

HBT - Heartbeat supervision sentence

\$**HBT,x.x,A,x*hh<CR><LF>
1 2 3

1. Configured repeat interval (1 - 999, null)
2. Equipment status (No use)
3. Sequential sequence identifier (0 - 9)

HDG - Heading, deviation and variation

\$**HDG,x.x,x.x,a,x.x,a*hh<CR><LF> *No use for
1 2 3 4 5 Type-IMO

1. Magnetic sensor heading, degrees (0.00 - 360.00)
2. Magnetic deviation, degrees (0.00 - 180.00)
3. E/W
4. Magnetic variation, degrees (0.00 - 180.00)
5. E/W

HDM - Heading, magnetic

\$**HDM,x.x,M*hh<CR><LF> *No use for
1 2 Type-IMO

1. Heading, degrees (0.00 - 360.00)
2. Magnetic (M)

HDT - Heading, true

\$**HDT,xxx.x,T*hh<CR><LF>
1 2

1. Heading, degrees (0.00 - 360.00)
2. True (T)

MTW - Water temperature

\$**MTW,x.x,C<CR><LF>
1 2

1. Water temperature (-9.994 - 99.994)
2. C=degrees C (fixed)

MWV - Wind speed and angle

\$**MWV,x.x,a,x.x,a,A*hh<CR><LF>
1 2 3 4 5

1. Wind angle, degrees (0.00 - 360.00)
2. Reference (R/T)
3. Wind speed (0.00 - 9999.94)
4. Wind speed units (K/M/N/S)
K=km/h M=m/s N=Knots S=Statute mile
5. Status (A)

APPENDIX 2 DIGITAL INTERFACE

RMB - Recommended minimum specific navigation information

```
**RMB,A,x,x,a,CCCC,CCCC,IIII.II,a,yyyy.yy,a,x,x,x,x,x,A,a*hh <CR><LF>  
  1  2  3  4      5  6  7  8  9 10 11 12 13 14
```

1. Data status (A)
A=Data valid, V=Navigation receiver warning
2. Cross track error (NM) (No use)
3. Direction to steer (L/R) (No use)
4. Origin waypoint ID (No use)
5. Destination waypoint ID (Max. 15 characters)
6. Destination waypoint latitude (0000.00000 - 9000.00000)
7. N/S
8. Destination waypoint longitude (0000.00000 - 18000.00000)
9. E/W
10. Range to destination, nautical miles (No use)
11. Bearing to destination, degrees true (No use)
12. Destination closing velocity, knots (No use)
13. Arrival status (No use)
14. Mode indicator (A/D)
A=Autonomous mode; D=Differential mode; E=Estimated (dead reckoning) mode;
M=Manual input mode; S=Simulator mode; N=Data not valid

RMC - Recommended minimum specific GPS/TRANSIT data

```
**RMC,hhmmss.ss,A,IIII.II,a,yyyy.yy,a,x,x,x,xxxxxx,x,x,a,a*hh <CR><LF>  
  1    2  3  4  5    6  7  8  9    10 11 12 13
```

1. UTC of position fix (No use)
2. Status (A)
A=data valid, V=navigation receiver warning
3. Latitude (0000.00000 - 9000.00000)
4. N/S (N/S)
5. Longitude (00000.00000 - 18000.00000)
6. E/W (E/W)
7. Speed over ground, knots (0.00 - 9999.94)
8. Course over ground, degrees true (0.00 - 360.0)
9. Date (No use)
10. Magnetic variation, degrees (No use)
11. E/W (No use)
12. Mode indicator (A/D/E/M/S/F/P/R)
A=Autonomous. Satellite system used in non-differential mode in position fix;
D=Differential. Satellite system used in differential mode in position fix;
E=Estimated (dead reckoning) mode;
F=Float RTK. Satellite system used in real time kinematic mode with floating integers;
M=Manual input mode;
N=No fix. Satellite system not used in position fix, or fix not valid;
P=Precise. Satellite system used in precision mode. Precision mode is defined as: no deliberate degradation (such as selective availability) and higher resolution code (P-code) is used to compute position fix. P is also used for satellite system used in multi-frequency, SBAS or Precise Point Positioning (PPP) mode;
R=Real time kinematic. Satellite system used in RTK mode with fixed integers;
S=Simulator mode
13. Navigational status indication (S/C/U/V, null)
S=Safe, C=Caution, U=Unsafe, V=Not valid

RTE - Routes

\$**RTE,x.x,x.x,a,c--c,c--c,...,c--c*hh <CR><LF>

1 2 3 4 5 ... 6

1. Total number of sentences being transmitted (1 - 500, null)
2. Sentence number (1 - 500, null)
3. Sentence mode (C/W)
C=Complete route, all waypoints W=Working route, first listed
4. Route identifier (alphabet or null)
5. Waypoint identifier (alphabet or null)
6. Waypoint "n" identifier (alphabet or null)

THS - True heading and status

\$**THS,x.x,a*hh<CR><LF>

1 2

1. Heading, degrees True (0.00 to 360.00)
2. Mode indicator(A/E)
A=Autonomous; E=Estimated; M=Manual; S=Simulator; V=Data not valid

VBW - Dual ground/water speed

\$**VBW,x.x,x.x,a,x.x,x.x,a,x.x,x.x,a,*hh<CR><LF>

1 2 3 4 5 6 7 8 9 10

1. Longitudinal water speed, knots (-9999.994 - 9999.994)
2. Transverse water speed, knots (-9999.994 - 9999.994, null)
3. Status: water speed, A=data valid V=data invalid (A)
4. Longitudinal ground speed, knots (-9999.994 - 9999.994)
5. Transverse ground speed, knots (-9999.994 - 9999.994, null)
6. Status: ground speed, A=data valid V=data invalid (A)
7. Stern transverse water speed, knots (No use)
8. Status: stern water speed, A=data valid V=data invalid (No use)
9. Stern transverse ground speed, knots (No use)
10. Status: stern ground speed, A=data valid V=data invalid (No use)

VDM - UAIS VHF data-link message

!VDM,x,x,x,a,s--s,x,*hh<CR><LF>

1 2 3 4 5 6

1. Total number of sentences needed to transfer the message (1 - 9)
2. Sentence number (1 - 9)
3. Sequential message identifier (0 - 9, null)
4. AIS channel number (A/B, null)
5. Encapsulated ITU-R M.1371 radio message (1 - 63 bytes)
6. Number of fill-bits (0 - 5)

VDO - UAIS VHFG data-link own vessel report

!VDO,x,x,x,a,s--s,x,*hh<CR><LF>

1 2 3 4 5 6

1. Total number of sentences needed to transfer the message (1 - 9)
2. Sentence number (1 - 9)
3. Sequential message identifier (0 - 9, null)
4. AIS channel Number (A/B, null)
5. Encapsulated ITU-R M.1371 radio message (1 - 63 bytes)
6. Number of fill-bits (0 - 5)

APPENDIX 2 DIGITAL INTERFACE

VDR - Set and drift

\$**VDR,x.x,T,x.x,M,x.x,N,*hh <CR><LF>
1 2 3 4 5 6

1. Direction, degrees (0.00 - 360.00, null)
2. T=True (fixed)
3. Direction, degrees Magnetic (No use)
4. M=Magnetic (No use)
5. Current speed (0 - 99.94)
6. N=Knots (fixed)

VHW - Water speed and headings

\$**VHW,x.x,T,x.x,M,x.x,N,x.x,K,*hh <CR><LF>
1 2 3 4 5 6 7 8

1. Heading, degrees (0.00 - 360.00)
2. T=True (fixed)
3. Heading, degrees (0.00 - 360.00)
4. M=Magnetic (fixed)
5. Speed, knots (0.00 - 999.94)
6. N=Knots (fixed)
7. Speed, knots (0.00 - 999.94)
8. K=km/hr (fixed)

VSD - UAIS Voyage static data

\$--VSD,x.x,x.x,x.x,c--c,hhmmss.ss,xx,xx,x.x,x.x*hh<CR><LF>
1 2 3 4 5 6 7 8 9

1. Type of ship and cargo category (No use)
2. Maximum present static draught (No use)
3. Persons on-board (0 - 8191, null)
4. Destination (No use)
5. Estimated UTC of arrival at destination (No use)
6. Estimated day of arrival at destination (No use)
7. Estimated month of arrival at destination (No use)
8. Navigational status (No use)
9. Regional application flags (No use)

VTG - Course over ground and ground speed

\$**VTG,x.x,T,x.x,M,x.x,N,x.x,K,a,*hh <CR><LF>
1 2 3 4 5 6 7 8 9

1. Course over ground, degrees (0.00 - 360.00)
2. T=True (fixed)
3. Course over ground, degrees (No use)
4. M=Magnetic (No use)
5. Speed over ground, knots (0.00 - 9999.94)
6. N=Knots (fixed)
7. Speed over ground (0.00 - 9999.94)
8. K=km/h (fixed)
9. Mode indicator (A/D/E/M/P/S)
 - A=Autonomous mode;
 - D=Differential mode;
 - E=Estimated (dead reckoning) mode;
 - M=Manual input mode;
 - P=Precise. Satellite system used in precision mode. Precision mode is defined as: no deliberate degradation (such as selective availability) and higher resolution code (P-code) is used to compute position fix. P is also used for satellite system used in multi-frequency, SBAS or Precise Point Positioning (PPP) mode;
 - S=Simulator mode;
 - N=Data not valid

VWR - Wind relative bearing and velocity

\$**VWR,x.x,a,x.x,N,x.x,M,x.x,K<CR><LF>
 1 2 3 4 5 6 7 8

1. Measured wind angle relative to the vessel, degrees (0.00 to 180.00)
2. Left/Right of vessel heading (L/R)
 L=Left semicircle, R=Right semicircle
3. Velocity, knots (0.00 - 999.94)
4. N=Knots (fixed)
5. Velocity (0.00 - 999.94)
6. M=m/s (fixed)
7. Velocity, km/h(0.00 - 999.94)
8. K=km/h (fixed)

VWT - True wind speed and angle

\$**VWT,xxx,a,xx.x,N,xx.x,M,xxx.x,K<CR><LF>
 1 2 3 4 5 6 7 8

1. Measured wind angle relative to the vessel, degrees (0.00 - 180.00)
2. Left/Right of vessel heading (L/R)
 L=Left semicircle, R=Right semicircle
3. Calculated wind speed kn (0.00 - 999.94)
4. N=Knots (fixed)
5. Wind speed m/s (0.00 - 999.94)
6. M=m/s (fixed)
7. Velocity, km/h (0.00 - 999.94)
8. K=km/h (fixed)

WPL - Waypoint location

\$**WPL,IIII.II,a,yyyyy.yy,a,c--c*hh<CR><LF>
 1 2 3 4 5

1. Waypoint latitude (0000.00000 - 9000.00000)
2. N/S (N/S)
3. Waypoint longitude (00000.00000 - 18000.00000)
4. E/W (E/W)
5. Waypoint identifier (alphanumeric characters)

ZDA - Time and date

\$**ZDA,hhmmss,xx,xx,xxxx,xx,xx<CR><LF>
 1 2 3 4 5 6

1. UTC (000000.00 - 2400001.00)
2. Day (01 - 31)
3. Month (01 -12)
4. Year (0000-9999)
5. Local zone, hours (No use)
6. Loca zone, minutes (No use)

Output sentences

For ACK, see input sentences.

APPENDIX 2 DIGITAL INTERFACE

ABM - AIS addressed binary and safety related message

```
!**ABM,x,x,x,xxxxxxxx,x,xx,s--s,x,*hh<CR><LF>  
1 2 3 4 5 6 7 8
```

1. Total number of sentences needed to transfer the message (1 - 9)
2. Sentence number (1 - 9)
3. Sequential message identifier (0 - 3)
4. The MMSI of destination AIS unit for the ITU-R M.1371 message (9 digits / null)
5. AIS channel for broadcast of the radio message (0 - 3 / null)
6. VDL message number (6 / 12 / null), see ITU-R M.1371
7. Encapsulated data (1 - 63 bytes)
8. Number of fill-bits (0 - 5)

ALC - Cyclic alert list

```
!**ALC,xx,xx,xx,xx,aaa,x,x,x,x,x,"",*hh<CR><LF>  
1 2 3 4 5 6 7 8 9
```

1. Total number of sentences this message (01 - 16)
 2. Sentence number (01 - 16)
 3. Sequential message identifier (00 - 99)
 4. Number of alert entries (0 - 3)
 5. Manufacturer mnemonic code (FEC, null) _____
 6. Alert identifier (1 - 999 or 10001 - 10999) _____
 7. Alert instance (null) _____
 8. Revision counter (1 - 99) _____
 9. Additional alert entries (see Note)
- Alert entry 1
See Note

Note: Alert entry 0 - n: Each alert entry consists of

- Manufacturer Identifier (see ALF Manufacturer)
- Alert Identifier (see ALF Alert identifier)
- Alert instance (see ALF instance)
- Revision counter (see ALF revision counter)

Each entry identifies a certain alert with a certain state.

It is not allowed that an alert entry is split between two ALC sentences.

ALF - Alert sentence

```
!**ALF,x,x,x,hmmss.ss,a,a,aaa,x,x,x,x,x,c--c,*hh<CR><LF>  
1 2 3 4 5 6 7 8 9 10 11 12 13
```

1. Total number of ALF sentences this message (1, 2)
2. Sentence number (1, 2)
3. Sequential message identifier (0 - 9)
4. Time of last change (000000.00 - 240001.00 / null)
null when #2 is 2
5. Alert category (A/ B/null)
A=Alert category A, B=Alert category B, null when #2 is 2
6. Alert priority (A/W/C/null)
A=Alarm, W=Warning, C=Caution, null when #2 is 2
7. Alert state (A/S/O/U/V/N/null)
A=Acknowledged
S=Silence
O=Active-responsibility transferred
U=Rectified-unacknowledged
V=Not acknowledged
N=Normal state
null when #2 is 2
8. Manufacturer mnemonic code (FEC/null)
9. Alert identifier (1 - 999 or 10001 - 10999)
10. Alert instance (null)
11. Revision counter (1 - 99)
12. Escalation counter (0 - 9)
13. Alert text (max. 16 characters)

ALR - Set alarm state

```
$**ALR,hhmmss.ss,xxx,A,A,c—c,*hh<CR><LF>
      1  2 3 4 5
```

1. Time of alarm condition change, UTC (000000.00 - 240001.00)
2. Unique alarm number (identifier) at alarm source (001 - 999 / null)
3. Alarm condition (A/V)
A=threshold exceeded V=not exceeded
4. Alarm acknowledge state (A/V)
A=acknowledged V=not acknowledged
5. Alarm description text (alphanumeric characters, max. 32)

ARC - Alert command refused

```
$**ARC,hhmmss.ss,aaa,x.x,x.x,c*hh<CR><LF>
      1      2  3 4 5
```

1. Release time of the alert command refused (000000.00 - 240001.00, null)
2. Used for proprietary alerts, defined by the manufacturer (FEC)
3. The alert identifier (10001 - 10999)
4. The alert instance (null)
5. Refused alert command (A/O)
A=acknowledge, O=responsibility transfer

BBM - UAIS broadcast binary message

```
!**BBM,x,x,x,x,xx,s--s,x,*hh<CR><LF>
      1 2 3 4 5 6 7
```

1. Total number of sentences needed to transfer the message (1 - 9)
2. Sentence number (1 - 9)
3. Sequential message identifier (0 - 9)
4. AIS channel for broadcast of the radio message (0 - 3/null)
5. VDL message number (8/14/null)
6. Encapsulated data (1 - 63 bytes)
7. Number of fill-bits (0 - 5)

EVE - General event message

```
$**EVE,hhmmss.ss,c--c,c--c*hh<CR><LF>
      1  2  3
```

1. Event time (000000.00 - 240001.00, null)
2. Tag code used for identification of source of event (six alphanumeric characters, two English characters, four digits)
3. Event description (OPERATION)

Note: The EVE sentence is output after input has been detected from either the trackball or the keyboard.

HBT - Heartbeat supervision sentence

```
$**HBT,x.x,A,x*hh<CR><LF>
      1 2 3
```

1. Configured repeat interval (60.0)
2. Equipment status (A)
A=Normal
3. Sequential sequence identifier (0 - 9)

APPENDIX 2 DIGITAL INTERFACE

OSD - Own ship data

\$**OSD,x.x,A,x.x,a,x.x,a,x.x,x,x,x,a*hh<CR><LF>
1 2 3 4 5 6 7 8 9

1. Heading, degrees true (0.0 - 359.9, null)
2. Heading status (A/V)
A=data valid V=data invalid
3. Vessel course, degrees true (0.0 - 359.9)
4. Course reference (B/M/W/R/P, null)
B=Bottom tracking log
M=Manually entered
W=Water referenced
R=Radar tracking (of fixed target)
P=Positioning system ground reference
5. Vessel speed (0.0 - 99.9)
6. Speed reference (B/M/W/R/P, null)
7. Vessel set, degrees true, manually entered(0.0 - 359.9, null)
8. Vessel drift (speed), manually entered (0.0 – 19.9, null)
9. Speed units (K/N/S, null)
K=km/h N=Knots S=Statute mile

RSD - Radar ship data

\$**RSD,x.x,x.x,x.x,x.x,x.x,x.x,x.x,x.x,x.x,x.x,x.x,x.x,aH*hh <CR><LF>
1 2 3 4 5 6 7 8 9 10 11 12 13

1. Origin 1 range, from own ship (0.000 - 9999, null) (see note 2)
2. Origin 1 bearing, degrees from 0 (0.0 - 359.9) (see note 2)
3. Variable range marker 1(VRM1), range (0.000 – 999.9, null)
4. Bearing line 1(EBL1), degrees from 0 (0.0 - 359.9, null)
5. Origin 2 range (0.000 - 9999, null) (see note 2)
6. Origin 2 bearing (0.0 - 359.9)(see note 2)
7. VRM2,.9 range (0.000 - 999.9, null)
8. EBL2, degrees (0.0 - 359.9, null)
9. Cursor range, from own ship (0.000 - 999.9)
10. Cursor bearing, degrees clockwise from 0 (0.0 - 359.9)
11. Range scale in use (0.0625 - 120)
12. Range units (K/N/S)
K=km/h N=Knots S=Statute mile
13. Display rotation (C/H/N, null)(see note 1)

NOTES

- 1 Display rotation:
C=Course-up, course-over-ground up, degrees true
H=Head-up, ship's heading(center-line) 0 up
N=North-up, true north is 0 up
null=Stern-up
- 2 Origin 1 and origin 2 are located at the stated range and bearing from own ship and provide for two independent sets of variable range markers (VRM) and electronic bearing lines (EBL) originating away from own ship position.

TLB - Target label

\$**TLB,x.x,c--c,x.x,c--c,...,x.x,c--c*hh<CR><LF>
1 2 3 3

1. Target number “n” reported by the device (1 - 1023)
2. Label assigned to target “n” (TT=000 - 999, AIS=000000000 - 999999999)
3. Additional label pairs

TLL - Target latitude and longitude

```
$**TLL,xx,llll.ll,a,yyyy.yy,a,c--c,hhmmss.ss,a,a*hh<CR><LF>
  1  2 3  4  5 6      7      8 9
```

1. Target number (Fixed at null)
2. Target Latitude (0000.0000 - 9000.0000)
3. Target N/S (N/S)
4. Target Longitude (00000.0000 - 18000.0000)
5. Target E/W (E/W)
6. Target name (Fixed at null)
7. UTC of data (000000.00 - 235959.99)
8. Target status (Fixed at null)
9. Reference target (Fixed at null)

TTD - Tracked target data

```
!**TTD,hh,hh,x,s--s,x*hh<CR><LF>
  1  2 3 4 5
```

1. Total hex number of sentences need to transfer the message (1 - FF)
2. Hex sentence number (1 - FF)
3. Sequential message identifier (0 - 9)
4. Encapsulated trancked target data (6 bit binary-converted data)
5. Number of fill bits (0 - 5)

TTM - Tracked target message

```
$**TTM,xx,x.x,x.x,a,x.x,x.x,a,x.x,x.x,a,c--c,a,a,hhmmss.ss,a*hh<CR><LF>
  1  2 3 4 5  6 7 8  9 10 11 12 13  14  15
```

1. Target number (00 - 99)
2. Target distance from own ship (0.000 - 99.999)
3. Bearing from own ship,degrees (0.0 - 359.9)
4. True or Relative (T)
5. Target speed (0.00 - 999.99, null)
6. Target course, degrees (0.0 - 359.9, null)
7. True or Relative output (T/R)
8. Distance of closet point of approach (0.00 - 99.99, null)
9. Time to CPA, min., "-" increasing (-99.99 - 99.99, null)
10. Speed/distance units (N)
N=nm
11. Target name (null)
12. Target status (L/Q/T)
L=Lost Q=Acquiring T=Tracking
13. Reference target (R/null)
14. UTC of data (null)
15. Type of acquisition (A/M)
A=Automatic M=Manual

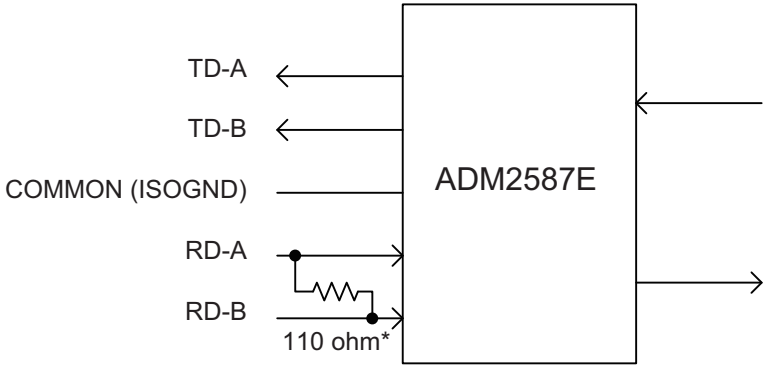
APPENDIX 2 DIGITAL INTERFACE

VSD - UAIS Voyage static data

\$--VSD,x.x,x.x,x.x,c--c,hhmmss.ss,xx,xx,x.x,x.x*hh<CR><LF>
1 2 3 4 5 6 7 8 9

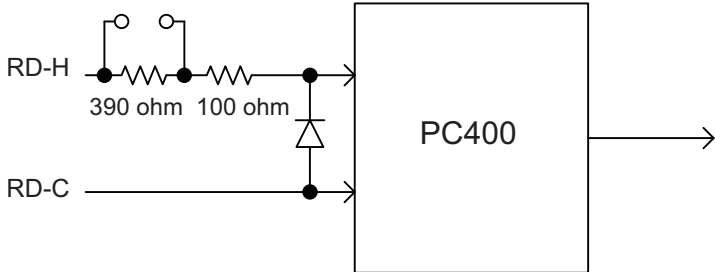
1. Type of ship and cargo category (null)
 2. Maximum present static draught (0 - 25.5, null)
 3. Persons on-board (0 - 8191, null)
 4. Destination (Alphanumeric character, null)
 5. Estimated UTC of arrival at destination (000000.00 - 246000.00*, null)
 6. Estimated day of arrival at destination (00 - 31) (UTC)
 7. Estimated month of arrival at destination (00 - 12) (UTC)
 8. Navigational status (0 - 15)
 - 0=Under way using engine
 - 1=At anchor
 - 2=Not under command
 - 3=Restricted maneuverability
 - 4=Constrained by her draught
 - 5=Moored
 - 6=Aground
 - 7=Engaged in Fishing
 - 8=Under way sailing
 - 9=HSC
 - 10=WIG
 - 11=Power-driven vessel towing astern
 - 12=Power-driven vessel pushing ahead or towing alongside
 - 13=Reserved for future use
 - 14=AIS-SART (active), MOB-AIS, EPIRB-AIS
 - 15=Undefined = default (also used by AIS-SART, MOB-AIS and EPIRB AIS under test)
 9. Regional application flags (null)
- * 246000.00 when ETA is not set.

Serial Interface

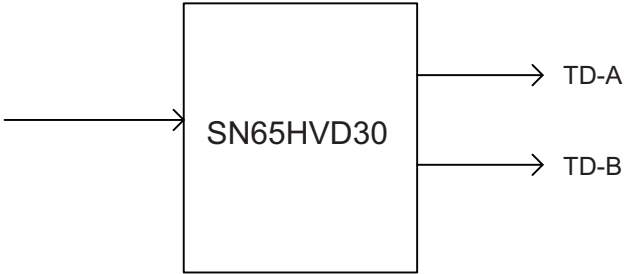


* Set with jumper.
Open/close switchable.

IEC 61162-2 input/output



IEC 61162-1 input



IEC 61162-1 output




PACKING LIST

RSB-120-IMO, RSB-121-IMO, RSB-120-HK, RSB-121-HK

03HQ-X-9851 -0

1/1

A-1

NAME	OUTLINE	DESCRIPTION/CODE No.	QTY
ユニット			
空中線本体部 SCANNER UNIT		RSB-120-*/121-*	1
予備品			
空中線予備品 SPARE PARTS		SP03-12501 008-485-360-00	1
工事材料			
工事材料 INSTALLATION MATERIALS		CP03-33402 001-419-290-00	1

コード番号末尾の「[*]」は、選択品の代表コードを表します。
CODE NUMBER ENDING WITH "[]" INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIAL.

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

03HQ-X-9851





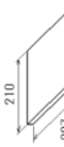



PACKING LIST

RPU024-J2*/HK, RPU024-E2*/HK (DC)

03HQ-X-9852 -0

1/1

A-2

NAME	OUTLINE	DESCRIPTION/CODE No.	QTY
ユニット			
制御部 PROCESSOR UNIT		RPU024-*	1
予備品			
予備品 SPARE PARTS		SP03-18001 001-419-820-00	1
工事材料			
ケーブル組品 CABLE ASSEMBLY		DVI-D/D S-LINK 5M 001-132-960-10	1
工事材料 INSTALLATION MATERIALS		CP03-36501 001-419-860-00	1
図書			
取扱説明書 OPERATOR'S MANUAL		OM*-36380-*	1
操作要領書 (多言語) OPERATOR'S GUIDE (MLG)		MLG-36380-*	1
操作要領書 (和) OPERATOR'S GUIDE (JP)		OSJ-36380-*	1
装備要領書 INSTALLATION MANUAL		IM*-36380-*	1

コード番号末尾の「[*]」は、選択品の代表コードを表します。
CODE NUMBER ENDING WITH "[]" INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIAL.

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

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