

AD 2 AERODROMES

RJCM AD 2.1 AERODROME LOCATION INDICATOR AND NAME

RJCM - MEMANBETSU

RJCM AD 2.2 AERODROME GEOGRAPHICAL AND ADMINISTRATIVE DATA

1	ARP coordinates and site at AD	435250N / 1440951E 175° / 1.25km from RWY 18 THR
2	Direction and distance from (city)	9.7nm SSW ABASHIRI
3	Elevation/ Reference temperature	109FT / 26°C (2004-2008)
4	Geoid undulation at AD ELEV PSN	99FT
5	MAG VAR/ Annual change	9° W(2009) / 2.1'E
6	AD Administration, address, telephone, telefax, telex, AFS, e-mail and/or Web-site addresses	HOKKAIDO. Public AP. 256-3, Chuou, Memanbetsu, Ozora-cho Abashiri-gun, Hokkaido TEL: 0152-74-2222 FAX: 0152-74-3674
7	Types of traffic permitted(IFR/VFR)	IFR/VFR
8	Remarks	Memanbetsu Airport Branch (CAB) 256, Chuou, Memanbetsu, Ozora-cho Abashiri-gun, Hokkaido TEL:0152-74-2673

RJCM AD 2.3 OPERATIONAL HOURS

1	AD Administration	2300-1200
2	Customs and immigration	On request Customs: 0154-22-3730 Immigration: 0154-22-2430
3	Health and sanitation	Quarantine(human): On request(0154-23-3340) Quarantine(animal, plant): Nil
4	AIS Briefing Office	Nil
5	ATS Reporting Office(ARO)	Nil
6	MET Briefing Office	H24 (NEW CHITOSE)
7	ATS	2300-1200
8	Fuelling	2300-1200
9	Handling	2300-1200
10	Security	2300-1200
11	De-icing	Nil
12	Remarks	Nil

RJCM AD 2.4 HANDLING SERVICES AND FACILITIES

1	Cargo-handling facilities	All the modern institutions that deal with the weight thing to a A306 type freighter
2	Fuel/ oil types	JET A-1
3	Fuelling facilities/ capacity	Fuel truck refueling, 22L/sec
4	De-icing facilities	Nil
5	Hangar space for visiting aircraft	Nil
6	Repair facilities for visiting aircraft	Nil
7	Remarks	Nil

RJCM AD 2.5 PASSENGER FACILITIES

1	Hotels	Nil
2	Restaurants	At airport
3	Transportation	Buses and taxis
4	Medical facilities	Hospital in Ozora-town, 5km from AP
5	Bank and Post Office	Nil
6	Tourist Office	At airport
7	Remarks	Nil

RJCM AD 2.6 RESCUE AND FIRE FIGHTING SERVICES

1	AD category for fire fighting	CAT 8
2	Rescue equipment	Chemical fire fighting truck x 3 Emergency medical equipments conveyance truck x 1
3	Capability for removal of disabled aircraft	Nil
4	Remarks	Nil

RJCM AD 2.7 SEASONAL AVAILABILITY-CLEARING

1	Types of clearing equipment	Snow removal equipment: 42
2	Clearance priorities	1) RWY 18/36, T1, T6, P1-P6, Apron A 2) T2-T5, TB, Apron B
3	Remarks	Nil

RJCM AD 2.8 APRONS, TAXIWAYS AND CHECK LOCATIONS DATA

1	Apron surface and strength	Apron A : Surface:Cement-concrete, Strength:PCN 74/R/B/X/T Apron B : Surface:Asphalt-concrete, Strength:PCN 21/F/B/Y/T
2	Taxiway width, surface and strength	T1-T6, P1-P6 : Surface:Asphalt-concrete, Width:30m, Strength:PCN 89/F/C/X/T TB : Surface:Asphalt-concrete, Width:9m, Strength:PCN 21/F/B/Y/T
3	ACL and elevation	Not available
4	VOR checkpoints	Not available
5	INS checkpoints	(Spot NR) 1 : 435257.24N/1440933.47E 2 : 435255.56N/1440933.89E 3 : 435253.47N/1440934.16E 4 : 435251.21N/1440934.53E 5 : 435248.95N/1440934.82E 6 : 435246.85N/1440935.01E
6	Remarks	Nil

RJCM AD 2.9 SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS

1	Use of aircraft stand ID signs, TWY guide lines and Visual docking/ parking guidance system of aircraft stands	Aircraft stand ID sign : Nil ACFT stand taxi lane marking : See AD2.24. AD chart Visual docking guidance system : Nil
2	RWY and TWY markings and LGT	RWY: RWY18/36 (Marking) RWY designation, RWY CL, RWY THR, Aiming point, TDZ, RWY side stripe (LGT) RCLL, REDL, RTHL, RENL, RTZL, RWY DIST marker LGT, WBAR TWY: ALL (Marking) TWY CL, TWY side stripe (LGT) TWY edge LGT TWY: T1-T6 (Marking) RWY HLDG PSN, Mandatory instruction (LGT) TWY CL LGT, RWY guard LGT, Taxiing guidance sign TWY: P1-P6 (LGT) TWY CL LGT TWY: TB (Marking) RWY HLDG PSN, Mandatory instruction (LGT) RWY guard LGT, Taxiing guidance sign
3	Stop bars	Nil
4	Remarks	(Marking) Overrun area (LGT) Apron flood LGT

RJCM AD 2.10 AERODROME OBSTACLES

In approach/TKOF areas

RWY/Area affected	Obstacle type	Coordinates	Elevation	Markings/LGT	Remarks
Nil					

In circling area and at AD

Obstacle type	Coordinates	Elevation	Markings/LGT	Remarks
Tree	435223.2N/1441218.2E	272FT	- /LIM(Red)	Nil
Tree	435202.2N/1441121.0E	295FT	- /LIM(Red)	Nil
Tree	435138.1N/1441113.3E	309FT	- /LIM(Red)	Nil

RJCM AD 2.11 METEOROLOGICAL INFORMATION PROVIDED

1	Associated MET Office	NEW CHITOSE
2	Hours of service MET Office outside hours	H24 (NEW CHITOSE)
3	Office responsible for TAF preparation Periods of validity	NEW CHITOSE 30 Hours
4	Trend forecast Interval of issuance	Nil
5	Briefing/ consultation provided	Briefing is available upon inquiry at NEW CHITOSE
6	Flight documentation Language(s) used	C En
7	Charts and other information available for briefing or consultation	S ₆ , U ₈₅ , U ₇ , U ₅ , U ₃ , U ₂₅ , U ₂ /T _r , P _s , P ₅ , P ₃ , P ₂₅ , P _{SWE} , P _{SWF} , P _{SWG} , P _{SWI} , P _{SWM} , P _{SW} (domestic), E, C, W _E , W _F , W _G , W _I , W, N
8	Supplementary equipment available for providing information	Nil
9	ATS units provided with information	TWR
10	Additional information(limitation of service, etc.)	Nil

RJCM AD 2.12 RUNWAY PHYSICAL CHARACTERISTICS

Designations RWY NR	TRUE BRG	Dimensions of RWY(M)	Strength(PCN) and Surface of RWY	THR coordinates THR geoid undulation	THR elevation and highest elevation of TDZ of precision APP RWY
1	2	3	4	5	6
18	174.66°	2500x45	PCN 89/F/C/X/T Asphalt-concrete	435330.51N/1440945.38E 98.8FT	THR ELEV: 102.0FT TDZ ELEV: 108FT
36	354.66°	2500x45		435209.85N/1440955.80E 98.8FT	THR ELEV: 135.2FT TDZ ELEV: 131FT
Slope of RWY		Strip Dimensions(M)	RESA (Overrun) Dimensions (M)		Remarks
7		10	11		14
See below figure		2620x300	190x(MNM:140 MAX:300)*		RWY Grooving 2500m x 45m
		2620x300	40x300 *For detail, ask airport administrator		



RJCM AD 2.13 DECLARED DISTANCES

RWY Designator	TORA (m)	TODA (m)	ASDA (m)	LDA (m)	Remarks
1	2	3	4	5	6
18	2500	2500	2500	2500	Nil
36	2500	2500	2500	2500	Nil

RJCM AD 2.14 APPROACH AND RUNWAY LIGHTING

RWY Designator	APCH LGT type LEN INTST	RTHL Color WBAR	PAPI (VASIS) Angle DIST FM THR MEHT	RTZL LEN	RCLL LEN Spacing Color INTST	REDL LEN Spacing Color INTST	RENL Color WBAR	STWL LEN Color
1	2	3	4	5	6	7	8	9
18	PALS (CAT I) 900m LIH	Green Green	PAPI 3.0°/Left 404.5m 65.6ft	900m	2500m 30m Coded color (White/Red) LIH	2500m 60m Coded color (White/Yellow) LIH	Red	Nil(*1)
36	PALS (CAT I) 900m LIH	Green Green	PAPI 3.0°/Left 499.2m 65.6ft	900m	2500m 30m Coded color (White/Red) LIH	2500m 60m Coded color (White/Yellow) LIH	Red	Nil(*1)
Remarks								
10								
Overrun area edge LGT(LEN:60m, Color:Red)(*1)								

RJCM AD 2.15 OTHER LIGHTING, SECONDARY POWER SUPPLY

1	ABN/IBN location, characteristics and hours of operation	ABN: 435259N /1440926E , ALTN FLG(2)WG EV 4.3SEC, HO
2	LDI location and LGT Anemometer location and LGT	LDI : Nil Anemometer : RWY 18: 263m from RWY 18 THR RWY 36: 305m from RWY 36 THR
3	TWY edge and center line lighting	TWY edge and center line lights installed, see AD2.9
4	Secondary power supply / switch-over time	Within 1sec : REDL, RENL, RTHL, WBAR, RCLL, Overrun area edge LGT Within 15sec : Other LGT
5	Remarks	WDI LGT

RJCM AD 2.16 HELICOPTER LANDING AREA

Nil

RJCM AD 2.17 ATS AIRSPACE

Designation and lateral limits		Vertical limits (ft)	Airspace classification	ATS unit call sign Language	Remarks
1		2	3	4	6
Memambetsu CTR	Area within a radius of 5nm(9km) of Memambetsu ARP (4353N/14410E)	3000 or below	D	Memambetsu TWR En	

RJCM AD 2.18 ATS COMMUNICATION FACILITIES

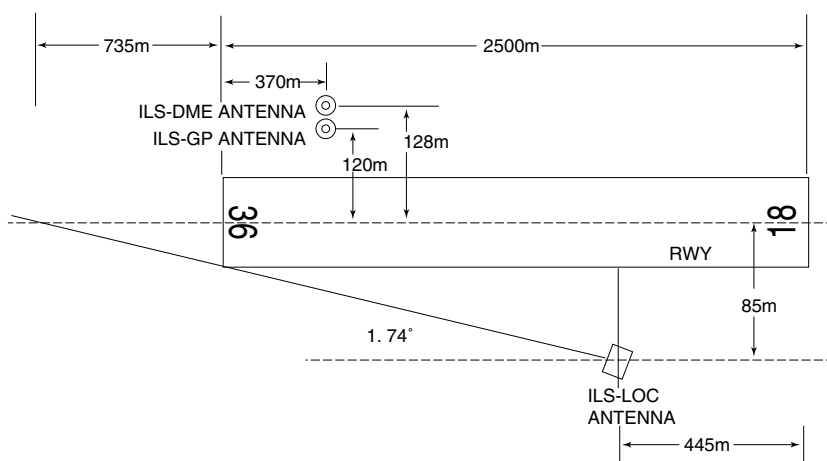
Service designation	Call sign	Frequency	Hours of operation	Remarks
1	2	3	4	5
TWR	Memambetsu tower	118.85MHZ(1) 126.2MHZ	2300 - 1200 (1)Primary	

RJCM AD 2.19 RADIO NAVIGATION AND LANDING AIDS

Type of aid (VOR declination)	ID	Frequency	Hours of operation	Position of transmitting antenna coordinates	Elevation of DME transmitting antenna	Remarks
1	2	3	4	5	6	7
VOR (9°W/2010)	TBE	110.85MHz	H24	435305.67N/ 1440958.26E		
DME	TBE	1132MHz (CH-45Y)	H24	435305.67N/ 1440958.26E	132ft	
ILS-LOC 18	ITB	110.1MHz	2300 - 1200	435202.26N/ 1440956.74E		LOC: 235m (771ft) away FM RWY 36 THR, BRG (MAG) 184°
ILS-GP 18	-	334.4MHz	2300 - 1200	435320.20N/ 1440952.07E		GP: 329m (1079ft) inside FM RWY 18 THR, 120m (394ft) E of RCL. Angle 3.0°, HGT of ILS reference datum 16.5m (54ft)
ILS-DME 18	ITB	999MHz (CH-38X)	2300 - 1200	435320.16N/ 1440952.39E	119ft	DME: 331m (1086ft) inside FM RWY 18 THR, 130m(427ft) E of RCL.
ILS-LOC 36	IHM	110.3MHz	2300 - 1200	435316.40N/ 1440950.98E		LOC: 445m(1460ft) inside FM RWY 18 THR, 85m(279ft) E of RCL. LOC off-set angle 1.74° BRG(MAG) 5° LOC unusable beyond 17NM from LOC antenna
ILS-GP 36	-	335MHz	2300 - 1200	435221.41N/ 1440948.86E		GP: 370m(1214ft) inside FM RWY 36 THR, 120m(394ft) W of RCL. HGT of ILS reference datum: 16.5m(54ft). GP angle 3.0°.
ILS-DME 36	IHM	1001MHz (CH-40X)	2300 - 1200	435221.39N/ 1440948.51E	141ft	DME: 370m(1214ft) inside FM RWY 36, 128m(420ft) W of RCL.
MSAS		1575.42MHz	H24			Transmitting antennas are satellite based.

ILS for RWY18

REMARKS : 1. LOC beam BRG(MAG) 184°
 2. HGT of ILS REF datum 16.5m(54ft)
 3. GP Angle 3.0°
 4. ELEV of ILS-DME 36.2m(119ft)

ILS for RWY36

REMARKS : 1. LOC OFFSET ANGLE 1.74°
 2. LOC beam BRG(MAG) 5°
 3. HGT of ILS REF datum 16.5m(54ft)
 4. GP Angle 3.0°
 5. ELEV of ILS-DME 42.85m (140.5ft)



LOC unusable in the following area : BEY 17NM FM LOC ANT.

RJCM AD 2.20 LOCAL TRAFFIC REGULATIONS

1. Airport regulations

Aircraft operations other than scheduled flights or in an emergency
On use of this airport, aircraft operator is required to obtain the prior permission of the Airport Administrator.

2. Taxiing to and from stands

Nil

3. Parking area for small aircraft(General aviation)

Nil

4. Parking area for helicopters

Nil

5. Apron - taxiing during winter conditions

Nil

6. Taxiing - limitations

Nil

7. School and training flights - technical test flights - use of runways

Nil

8. Helicopter traffic - limitation

Nil

9. Removal of disabled aircraft from runways

Nil

RJCM AD 2.21 NOISE ABATEMENT PROCEDURES

Nil

RJCM AD 2.22 FLIGHT PROCEDURES**1.TAKE OFF MINIMA**

	RWY	REDL & RCLL		REDL or RCLL or RCL Marking		NIL (DAY ONLY)	
		RVR	VIS	RVR	VIS	RVR	VIS
Multi-Engine ACFT with TKOF ALTN AP Filed	18/36	400m		400m	400m	-	500m
OTHER	18/36	AVBL LDG MINIMA					

RJCM AD 2.23 ADDITIONAL INFORMATION

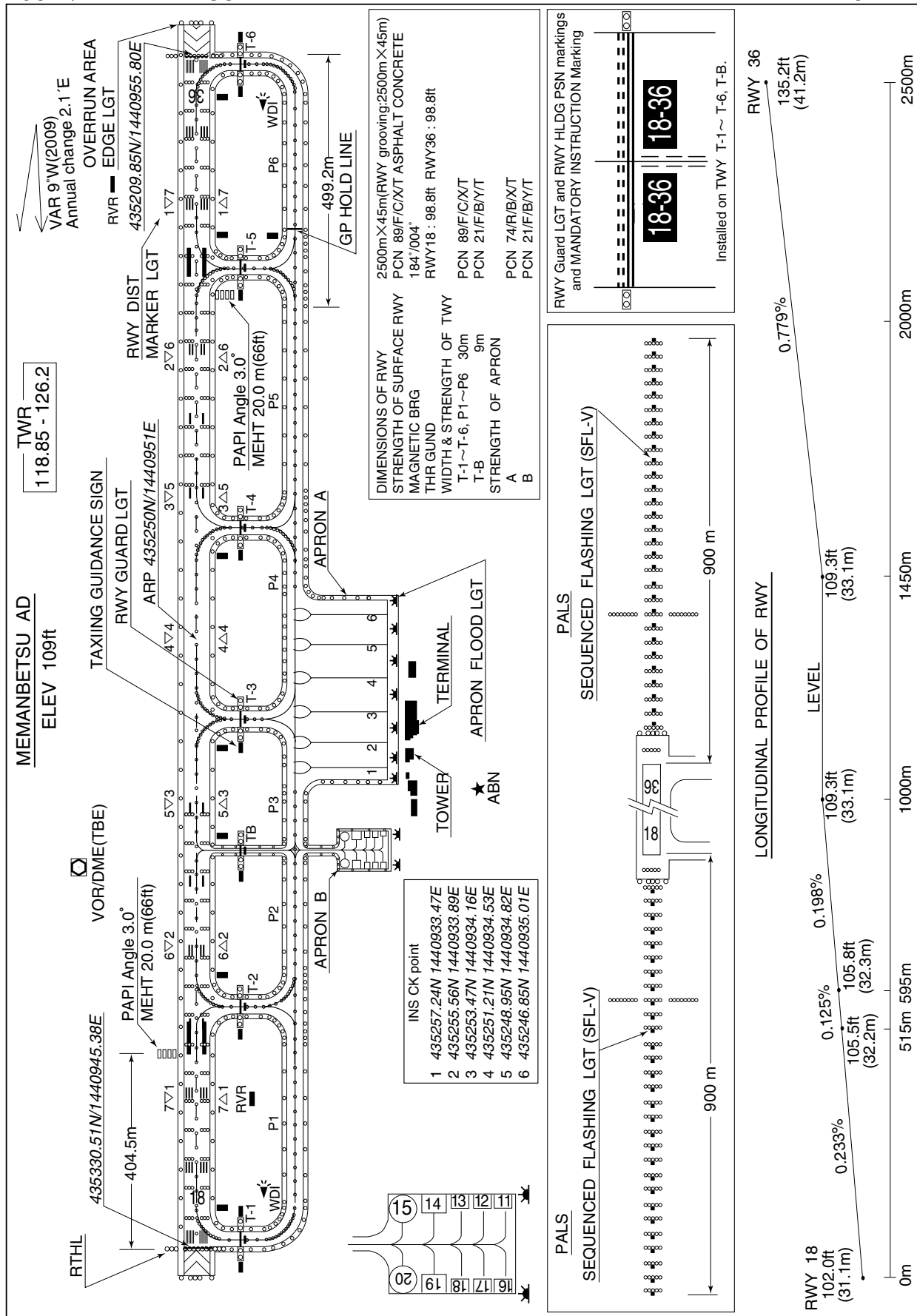
Nil

RJCM AD 2.24 CHARTS RELATED TO AN AERODROME

Aerodrome/Heliport Chart Standard Departure Chart (KUSHIRO) Standard Departure Chart (EATAK) Standard Departure Chart (MEMANBETSU REVERSAL) Standard Departure Chart (SHIBARE-RNAV) Standard Arrival Chart (QURIO ARC) Instrument Approach Chart (ILS Z or LOC Z RWY18) Instrument Approach Chart (ILS Y or LOC Y RWY18) Instrument Approach Chart (ILS or LOC RWY36) Instrument Approach Chart (VOR RWY18) Instrument Approach Chart (VOR RWY36) Instrument Approach Chart (RNAV(RNP) RWY18) Other Chart (Visual REP) Other Chart (LDG CHART) Other Chart (MVA CHART)
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RJCM / MEMANBETSU

AD CHART



STANDARD DEPARTURE CHART -INSTRUMENT

RJCM / MEMANBETSU

SID

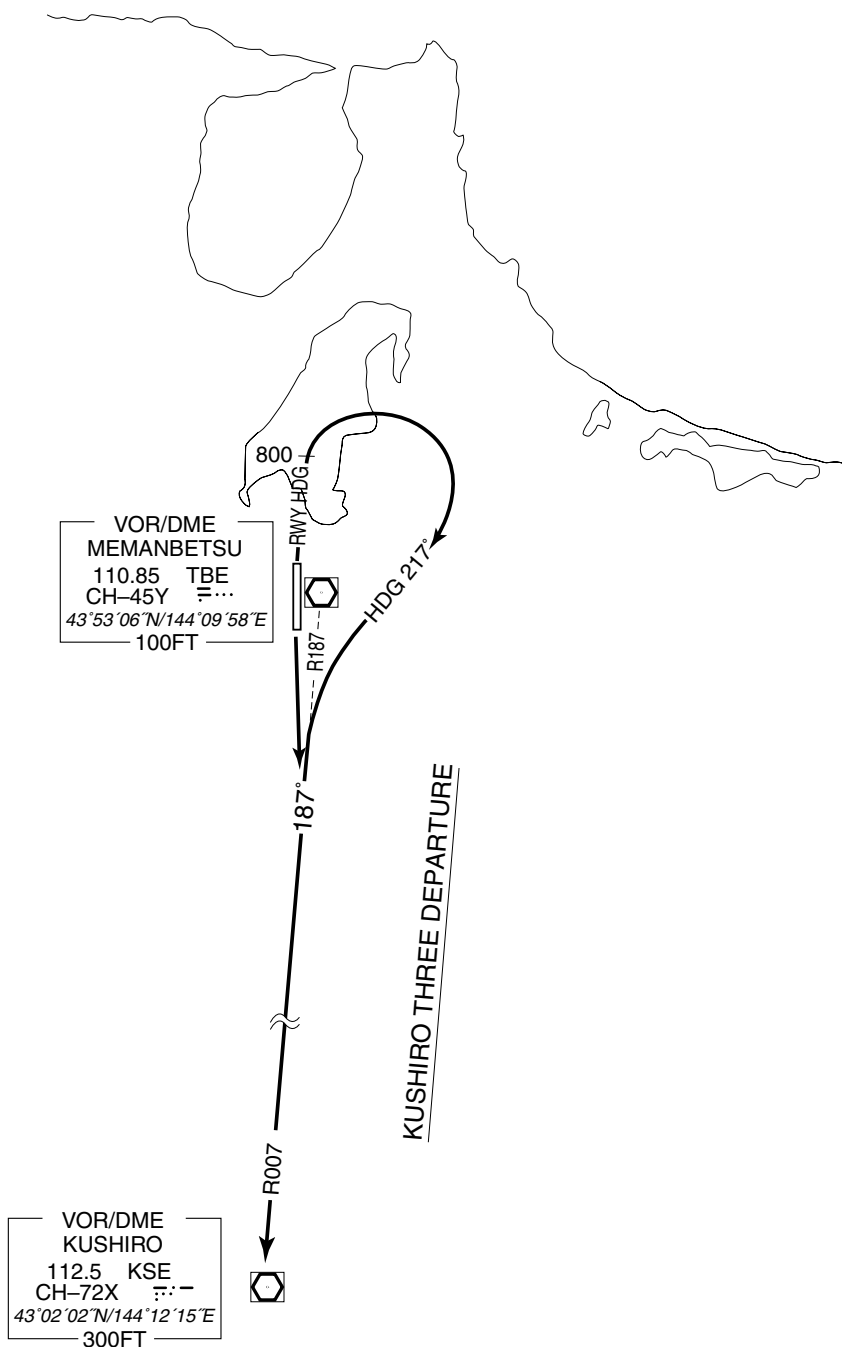
KUSHIRO THREE DEPARTURE

RWY 18 : Climb via TBE R187/KSE R007 to KSE VOR/DME.

RWY 36 : Climb RWY HDG to 800FT, turn right HDG 217° to intercept and proceed via TBE R187/KSE R007 to KSE VOR/DME.

Note RWY18 : 3.9% climb gradient required up to 4500FT.

OBST ALT 3281FT located at 17.0NM 179° FM end of RWY18.



STANDARD DEPARTURE CHART-INSTRUMENT

RJCM / MEMANBETSU

SID

EATAK THREE DEPARTURE

RWY 18 : Climb RWY HDG to 800FT, turn right climb via TBE R220/OBE R039 to EATAK....

RWY 36 : Climb RWY HDG to 1000FT, turn left HDG 175° to intercept and proceed via
TBE R220/OBE R039 to EATAK....

....Cross EATAK at or above 6000FT.

Note RWY36 : 3.9% climb gradient required up to 2000FT.

OBST ALT 1181FT located at 4.5NM 290° FM end of RWY36.



STANDARD DEPARTURE CHART-INSTRUMENT

RJCM / MEMANBETSU

SID

MEMANBETSU REVERSAL THREE DEPARTURE

RWY 18 : Climb via TBE R187 to TBE 5.0DME, turn left....

RWY 36 : Climb via TBE R001 to TBE 5.0DME, turn right,....

....Proceed to TBE VOR/DME. Cross TBE VOR/DME at or above 4000FT.



STANDARD DEPARTURE CHART-INSTRUMENT

RJCM / MEMANBETSU

RNAV SID

SHIBARE ONE DEPARTURE

Basic RNP1

Note GNSS required.

VAR 9° W(2016)

SHIBARE ONE DEPARTURE



SHIBARE ONE DEPARTURE

RWY18: Climb on HDG184° at or above 600FT, turn right direct to NICOL at or above 7000FT, to NOTAK at or above 9000FT.

RWY36: Climb on HDG004° at or above 600FT, turn left direct to NICOL at or above 7000FT, to NOTAK at or above 9000FT.

Note RWY36 : 5.0% climb gradient required up to 600FT.

OBST ALT 1181FT located at 6.3NM 312° FM end of RWY36.

RWY18

Serial Number	Path Descriptor	Waypoint Identifier	Fly Over	Course °M(°T)	Magnetic Variation	Distance (NM)	Turn Direction	Altitude (FT)	Speed (KIAS)	Vertical Angle	Navigation Specification
001	VA	—	—	184 (174.7)	-9.2	—	—	+600	—	—	Basic RNP1
002	DF	NICOL	—	—	-9.2	—	R	+7000	—	—	Basic RNP1
003	TF	NOTAK	—	231 (222.1)	-9.2	45.3	—	+9000	—	—	Basic RNP1

RWY36

Serial Number	Path Descriptor	Waypoint Identifier	Fly Over	Course °M(°T)	Magnetic Variation	Distance (NM)	Turn Direction	Altitude (FT)	Speed (KIAS)	Vertical Angle	Navigation Specification
001	VA	—	—	004 (354.7)	-9.2	—	—	+600	—	—	Basic RNP1
002	DF	NICOL	—	—	-9.2	—	L	+7000	—	—	Basic RNP1
003	TF	NOTAK	—	231 (222.1)	-9.2	45.3	—	+9000	—	—	Basic RNP1

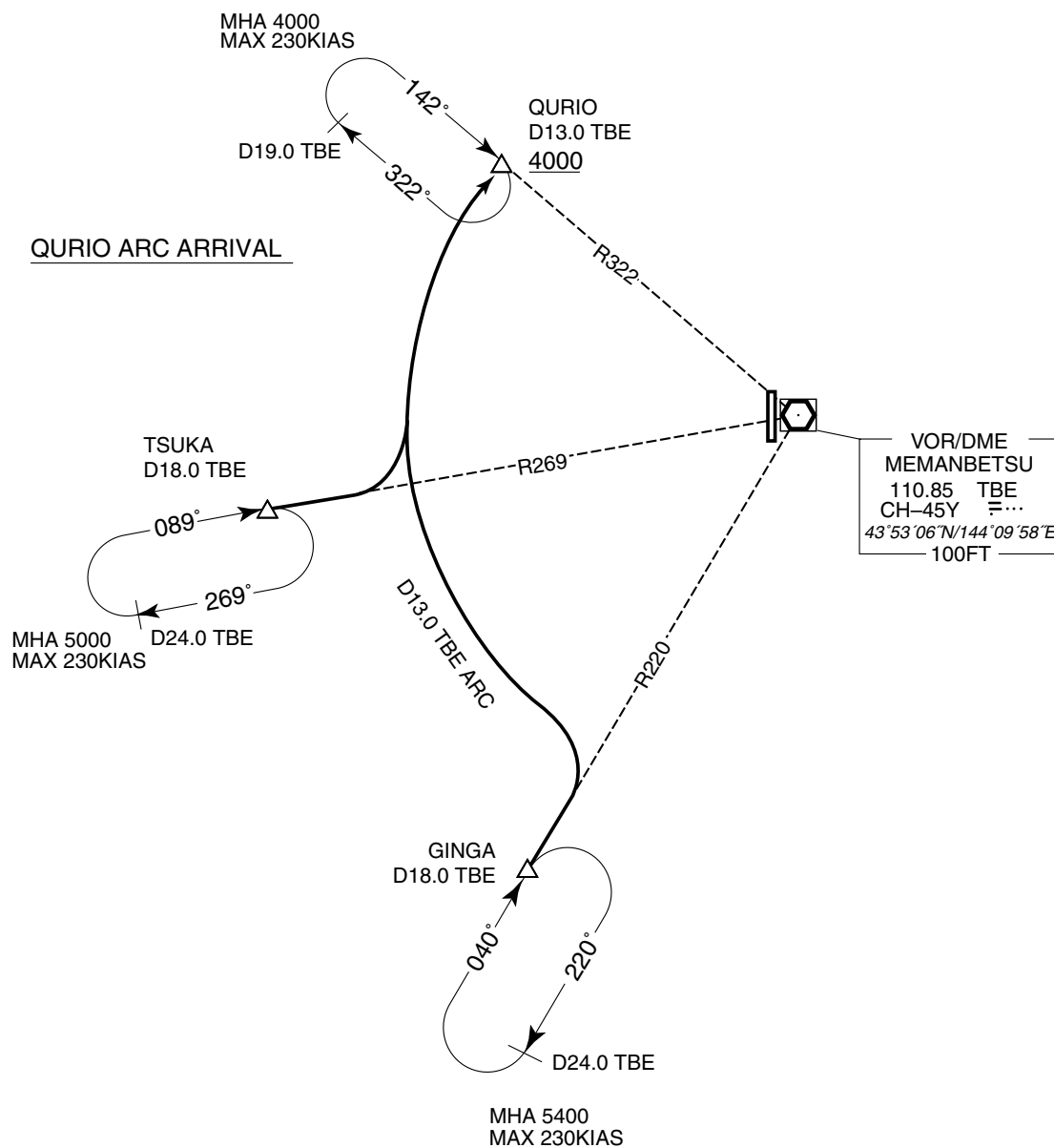
STANDARD ARRIVAL CHART-INSTRUMENT

RJCM / MEMANBETSU

STAR

QURIO ARC ARRIVAL

From over GINGA or TSUKA, turn left via TBE 13.0DME clockwise ARC to QURIO.
Cross QURIO at or above 4000FT.



INSTRUMENT APPROACH CHART

RJCM / MEMANBETSU

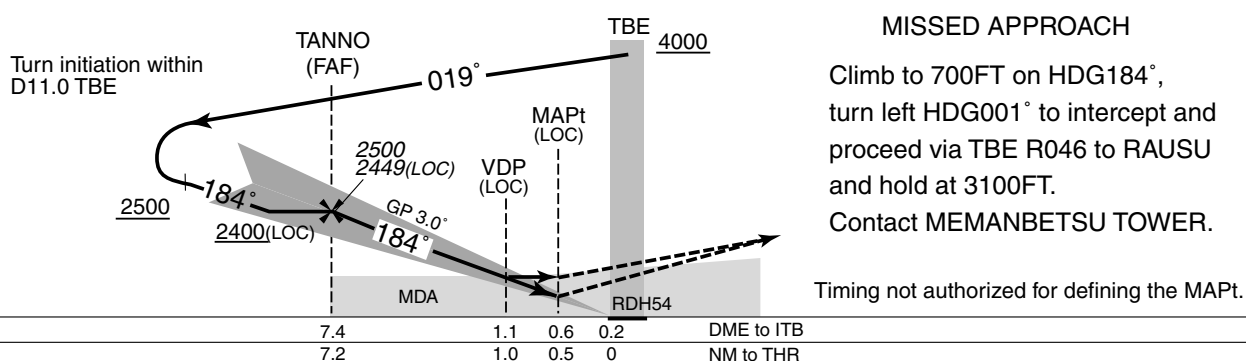
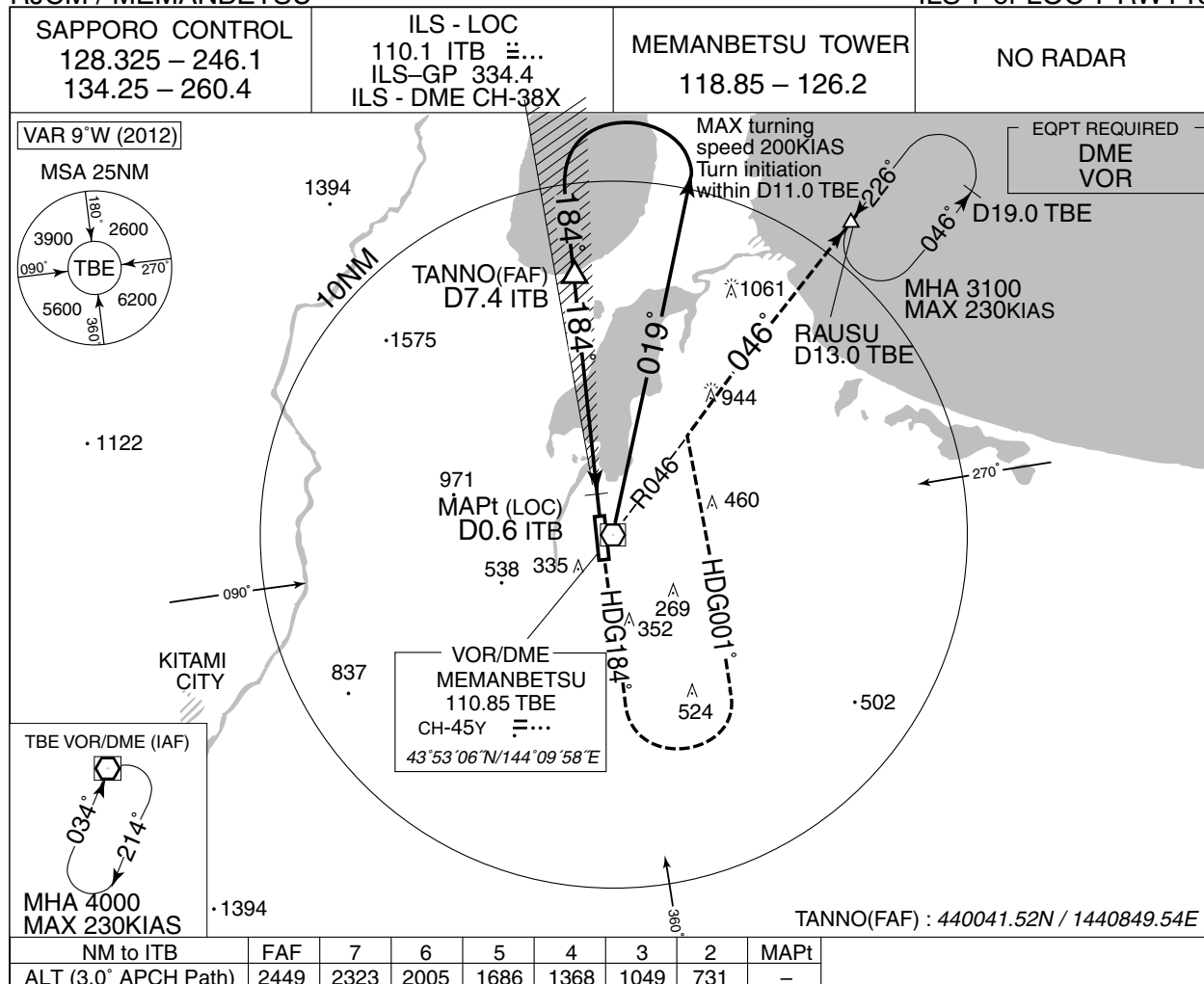
ILS Z or LOC Z RWY18



INSTRUMENT APPROACH CHART

RJCM / MEMANBETSU

ILS Y or LOC Y RWY18



MINIMA		THR elev. 102		AD elev. 109		
CAT	CAT I		LOC		CIRCLING	
	DA(H)	RVR/ CMV	MDA(H)	RVR/ CMV	MDA(H)	VIS
A	302 (200)	550	450 (341)	900	640 (531)	1600
B				1000		
C					750 (641)	2400
D					1400	760 (651)

RJCM / MEMANBETSU

ILS or LOC RWY36



RJCM / MEMANBETSU

SAPPORO CONTROL
128.325 – 246.1
134.25 – 260.4

MEMANBETSU TOWER
110.85 TBE
CH-45Y
43°53'06"N/144°09'58"E

MEMANBETSU TOWER
118.85 – 126.2

NO RADAR

VAR 9°W (2010)

MSA 25NM

1122

TBE VOR/DME (IAF)

NM to TBE	FAF	6	5	4	3	2	MAPt
ALT (3.0° APCH Path)	2244	1926	1607	1289	970	652	—

MISSED APPROACH

Climb to 900FT via TBE R181, turn left HDG001° to intercept and proceed via TBE R046 to RAUSU and hold at 3100FT. Contact MEMANBETSU TOWER.

Timing not authorized for defining the MAPt.

MINIMA		THR elev. 102	AD elev. 109	
CAT			CIRCLING	
	MDA(H)	RVR/CMV	MDA(H)	VIS
A	480 (371)	900	640 (531)	1600
B				
C		1000	750 (641)	2400
D		1400	760 (651)	3200

INSTRUMENT APPROACH CHART

RJCM / MEMANBETSU

VOR RWY36



MISSED APPROACH

Climb to 1000FT via TBE R006,
turn left HDG224° to intercept
and proceed via TBE R269 to
TSUKA and hold at 5000FT.
Contact MEMANBETSU TOWER.

Timing not authorized for defining the MAPt.



MINIMA		THR elev. 135		AD elev. 109	
CAT			CIRCLING		
	MDA(H)	RVR/ CMV	MDA(H)	VIS	
A	690 (581)	1000	690 (581)	1600	
B		1200			
C			750 (641)	2400	
D			1600	760 (651)	3200

INSTRUMENT APPROACH CHART

RJCM / MEMANBETSU

➔ RNAV(RNP) RWY18

SAPPORO CONTROL
128.325 – 246.1
134.25 – 260.4

GNSS and RF required.

MEMANBETSU TOWER
118.85 – 126.2

NO RADAR

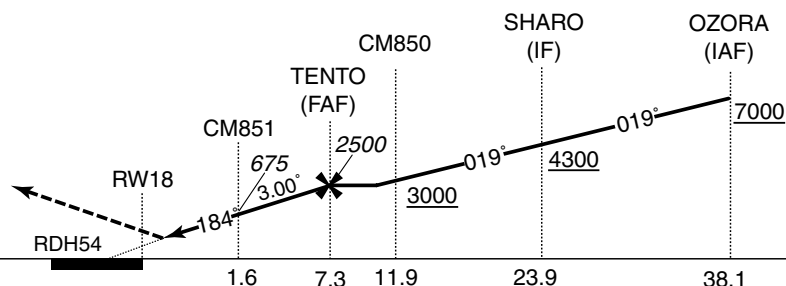
For uncompensated Baro-VNAV systems, procedure not authorized below -25°C / above 45°C

VAR 9°W (2017)



MISSED APPROACH

From RW18 on track 184°, at or above 600FT turn left, direct to RAUSU and hold at 3100FT. Contact MEMANBETSU TOWER.



Missed APCH climb gradient MNM 3.0%

CAT	RNP 0.30	
	DA(H)	RVR/CMV
A	—	—
B	—	—
C	402 (300)	1000
D	402 (300)	1400

MINIMA with Missed APCH climb gradient of 2.5% are not established.

RNP AR

Special Authorization Required

INSTRUMENT APPROACH CHART

RJCM / MEMANBETSU

➔ RNAV(RNP) RWY18

RNAV(RNP) RWY18Coding Table

Serial Number	Path Descriptor	Waypoint Identifier	Fly Over	Course °M(°T)	Magnetic Variation	Distance (NM)	Turn Direction	Altitude (FT)	Speed (KIAS)	VPA/RDH (°/FT)	RNP Value
001	IF	OZORA	—	—	-9.2	—	—	+7000	—	—	—
002	TF	SHARO	—	019 (009.5)	-9.2	14.1	—	+4300	—	—	1.0
003	TF	CM850	—	019 (009.6)	-9.2	12.0	—	+3000	-185	—	1.0
004	RF Center: CMRF1 r=3.04	TENTO	—	—	-9.2	4.6	L	2500	-165	—	1.0
005	RF Center: CMRF1 r=3.04	CM851	—	—	-9.2	5.7	L	675	—	-3.00	0.3
006	TF	RW18	Y	184 (174.7)	-9.2	1.6	—	156	—	-3.00/54	0.3
007	FA	—	—	184 (174.7)	-9.2	—	—	+600	—	—	1.0
008	DF	RAUSU	—	—	-9.2	—	L	3100	—	—	1.0

Waypoint Coordinates

Waypoint Identifier	Coordinates	RF Arc Center Identifier	Coordinates
OZORA	432908.24N / 1441153.19E	CMRF1	435524.66N / 1441344.15E
SHARO	434301.91N / 1441506.66E		
CM850	435454.27N / 1441753.05E		
TENTO	435822.66N / 1441439.66E		
CM851	435507.75N / 1440932.81E		
RW18	435330.51N / 1440945.38E		
RAUSU	440327.56N / 1442052.43E		

RJCM / MEMANBETSU

Visual REP



Call sign	BRG / DIST from ARP	Remarks
網走 Abashiri	034°/ 9NM	JR駅 Station
涛沸湖 Tohfutsu-ko	082°/10.5NM	湖 Lake
小清水 Koshimizu	105°/13.3NM	学校 School
東藻琴 Higashimokoto	121°/ 6.1NM	市街地 Town
美幌峠 Bihoro - tohge	173°/14.3NM	峠 Pass
津別 Tsubetsu	221°/11.8NM	市街地 Town
美幌ステーション Bihoro Station	235°/ 3.5NM	JR駅 Station
北見 Kitami	257°/12.5NM	JR駅 Station
浜佐呂間 Hamasaroma	329°/15.3NM	佐呂間大橋 Bridge

RJCM / MEMANBETSU

LDG CHART



RJCM / MEMANBETSU

Minimum Vectoring Altitude CHART

