

NO		PART NO. (部品番号)		QTY (数量)		MATERIAL		DESCRIPTION (概要)	
NAME (名称) WIRING OF ARRAY (4 modules/24V system) SCALE (比率) MATERIAL (材質)									
DATE (日付)		DRAWN (図取)		CHECKED (検査)		APPROVED (承認)		TOLERANCES (公差)	
ACCOUNT (記号)		DATE (日付)		DRAWN (図取)		CHECKED (検査)		APPROVED (承認)	
KYOCERA CORPORATION		DATE (日付)		DRAWN (図取)		CHECKED (検査)		APPROVED (承認)	
KYOTO		DATE (日付)		DRAWN (図取)		CHECKED (検査)		APPROVED (承認)	
NOV. 11 '92		DATE (日付)		DRAWN (図取)		CHECKED (検査)		APPROVED (承認)	

INSTALLATION MANUAL

OF

SOLAR ARRAY

Covered : Pole mount type solar array
(Solar module : GL144N)
— For 12V SYSTEM —

KYOCERA CORPORATION
CHIBA SAKURA PLANT
SOLAR ENERGY SYSTEM DIVISION

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Attached drawings

Name	Drawing No.
1. Solar array	SAA519A
2. Array assembly	SAA545E
3. Mounting solar array to pole	SAA546E
4. Wiring of array	SAB115E

1 General

(1) Location

Solar array is installed normally on the array foundation which is free from shade of house, trees, tower or other obstructions, that could interfere with the operation of the solar modules.

(2) Orientation

It is important that the modules be facing in the correct direction to realize their maximum power output. Installations in the northern hemisphere should face towards true south, and those in the southern hemisphere towards true north.

A compass should be used to determine the magnetic heading, and a correction for compass variation determined to obtain the true bearing. Variation is different for every geographical location and local government maps or navigational charts must be utilized to obtain the current correct variation.

2 Mounting Facilities

This solar array is specially designed for mounting the array to 100 mm ~ 120 mm diameter steel (or concrete) pole.

3 Parts List per Array

Solar array has been semi - assembled at factory. (Two modules have been fixed on panel frames and properly wired between them at factory.) Components marked as "*1" in the following table have been assembled at factory and components marked as "*2" are assembled at site, i.e. "*2" components are shipped as array parts and/or attachments.

Table 1 Parts List per Array

No.	Component parts	System voltage		Quantity		Remarks
				12V		
1.	Solar module	*1		2		
2.	Panel frame	*1		2		
3.	Support leg	*2		2		
4.	Foot bracket	*2		4		
5.	Cross arm	*2		2		
6.	Attachment	*2		2		
7.	Band	*2		2		with bolts and nuts M12
8.	Bird spike	*2		2		
9.	Hex. head bolt	*2	M10	10		for fixing support legs and brackets
10.	Hex. nut	*2	M10	10		- do -
11.	Plain washer	*2	M10	20		- do -
12.	Spring washer	*2	M10	10		- do -
13.	Hex. head bolt	*1	M8	8		for fixing modules
14.	Hex. nut	*1, *2	M8	$10(8^{*1} + 2^{*2})$		for fixing modules and bird spikes
15.	Plain washer	*1	M8	16		for fixing modules
16.	Spring washer	*1	M8	8		- do -
17.	Cable	*1		2		for intermodule wiring
18.	Cable clamp	*1		4		
19.	Screw	*1	M5	4		for fixing cable clamps
20.	Hex. nut	*1	M5	4		- do -
21.	Plain washer	*1	M5	4		- do -
22.	Spring washer	*1	M5	4		- do -

4 Array Assembly / Wiring Flowchart

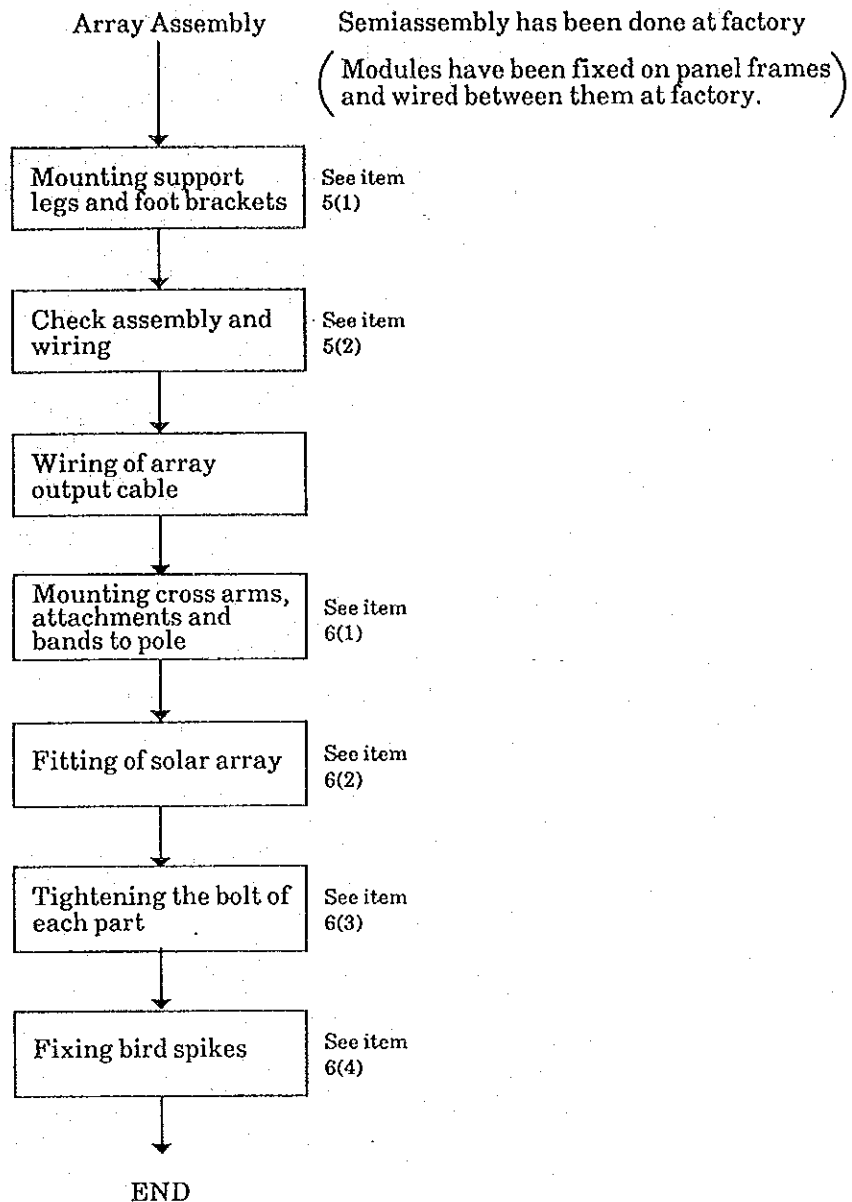


Fig. 1 Array assembly / wiring flowchart

5 Array Assembly

(1) Mounting support legs and foot brackets

– Refer to drawing No. SAA545E(1/2) –

After wiring the module's junction box, and while the assembly is still lying face down, attach front foot brackets from outside of the panel frame, corner side in.

Attach support legs from outside of the panel frame. Attach rear brackets from inside of the support legs, corner side in.

All attachments are made with M10 hexagon head bolts. Each bolt must be installed with a plain washer under the head and plain washer, spring washer, and nut on the threaded portion.

Tighten the bolts just enough to allow movement of the brackets and legs.

CAUTION

SHOCK MUST NOT be give to the solar module / array. Be cautious against possible shock hazard when installations are performed during daylight hours.

(2) Check after the completion of assembling works of solar array

Check right or wrong for wiring works, tightening of fixing screws of module.

With regard to wiring of array, refer to drawing No. SAB115E.

6 Fitting of Solar Array

(1) Mounting cross arm, attachment and band to pole

— Refer to drawing No. SAA545E(2/2) and SAA546E —

Mount cross arms, attachments and bands to pole by employing M12 stud bolts and M12 nuts.

With regard to the position of them, refer to drawing No. SAA546E.

The cross arm should face towards true south (in the northern hemisphere) or face towards true north (in the southern hemisphere).

(2) Fitting of solar array

— Refer to drawing No. SAA545E(2/2) —

Fix the foot brackets to the cross arms by employing M10 bolts, nuts.

Each bolt must be installed with a plain washer under the head and plain washer, spring washer, and nut on the threaded portion.

(3) Tightening the bolt of each part of the array

Tighten the bolts of the solar array that is assembled temporarily in initial stage of the works.

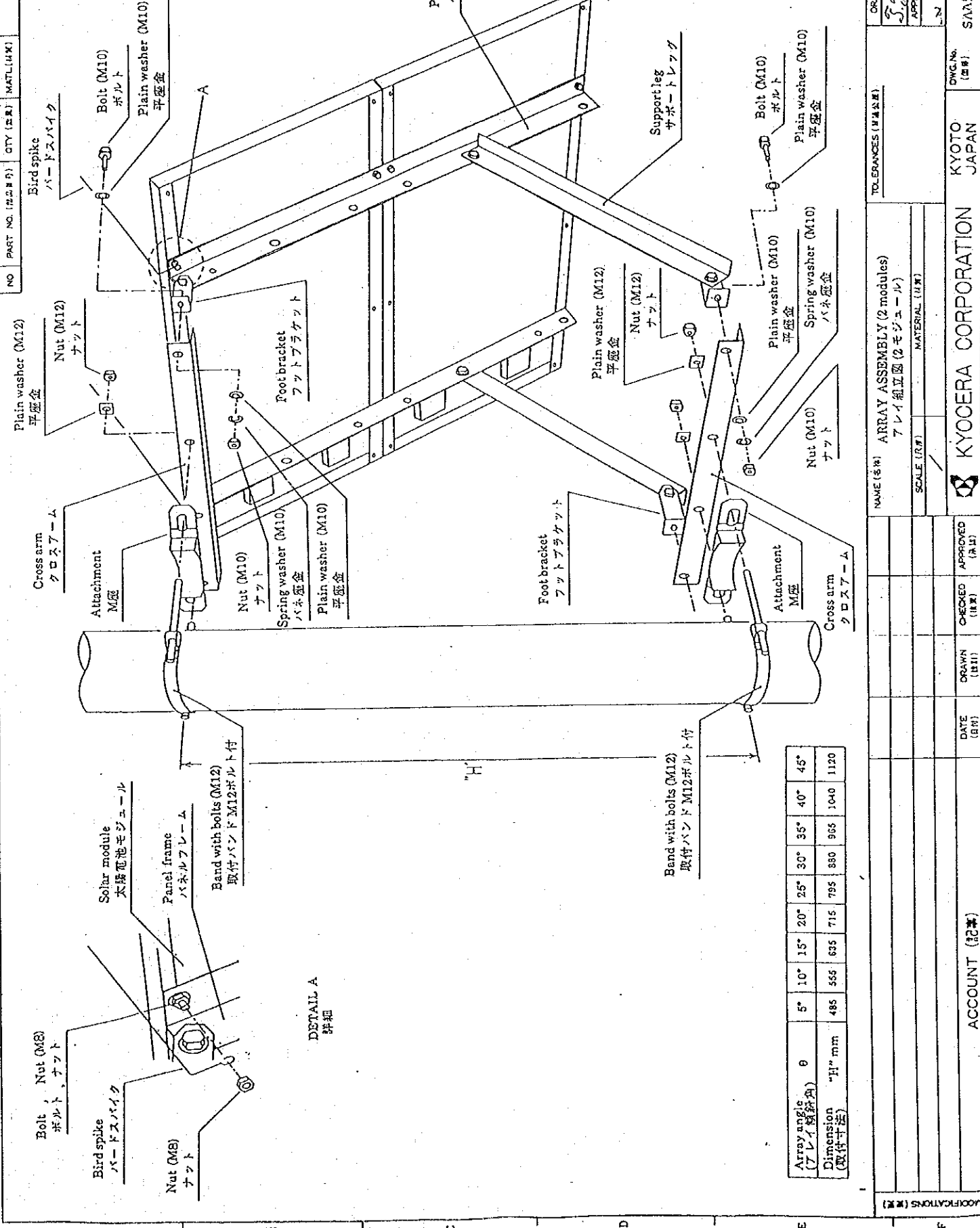
(4) Fixing bird spike

— Refer to drawing No. SAA519A and SAA545E(2/2) —

Fix two bird spikes on top of array.

The fixing works should be performed by inserting the ring of bird spike to 8mm bolts (M8) that mount the solar module to the panel frame.

NO	PART NO. (部品番号)	QTY (数量)	MATL (材質)	DESCRIPTION (説明)
5				



NO	PART NO. (部品番号)	QTY (数量)	MATL (材質)	DESCRIPTION (説明)
7				

NO	PART NO. (部品番号)	QTY (数量)	MATL (材質)	DESCRIPTION (説明)
8				

SCALE (比率)	MATERIAL (材質)	TOLERANCES (公差)
NAME (名称) ARRAY ASSEMBLY (2 modules) アレイ組立機(2モジュール)		

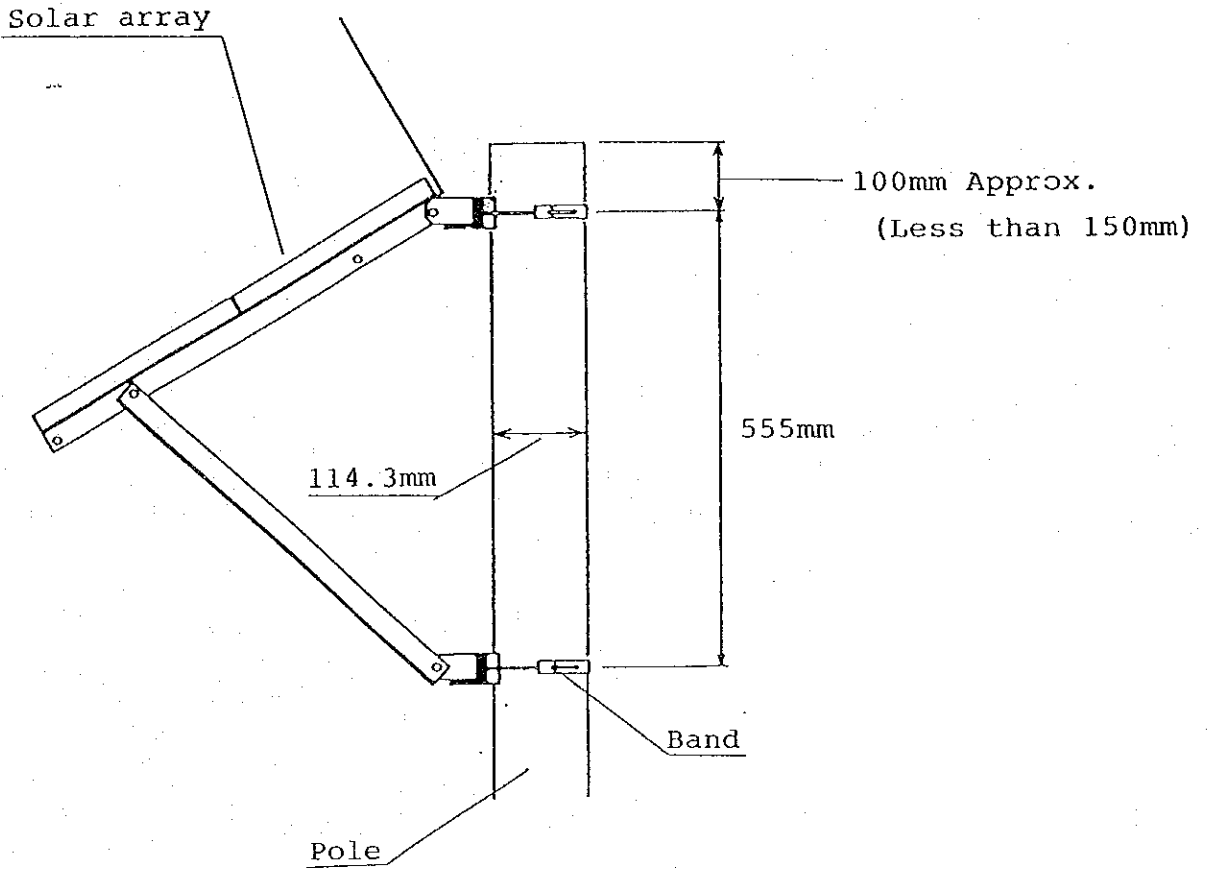
CHECKED (検査)	APPROVED (承認)

DATE (日付)	DRAWN (製図)

CHECKED (検査)	APPROVED (承認)

DATE (日付)	DRAWN (製図)

NO	PART NO. (部品番号)	QTY (数量)	MATL (材質)	DESCRIPTION (説明)
9				

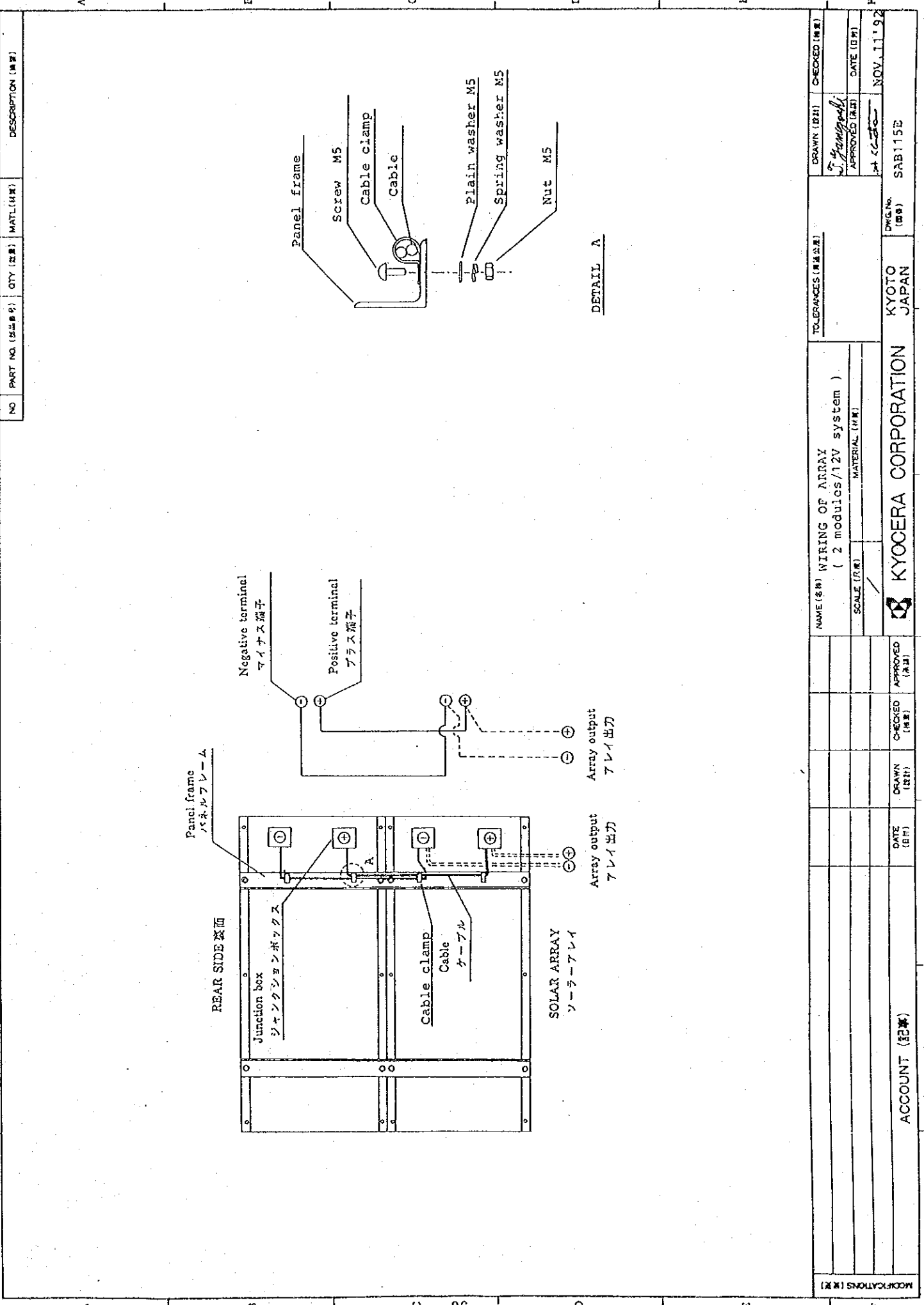


MODIFICATIONS (変更)

ACCOUNT (記事)	DATE (日付)	DRAWN (設計)	CHECKED (検査)	APPROVED (承認)

NAME (名称) Mounting array to pole		TOLERANCES (普通公差):	DRAWN (設計)	CHECKED (検査)
SCALE (尺度)	MATERIAL (材質)		<i>J. Yamaguchi</i> APPROVED (承認)	DATE (日付)
			<i>[Signature]</i>	NOV. 11 '92

	KYOCERA CORPORATION KYOTO JAPAN	DWG. No. (図番)	SAA546E



NO		PART NO. (部品番号)		CITY (支店)		MATERIAL (材質)		DESCRIPTION (概要)	
NAME (名称)		WIRING OF ARRAY (2 modules / 12V system)		TOLERANCES (公差)		DRAWN (図取)		CHECKED (検査)	
SCALE (尺)		MATERIAL (材質)		APPROVED (承認)		DATE (日付)		NOV. 11 '92	
ACCOUNT (記号)		KYOCERA CORPORATION		KYOTO JAPAN		DVG. NO. (図番)		SAB1152	

INSTALLATION MANUAL

OF

SOLAR ARRAY

Covered : Pole mount type solar array
(Solar module : LA441K59)
— For 12V SYSTEM —

KYOCERA CORPORATION
CHIBA SAKURA PLANT
SOLAR ENERGY SYSTEM DIVISION

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7. Wiring of Array Output Cable	5

Attached drawings

Name	Drawing No.
1. Solar module (LA441K59)	AC-32216
2. Solar array	SAA518A
3. Array assembly	NAA064A
4. Mounting solar array to pole	SAA546E
5. Wiring of array	NAB003A

1 General

(1) Location

Solar array is installed normally on the array foundation which is free from shade of house, trees, tower or other obstructions, that could interfere with the operation of the solar modules.

(2) Orientation

It is important that the modules be facing in the correct direction to realize their maximum power output. Installations in the northern hemisphere should face towards true south, and those in the southern hemisphere towards true north.

A compass should be used to determine the magnetic heading, and a correction for compass variation determined to obtain the true bearing. Variation is different for every geographical location and local government maps or navigational charts must be utilized to obtain the current correct variation.

2 Mounting Facilities

This solar array is specially designed for mounting the array to 100 mm ~ 120 mm diameter steel (or concrete) pole.

3 Parts List per Array

Solar array has been semi - assembled at factory. (Two modules have been fixed on panel frames and properly wired between them at factory.) Components marked as “*1” in the following table have been assembled at factory and components marked as “*2” are assembled at site, i.e. “*2” components are shipped as array parts and/or attachments.

Table 1 Parts List per Array

No.	Component parts	System voltage	Quantity		Remarks
				12V	
1.	Solar module *1			2	
2.	Panel frame *1			2	
3.	Support leg *2			2	
4.	Foot bracket *2			4	
5.	Cross arm *2			2	
6.	Attachment *2			2	
7.	Band *2			2	with bolts and nuts M12
8.	Bird spike *2			2	
9.	Hex. head bolt *2 M10			10	for fixing support legs and brackets
10.	Hex. nut *2 M10			10	- do -
11.	Plain washer *2 M10			20	- do -
12.	Spring washer *2 M10			10	- do -
13.	Hex. head bolt *1 M6			8	for fixing modules
14.	Hex. nut *1,*2 M6			10 (8 ^{*1} + 2 ^{*2})	for fixing modules and bird spikes
15.	Plain washer *1 M6			16	for fixing modules
16.	Spring washer *1 M6			8	- do -
17.	Cable *1			2	for intermodule wiring
18.	Cable tie *1,*2			4 (2 ^{*1} + 2 ^{*2})	

4 Array Assembly / Wiring Flowchart

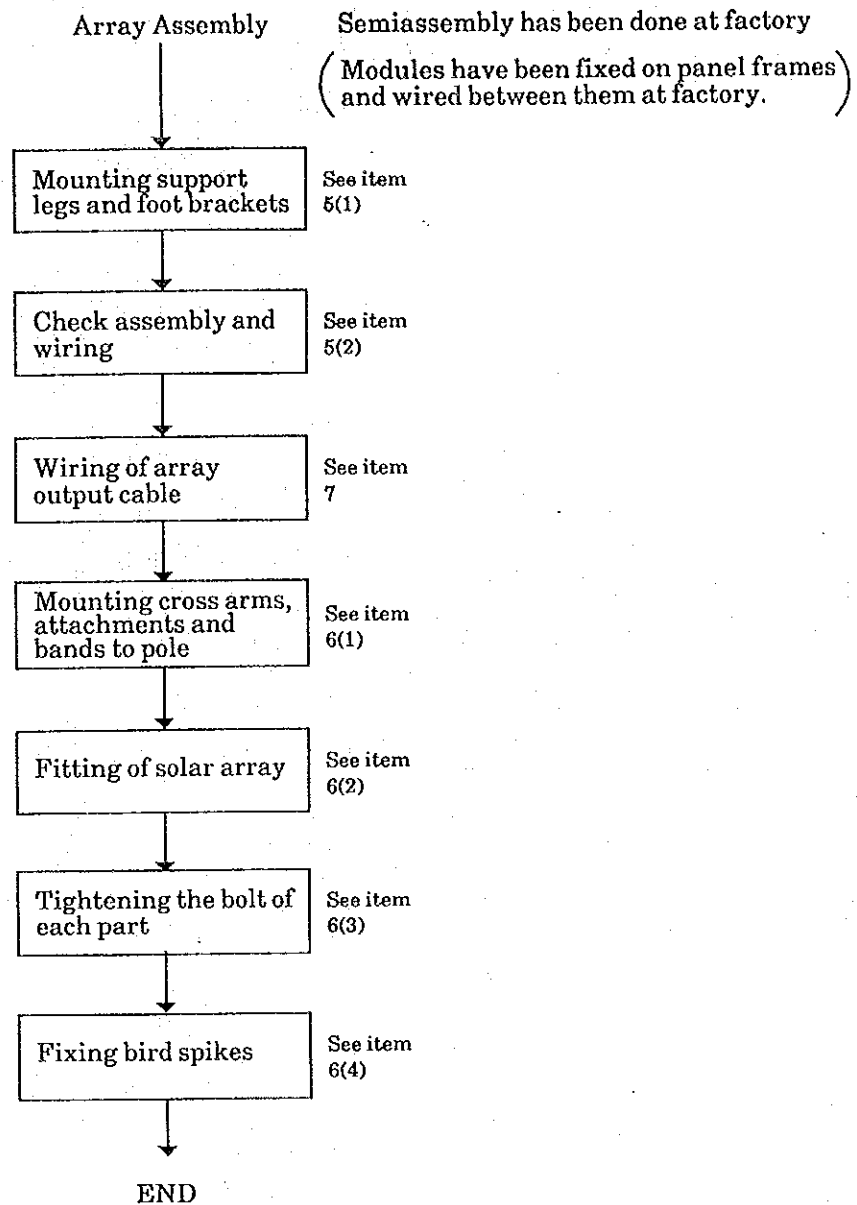


Fig. 1 Array assembly / wiring flowchart

6 Fitting of Solar Array

(1) Mounting cross arm, attachment and band to pole

– Refer to drawing No. NAA064A(2/2) and SAA546E –

Mount cross arms, attachments and bands to pole by employing M12 stud bolts and M12 nuts.

With regard to the position of them, refer to drawing No. SAA546E.

The cross arm should face towards true south (in the northern hemisphere) or face towards true north (in the southern hemisphere).

(2) Fitting of solar array

– Refer to drawing No. NAA064A(2/2) –

Fix the foot brackets to the cross arms by employing M10 bolts, nuts.

Each bolt must be installed with a plain washer under the head and plain washer, spring washer, and nut on the threaded portion.

(3) Tightening the bolt of each part of the array

Tighten the bolts of the solar array that is assembled temporarily in initial stage of the works.

(4) Fixing bird spike

– Refer to drawing No. SAA518A and NAA064A(2/2) –

Fix two bird spikes on top of array.

The fixing works should be performed by inserting the ring of bird spike to 6mm bolts (M6) that mount the solar module to the panel frame.

7. Wiring of Array Output Cable

– Refer to drawing No. NAB003A –

Connect the wire to the array output terminals in module's junction box by using crimp-type terminal lug. Screw size of array output terminal is M4 (4mm diameter), it is already fitted onto the output terminals in the shipment or supplied as attachment, never apply other screws than this.

Usable cable outer diameter for module's junction box is approximately 8.5mm~7.4mm. 3.5mm² or 2mm²-single core type flexible power cable is recommended. Don't use small size wire and unsuitable cable for outdoor use.

5 Array Assembly

(1) Mounting support legs and foot brackets

— Refer to drawing No. NAA064A(1/2) —

After wiring the module's junction box, and while the assembly is still lying face down, attach front foot brackets from outside of the panel frame, corner side in.

Attach support legs from outside of the panel frame. Attach rear brackets from inside of the support legs, corner side in.

All attachments are made with M10 hexagon head bolts. Each bolt must be installed with a plain washer under the head and plain washer, spring washer, and nut on the threaded portion.

Tighten the bolts just enough to allow movement of the brackets and legs.

CAUTION

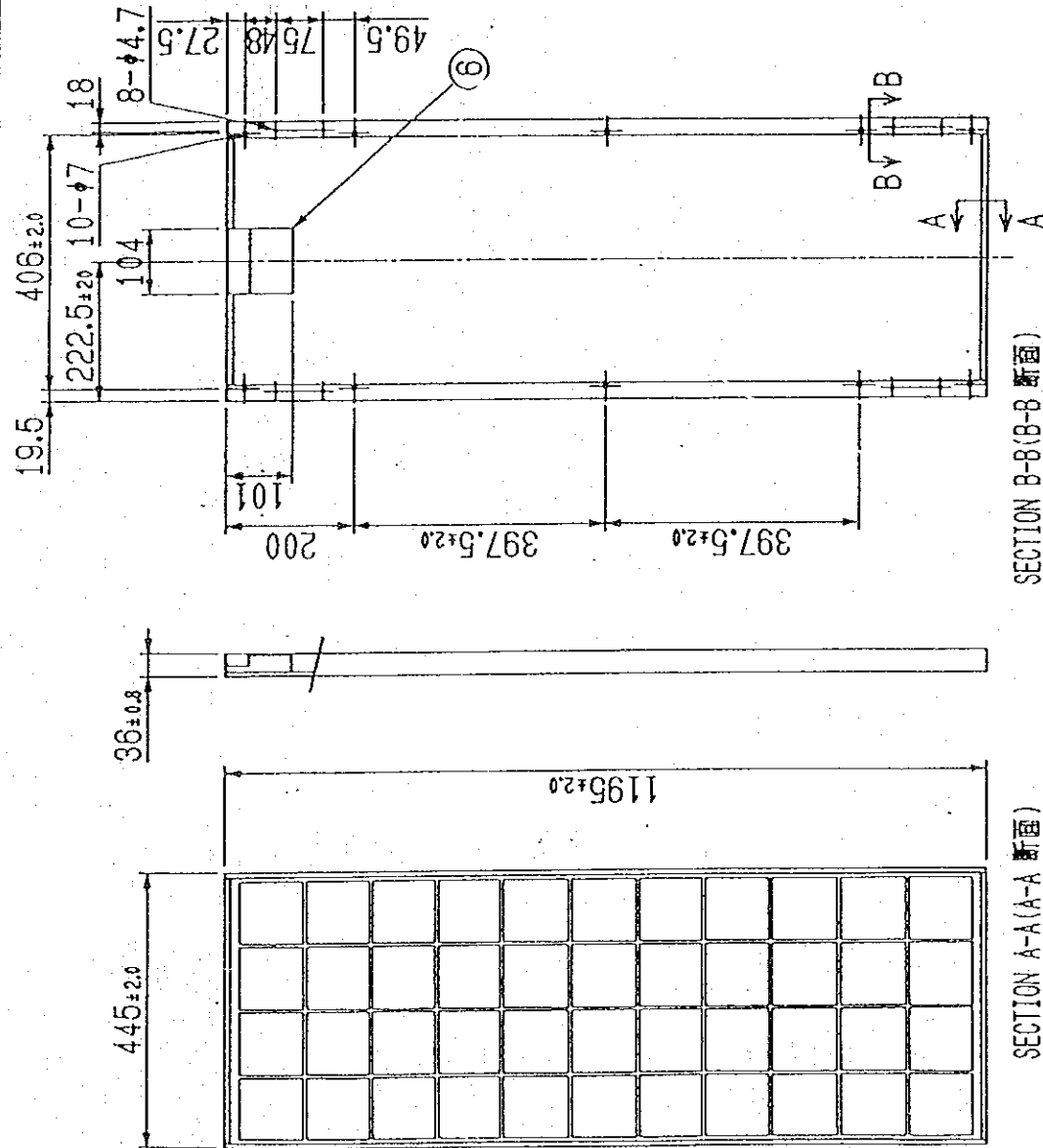
SHOCK MUST NOT be give to the solar module / array. Be cautious against possible shock hazard when installations are performed during daylight hours.

(2) Check after the completion of assembling works of solar array

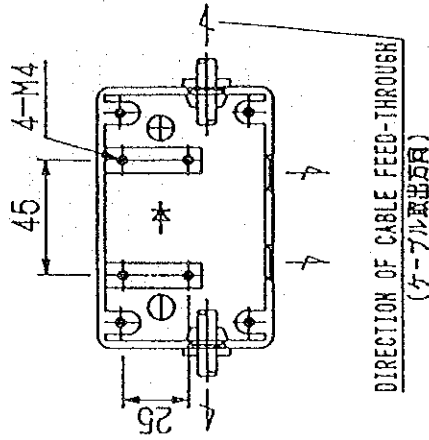
Check right or wrong for wiring works, tightening of fixing screws of module.

With regard to wiring of array, refer to drawing No. NAB003A .

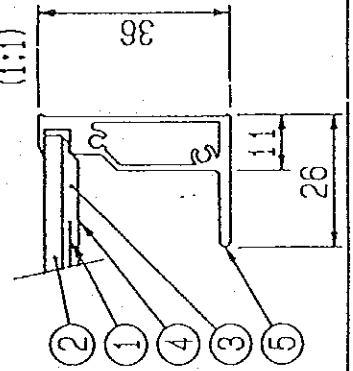
NO. (番号)	DESCRIPTION (品名)	QTY. (数量)	UNIT (単位)	REMARKS (備考)
1	SOLAR CELL (太陽電池素子)	44	S1	PSC100H
2	GLASS (ガラス)	1		LOW-IRON TEMPERED (低鉄強化)
3	PCYANT (UV防止剤)	1S	EVA	
4	BACK SHEET (バックシート)	1	PE/AL	
6	FRAME (フレーム)	1S	AL	
8	JUNCTION BOX (ジャンクションボックス)	1	ABS	USABLE CABLE (L: 8.6, W: 4.8) (ケーブル利用長さ 8.5-7.4mm)



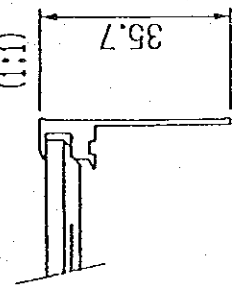
DETAIL OF JUNCTION BOX (1:2)
(ジャンクションボックス内部詳細)



SECTION B-B (B-B 断面) (1:1)



SECTION A-A (A-A 断面) (1:1)



DESIGNED (設計)	DRAWN (製図)	NAME (品名)	SOLAR MODULE (太陽電池モジュール)
Mr. Taniuchi	Mr. Taniuchi	TYPE (型式)	LA441K59
CHECKED (検印)	SCALE (縮尺)	DRG. NO. (図番)	AC-32216
S. Horie	(1:1, 1:2)		
APPROVED (承認)	DATE (作図日)		
S. Iizawa	MAR. 14, 1980		

Unit (単位): 100mm

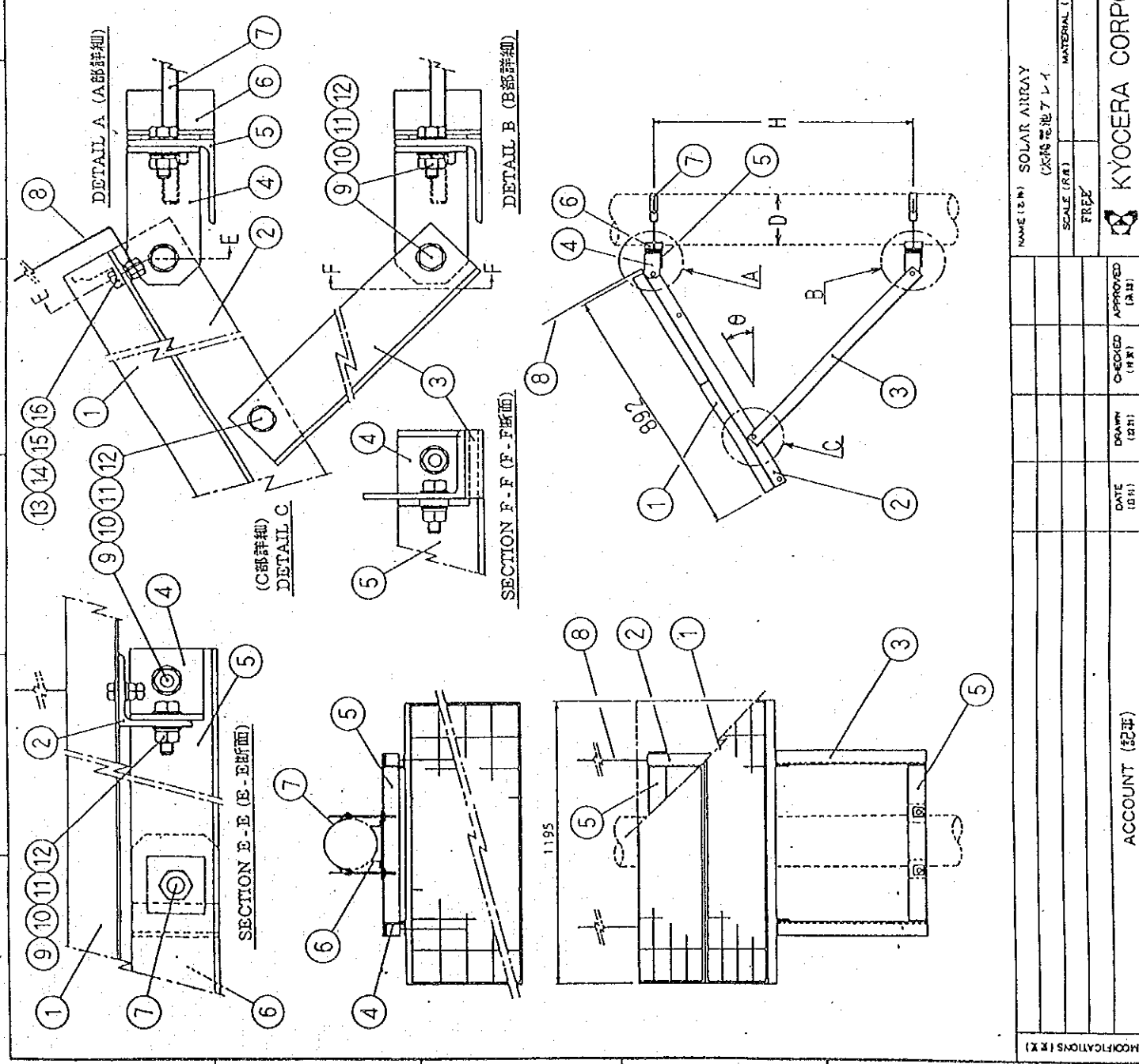
NO	PART NO. (部品番号)	QTY. (数量)	MAT.(材質)	DESCRIPTION (説明)
1	LA441K	2		Solar module (太陽電池モジュール)
2	SAC381A	2	SS41	Panel frame L50X50X4 (パネルフレーム)
3	SAC381A	2	SS41	Support leg L50X50X4 (サポートレグ)
4	SAC381A	4	SS41	Foot bracket (フットブラケット)
5	SAC381A	2	SS41	Cross arm L60X60X4 (クロスアーム)
6	SAC381A	2	SS41	Attachment (M2)
7	SAC381A	2	SS41	Band with bolts & nuts M12 (バンドボルトM12ナット付)
8	SAC381A	2	SUS304	Bird spike (バードスパイク)
9		10	SS41	Hex. head bolt M10X30 (六角ボルト M10X30)
10		10	SS41	Hex. nut M10 (六角ナット M10)
11		20	SS41	Plain washer M10 (平座金 M10)
12		10	SS41	Spring washer M10 (バネ座金 M10)
13		8	SUS304	Hex. head bolt M6X20 (六角ボルト M6X20)
14		10	SUS304	Hex. nut M6 (六角ナット M6)
15		16	SUS304	Plain washer M6 (平座金 M6)
16		8	SUS304	Spring washer M6 (バネ座金 M6)
		1 set		Intermodule cabling set (モジュール間配線セット)

Note (注): SS41: Hot dipped galvanized steel (溶融亜鉛メッキ鋼)
SUS304: Stainless steel (ステンレス鋼)

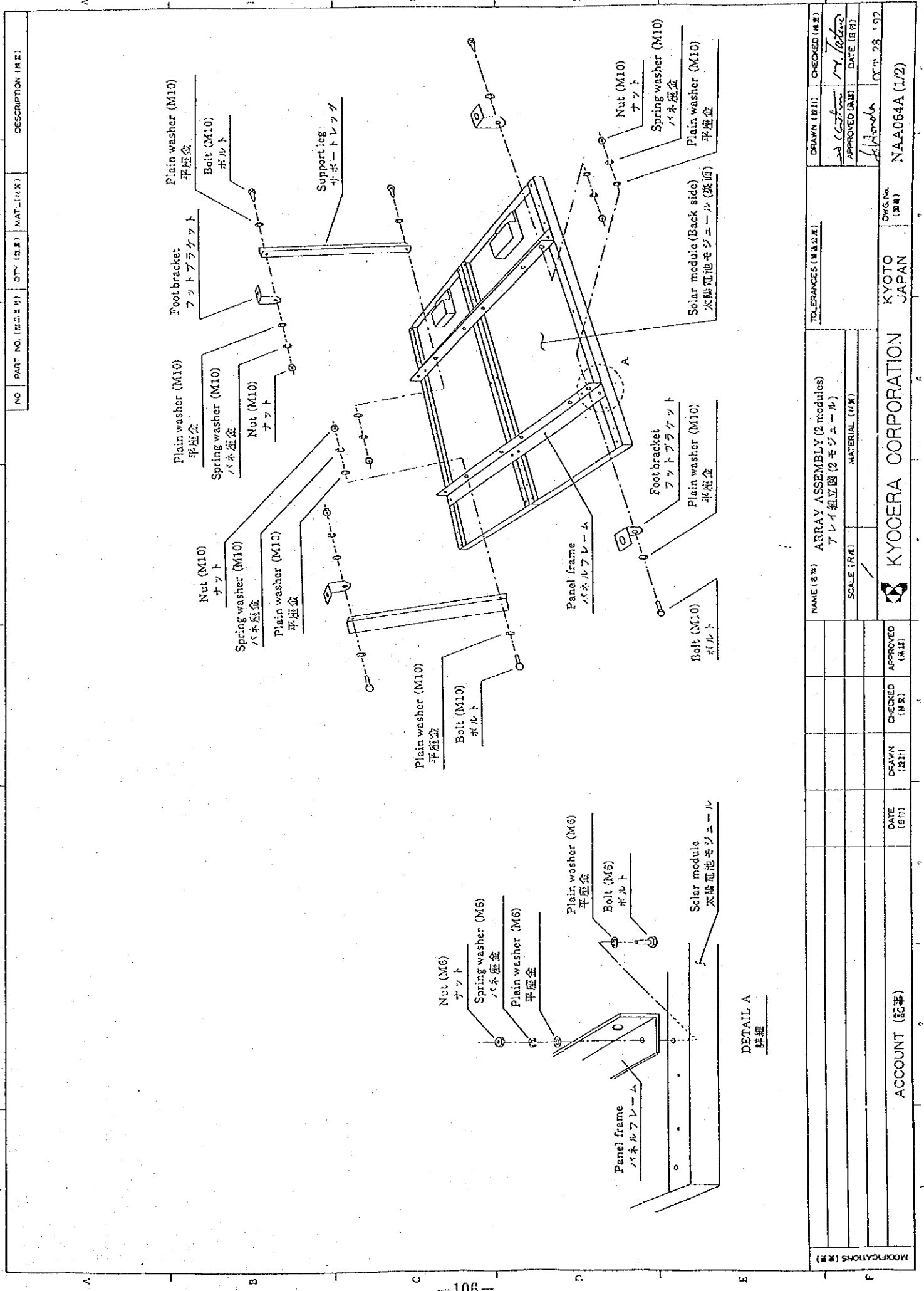
Applicable pole dia. (適合ポール径)	100-	120-	150-	170-	205-	240-	275-
"D" mm	120	150	177	214	251	286	322

Array angle (アレイ傾斜角)	0	5°	10°	15°	20°	25°	30°	35°	40°	45°
Dimension (取付寸法)	"H" mm	485	555	635	715	795	880	965	1040	1120

UNIT (単位): mm



NAME (社名)	SOLAR ARRAY (太陽電池アレイ)	DRAWN (製図)	CHECKED (検査)
SCALE (比率)	MATERIAL (材質)	DATE (日付) <td>DATE (日付)</td>	DATE (日付)
FREE			
DATE (日付)	DRAWN (製図)	CHECKED (検査)	APPROVED (承認)
TOLERANCES (公差)		DRAWN (製図)	CHECKED (検査)
12.0			
APPROVED (承認)		DATE (日付)	
		SEP. 28 '92	
DWG. NO. (図番)		SAAS18A	
KYOCERA CORPORATION		KYOTO JAPAN	
ACCOUNT (記号)			

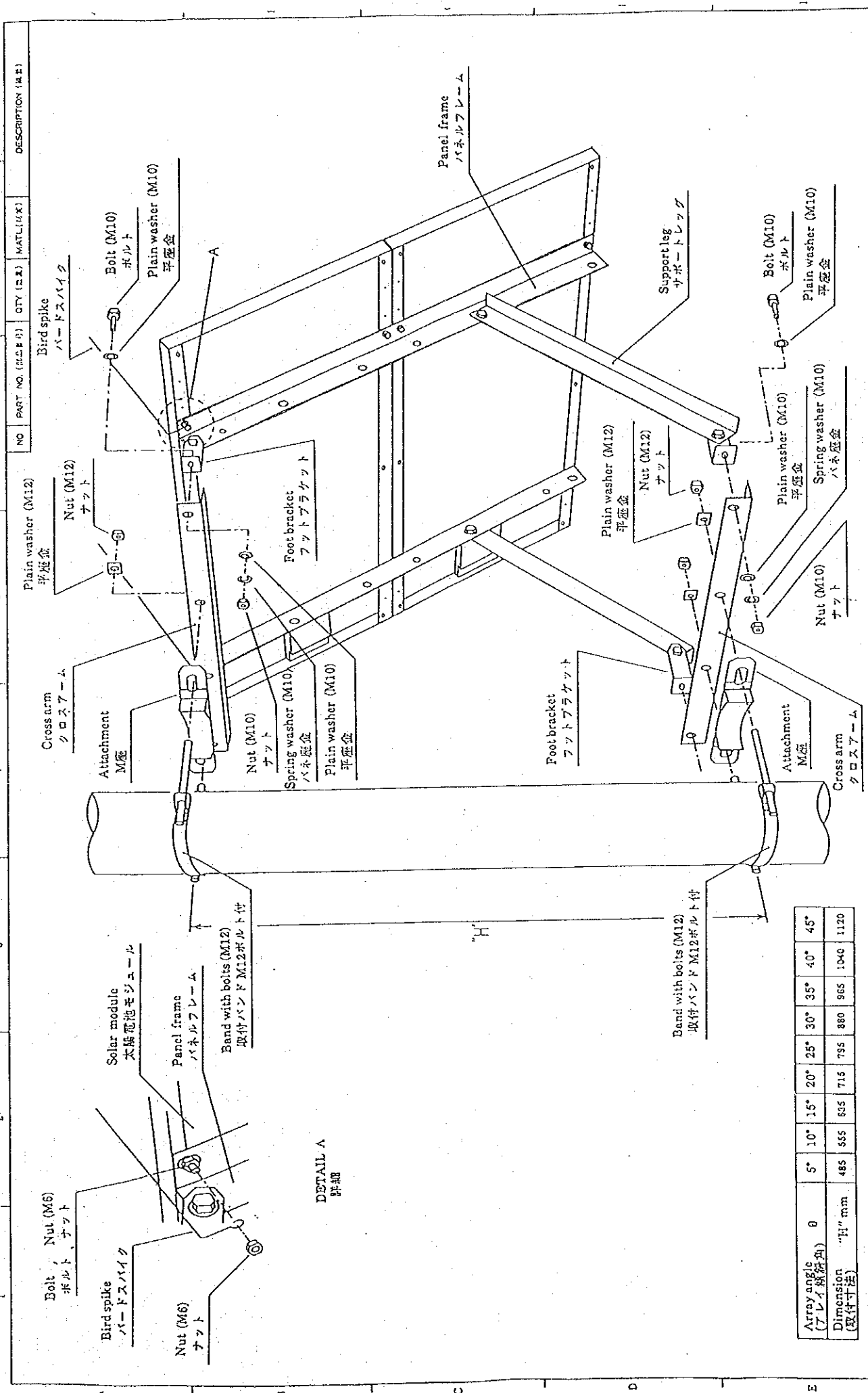


DETAIL A
詳細

NO.	PART NO. (JIS E 1)	QTY. (JIS E 1)	MAT'L (JIS E 1)	DESCRIPTION (JIS E 1)
1				
2				
3				
4				
5				
6				
7				
8				

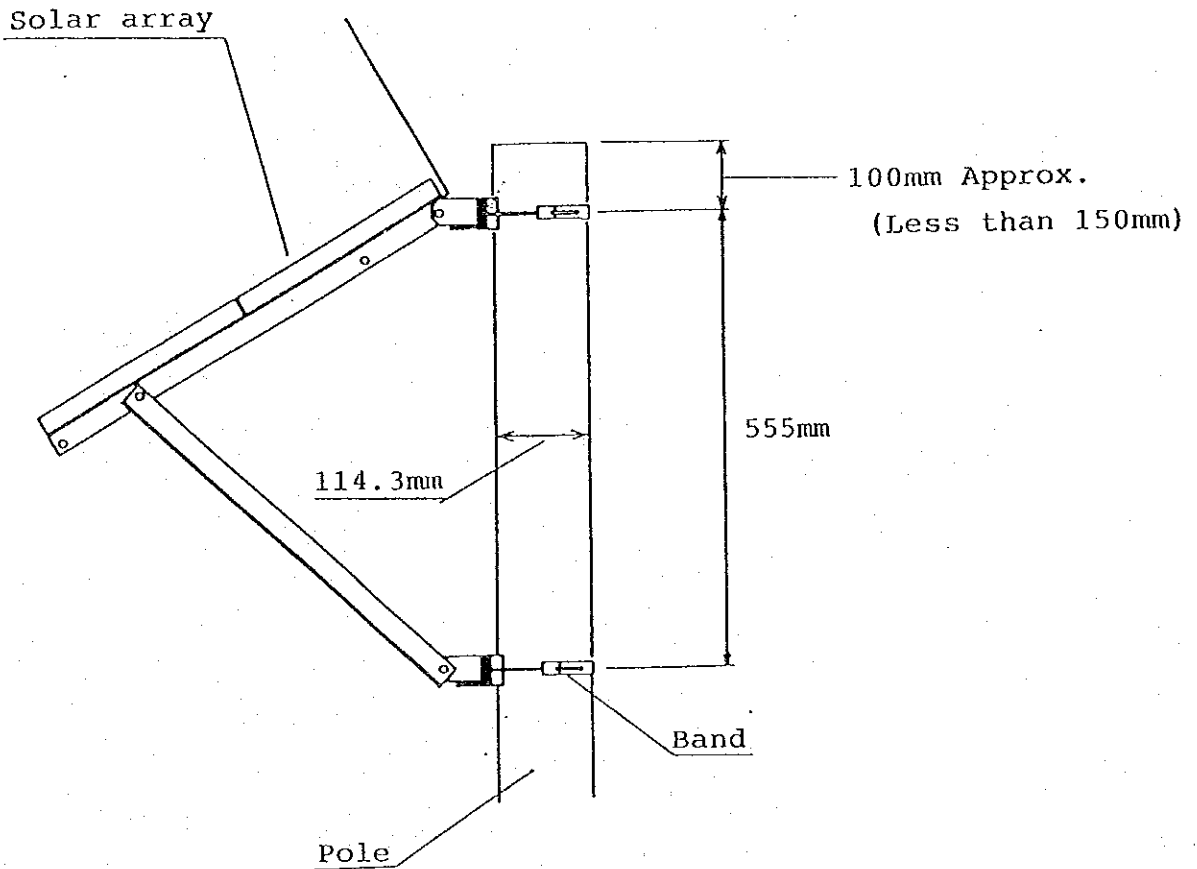
NAME (JIS E 1)	ARRAY ASSEMBLY (2 modules) アレイ組立図 (2 モジュール)	TOLERANCES (JIS B 1302)	DRAWN (JIS E 1)	CHECKED (JIS E 1)
SCALE (JIS E 1)			DATE (JIS E 1)	
MATERIAL (JIS E 1)			APPROVED (JIS E 1)	
			DATE (JIS E 1)	
			DWG. NO. (JIS E 1)	
			NAA064A (1/2)	

MOORFACATORS (JIS E 1)	ACCOUNT (記号)	DATE (日付)	DRAWN (日付)	CHECKED (日付)	APPROVED (日付)



NO. PART NO. (部品番号) QTY. (数量) MAT. (材質) DESCRIPTION (記述)

NAME (名称) ARRAY ASSEMBLY (2 modules) アレイ組立図 (2モジュール)
 SCALE (尺) MATERIAL (材質)
 TOLERANCES (公差)
 DRAWN (図取) CHECKED (図検) DATE (日付) APPROVED (承認) DATE (日付)
 KYOTO JAPAN
 KYOCERA CORPORATION
 NAA064A (2/2)
 ACCOUNT (記号)



MODIFICATIONS (変更)						
ACCOUNT (記事)			DATE (日付)	DRAWN (設計)	CHECKED (検査)	APPROVED (承認)
NAME (名称) Mounting array to pole		TOLERANCES (公差):		DRAWN (設計) <i>S. Yamaguchi</i>	CHECKED (検査)	
SCALE (尺度)	MATERIAL (材質)			APPROVED (承認)	DATE (日付)	
				<i>CC</i>	NOV. 11 '92	

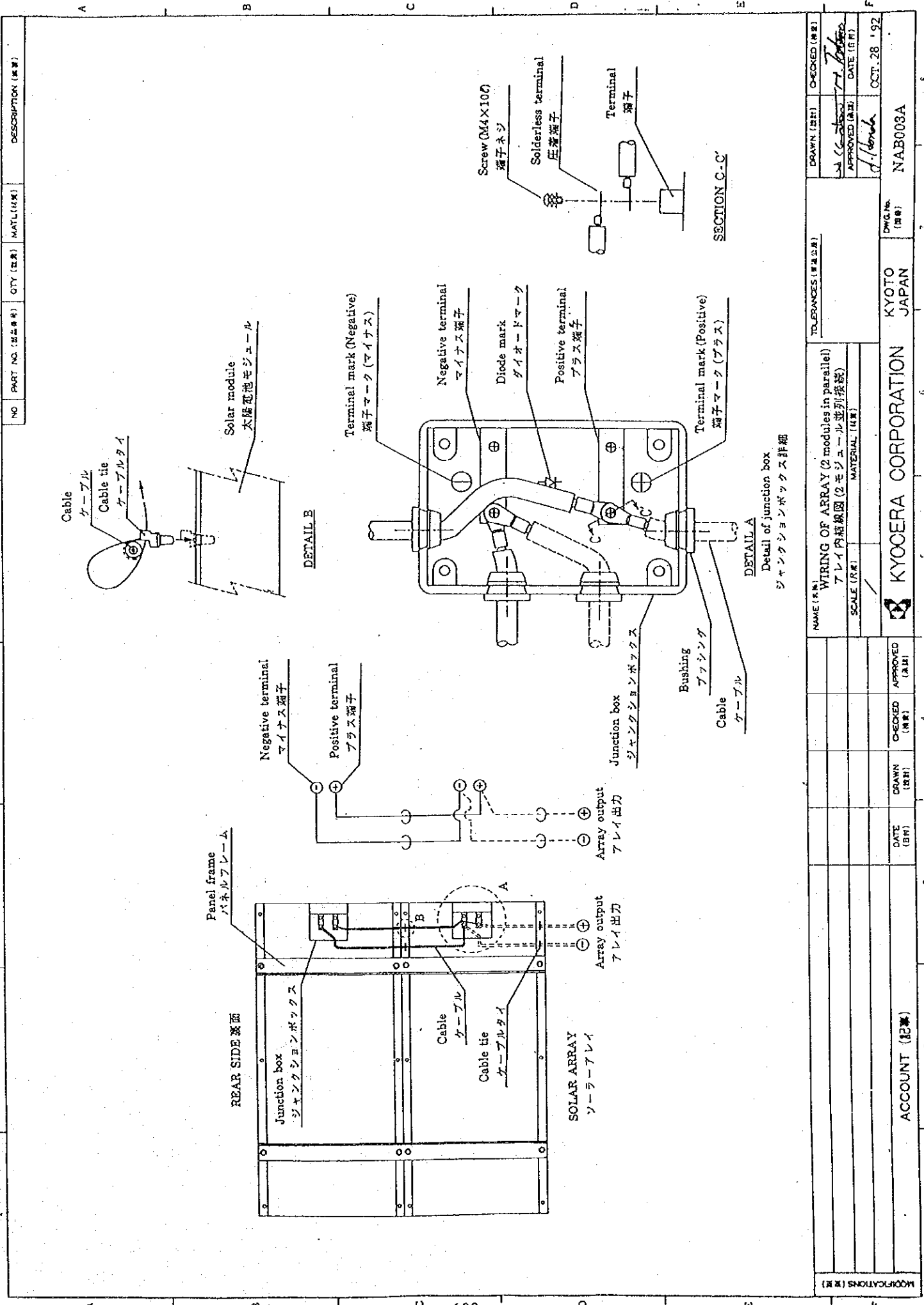


KYOCERA CORPORATION

KYOTO JAPAN

DWG.No. (図番)

SAA546E



NO	PART NO. (部品番号)	QTY (数量)	MAT'L (材質)	DESCRIPTION (概要)
1				
2				
3				
4				
5				
6				
7				
8				

NAME (品名)	TOLERANCES (公差)	DRAWN (図取)	CHECKED (検取)
WIRING OF ARRAY (2 modules in parallel) アレイ内結線図 (2モジュール並列接続)			
SCALE (尺)	MATERIAL (材質)	APPROVED (承認)	DATE (日付)

DATE (日付)	DRAWN (図取)	CHECKED (検取)	APPROVED (承認)

DWG. No. (図番)	DATE (日付)	CHECKED (検取)
NAB008A	OCT. 28 '92	

JICA

