr.	Ständer [4]			Leistung-				cos. phi	M [16] [Nm]	Eta [17] [%]	Ia/In [22]	M _A /M _N [23]	Pol zahl [15]
		Fre-guenz [3] [Hz]	Span-nung [5] [V]	Strom [6] [A]	Dreh-zahl [7] [1/min]	Aufn. P1 [9] [kW]	Abgabe P2 [8] [kW]							
Leerl. [10]		50	400	16.2	1500	0.900			0.080					4
Last [18]														
Anzug [19]														

Kurzschlußläufer [11] Ausführung : EN 60034, IEC 60034 [12]



Temperaturfühlerwiderstände / Resistance of the temperature sensors : Ohm
Stillstandsheizwiderstand / Resistance of the anti-condensation heater : Ohm

Isolationswiderstand / Insulation resistance : > 50 Mohm

Schwingung / Vibration : Nach / acc.to EN 60034-14 max.	1	2	3	4	5	mm/s
---	---	---	---	---	---	------

Viderstand zwischen Klemmen [13] U1-V1
U1-W1 0.260 Ohm
V1-W1

Vicklungsprüfung der Isolierung bestanden [14] Kühllufttemperatur max. 45 °C [20]
bzw. nach Leistungsschildangabe [21]

- | | | |
|--------------------------------------|--|---|
| [1] English / Francais | [13] Resistance between terminals | / Résistance entre bornes |
| [2] Test report | [14] High-voltage test passed | / L'essai diélectrique a donné satisfaction |
| [3] Reference | [15] Number of poles | / Nombres des poles |
| [4] Frequency | [16] Torque | / Couple |
| [5] Stator | [17] Efficiency | / Rendement |
| [6] Voltage | [18] Load | / Mesure à...charge |
| [7] Current | [19] Locked rotor test | / Test en court circuit |
| [8] Speed r.p.m. | [20] Cooling air temp. max. °C | / Temp.de l'air de refroidissement max. °C |
| [9] Output | [21] Or indication on name plate | / Ou indique sur la plaque |
| [10] Input | [22] Starting current related tu rated current | |
| [11] No load test | [23] Starting torque related to rated torque | |
| [12] Squirrel-cage rotor | | / courant rotor bloqué en proportion de courant assigné |
| [12] According to stand prescription | | / couple rotor bloqué en proportion de couple assigné |

&D SD MF QM

Datum : 2004/11/4

Unterschrift : Pink *[Signature]* Qualitätssicherung

Prüfbescheinigung

Witnessed By
 Reviewed By T. Fujinaga
SANKO AIR PLANT LTD.
Date 2004.11.4

REV. No.	DATE	DESCRIPTION	CHCD	APPD.
△				
△				
△				

Maker:SHIDA

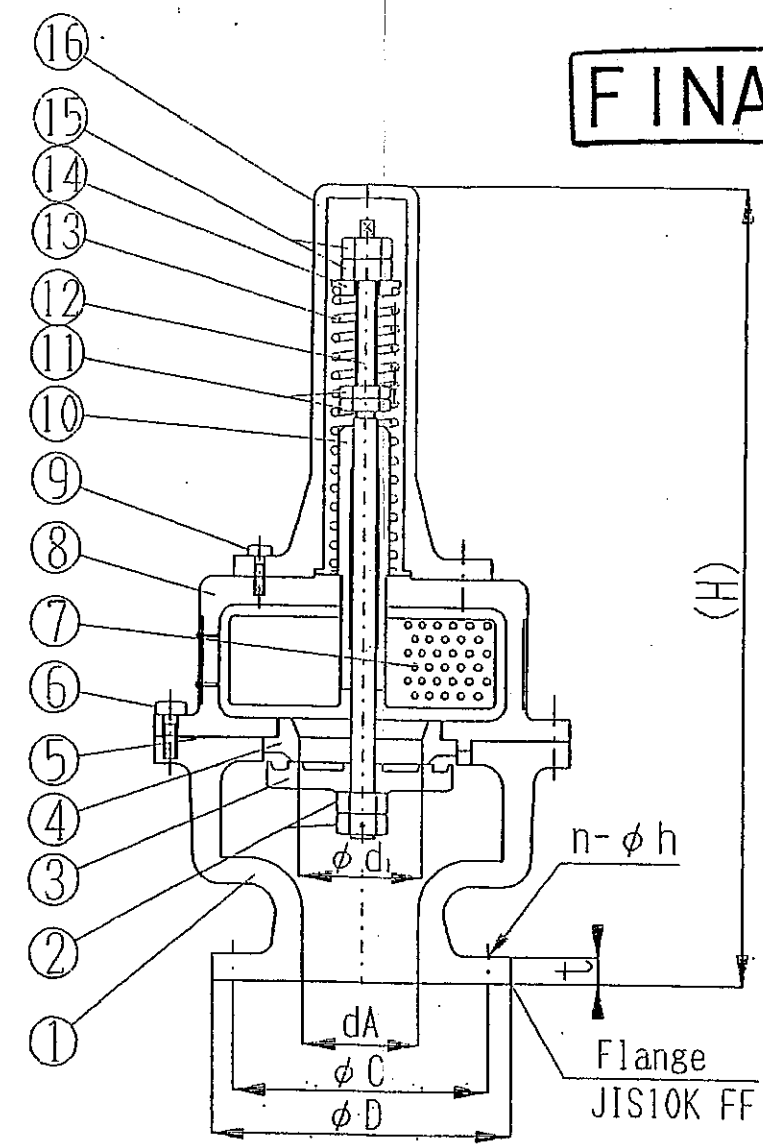
No.	Name of Parts	Material
1	BODY	FC200
2	LOCK NUT	SUS304
3	VALVE DISC	BC6
4	VALVE SEAT	BC6
5	GASKET	V #1500
6	SET BOLT	SS400
7	STRAINER	SUS304
8	BODY COVER	FC200
9	SET BOLT	SS400
10	SPINDLE GUIDE	C3604
11	LIFT STOPPER	SS400
12	SPINDLE	SUS304
13	SPRING	SWPA, SWDSM SUP or
14	SPRING SEAT	SS400
15	LOCK NUT	SS400
16	SPRING CASE	FC200

dA	d _i	D	C	t	n	h	H
25A	50	125	90	18	4	19	330
32A	50	135	100	20	4	19	330
40A	50	140	105	20	4	19	330
50A	80	155	120	20	4	19	410
65A	100	175	140	22	4	19	485
80A	100	185	150	22	8	19	485
100A	150	210	175	24	8	19	570
125A	175	250	210	24	8	23	655
150A	200	280	240	26	8	23	720
200A	250	330	290	26	12	23	830
250A	300	400	355	30	12	25	940
300A	350	445	400	32	16	25	1000

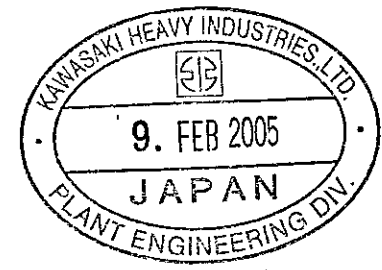
Set pressure -45kPa NORMAL

Drawing revision	Date	Prepared	Chief	Check	Drawing	Date	Name
						Aug. 30. 1999	VACUUM SAFETY VALVE
							Material
							Scale NTS : 3rd. A. Unit mm
							Type VB
							Sheet No. VB-A-C-001-E
							DWG. No. VB-C-01

 ANLET CO., LTD.



FINAL



NOTE
1. QUANTITY : 1 SET / UNIT

Purchaser review and comments shall not be assumed to indicate either responsibility or liability for accuracy and completeness of this document or to alter any contractual terms and conditions.

Item Numbers H-2101

Purchaser Disposition
 No Comments Comments as Noted Rejected Not reviewed

Date: 9. October '04 Company: KH Initial: Al

SDRL Code: A10 REQ. No.: 5777-21D1-8628-01 Purchase Order No.: 04AA4170

PART No.	NAME OF PART	No.FOR 1 SET	MATERIALS	REMARKS
FOR				NAME OF JOB
DATE	TITLE			
2004.08.19	VACUUM SAFETY VALVE			
FILE No.				
DRAWN	DESIGNED	CHECKED	APPROVED	SCALE
T.F.	T.F.	M.K.	H.O.	NON
OUR JOB No.				N-89984
SANKO AIR PLANT LTD.				9984AM06001