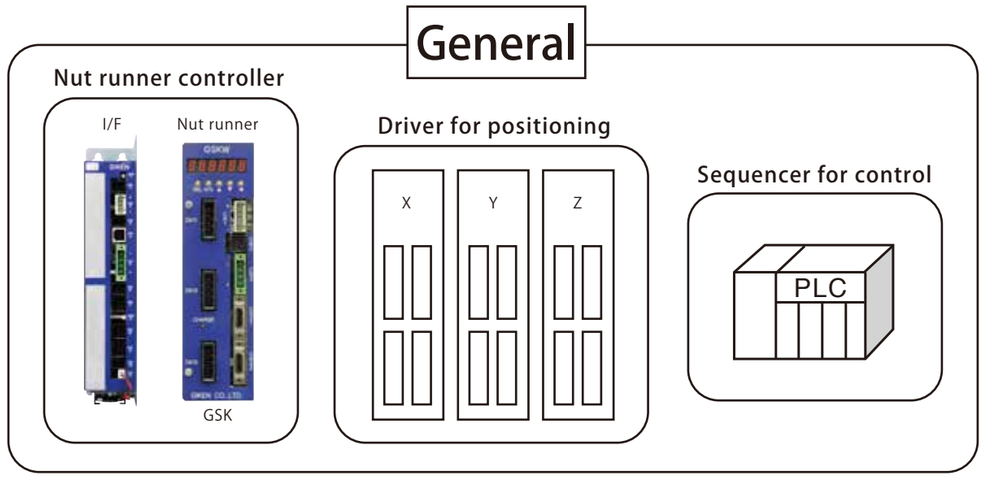
Positioning GSK motion control system

Items

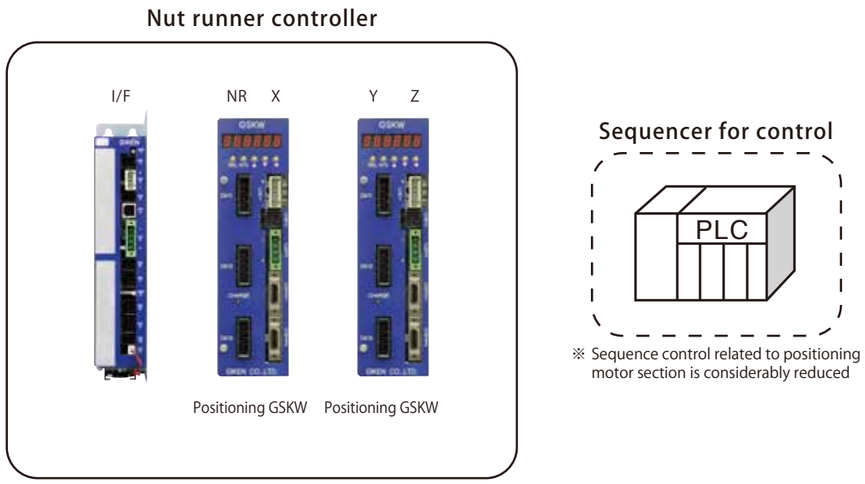
◆Positioning function is regularly mounted on the nut runner controller

■Regularly equipped with orthogonal axes control for X, Y, Z axes



Driver controller for orthogonal axes is not necessary
Downsizing of control panel and space saving

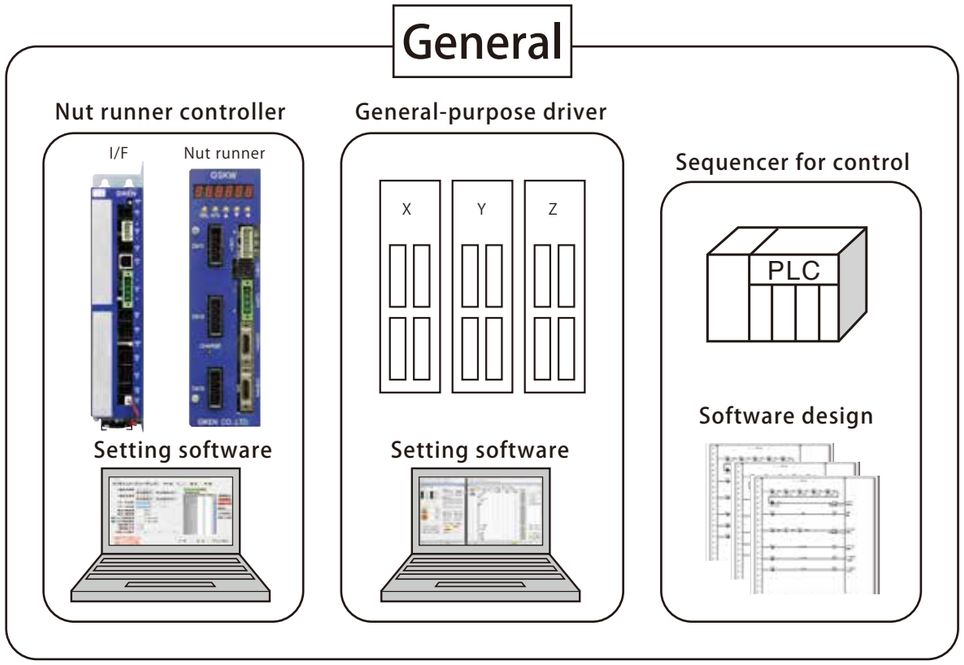
Positioning GSK



※ Sequence control related to positioning motor section is considerably reduced

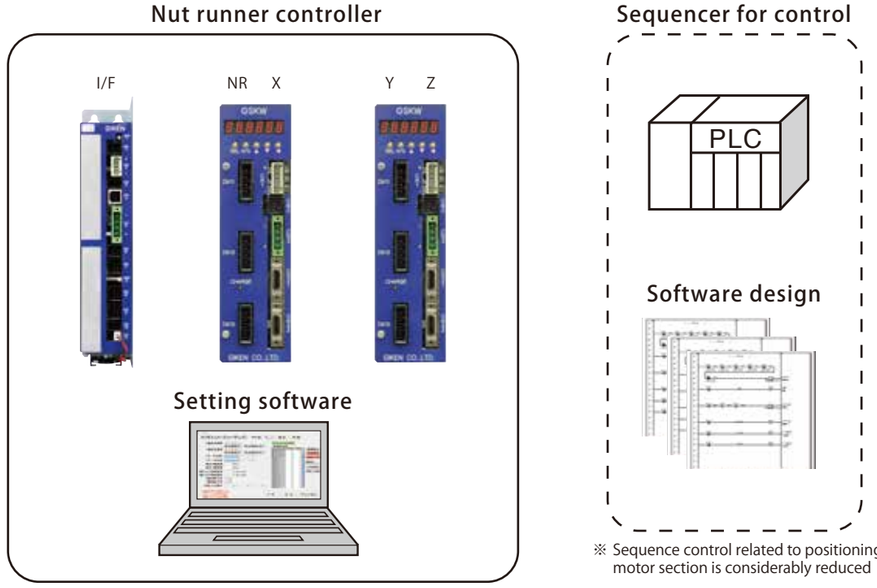
◆Simplification of software (circuit) design in positioning motor section

■Teaching (Coordinate setting) is enabled by using setting PC (Software)



Simplification of positioning control
Various models can be supported
Reduction of man-hour

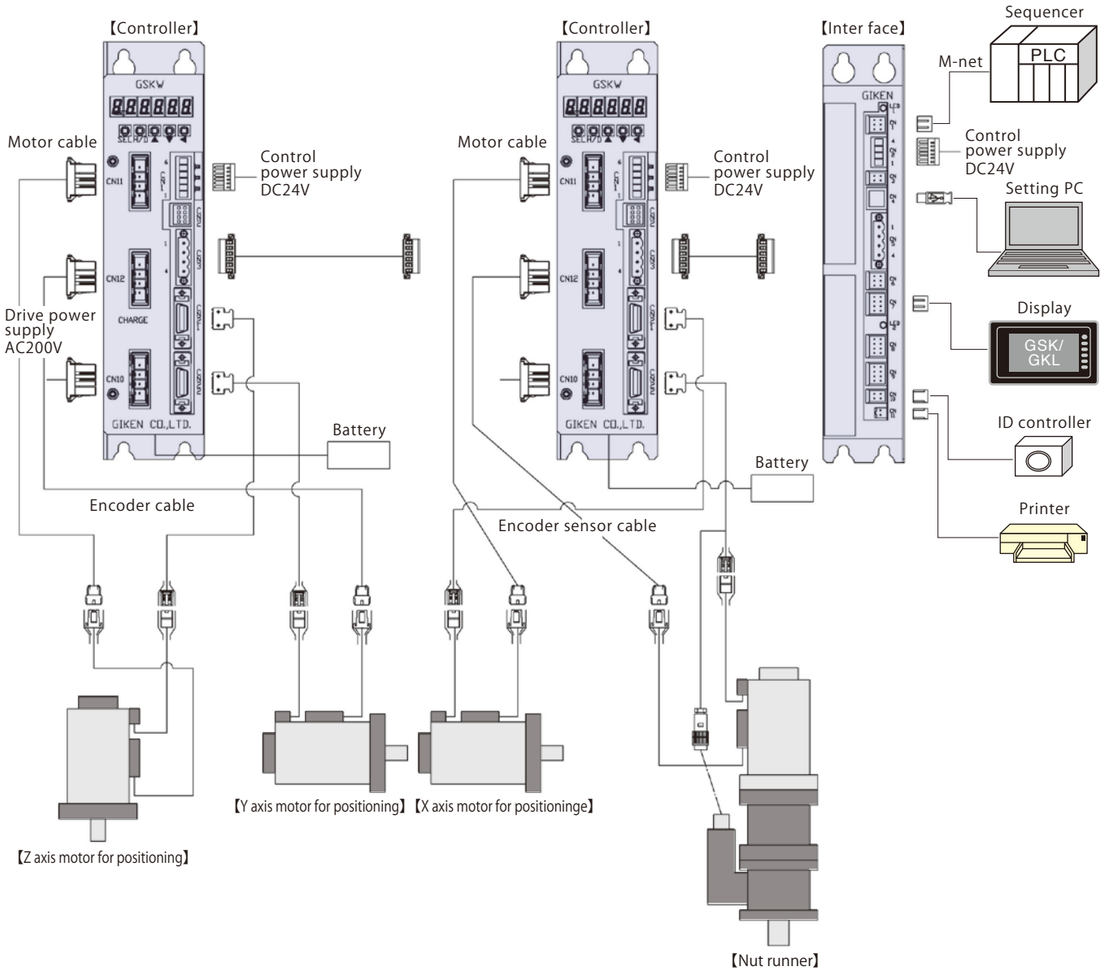
Positioning GSK



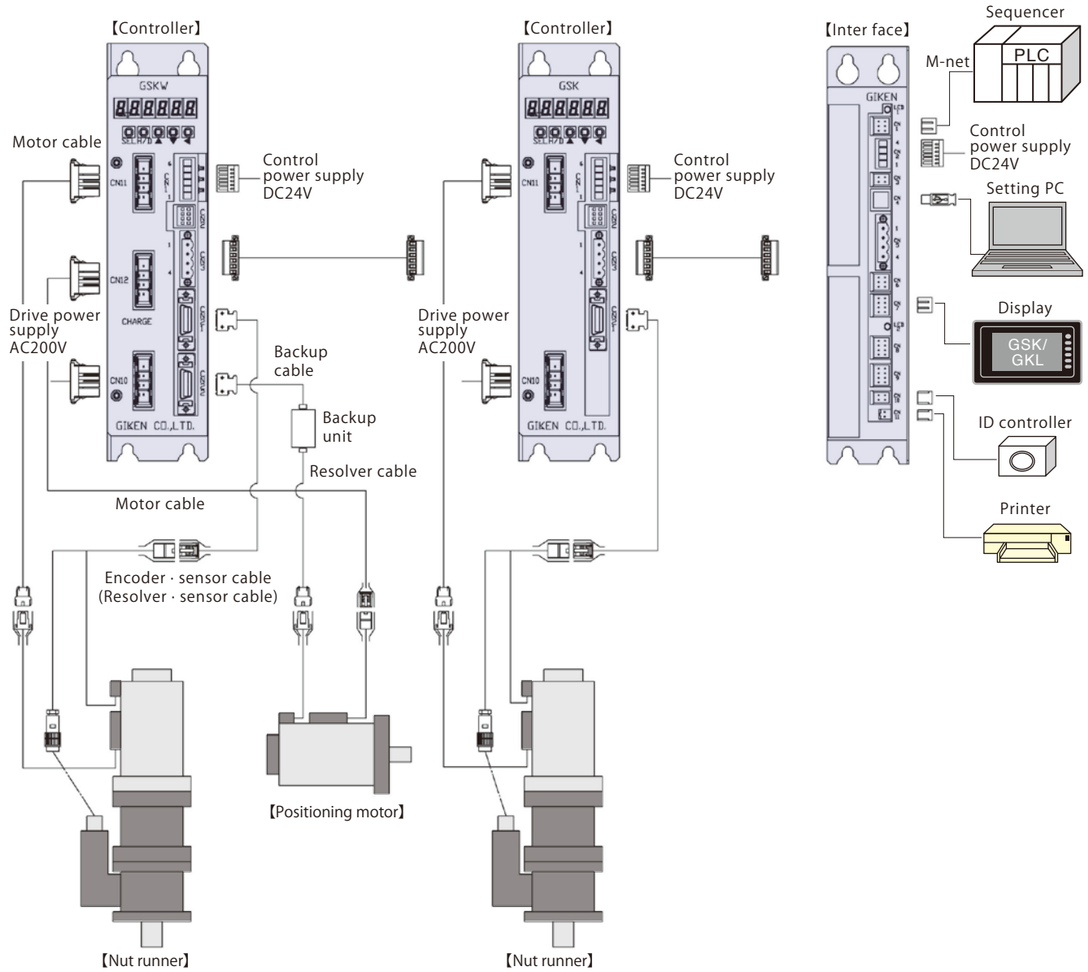
※ Sequence control related to positioning motor section is considerably reduced

■Positioning GSK system configuration

Specifications of positioning motor encoder (Standard specification)



Specifications of positioning motor resolver (Custom specification)



■Positioning Motor Model List

◆No brake type

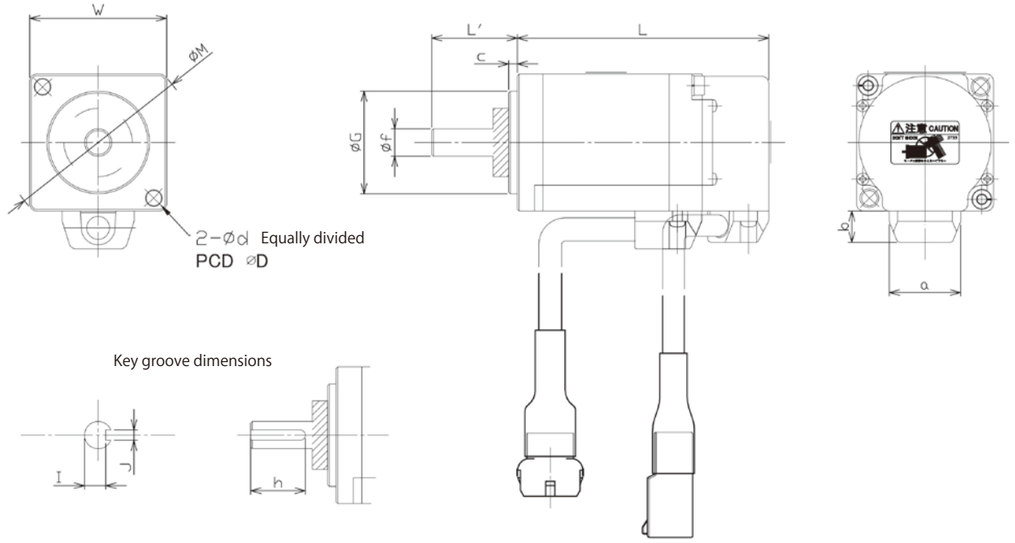
Model	Rated output (W)	Rated torque N·m (kgf·cm)	Instantaneous maximum torque N·m(kgf·cm)	Rated rotation speed r/min	Maximum rotation speed r/min	Drive power supply (AC200V) Supply current capacity Rated value [A rms]		Sensor type	Sensor resolution	□ Size	Key way		Corresponding driver
											Yes	No	
TS4603N2099E200	100	0.318 (3.25)	0.95 (9.7)	3000	5000	0.75		Absolute encoder	17 / 33 bit	□40	●		GSK-14-E-P2 GSK-T4-E-P2 GSKW-14-E-P2 GSKW-T4-E-P2
TS4603N2058E200	100	0.318 (3.25)	0.95 (9.7)	3000	5000	0.75		Absolute encoder	17 / 33 bit	□40		●	
TS4604N2023E200	150	0.477 (4.87)	1.43 (14.6)	3000	5000	1.2		Absolute encoder	17 / 33 bit	□40	●		
TS4604N2021E200	150	0.477 (4.87)	1.43 (14.6)	3000	5000	1.2		Absolute encoder	17 / 33 bit	□40		●	
TS4607N2120E200	200	0.64 (6.5)	1.91 (19.5)	3000	5000	1.5		Absolute encoder	17 / 33 bit	□60	●		
TS4607N2088E200	200	0.64 (6.5)	1.91 (19.5)	3000	5000	1.5		Absolute encoder	17 / 33 bit	□60		●	
TS4607N3222E200 ※	200	0.64 (6.5)	1.91 (19.5)	3000	5000	1.5		Resolver	±30′	□81		●	GSK-14-R-P2 GSK-14-R-P2 GSKW-14-R-P2 GSKW-14-R-P2
TS4609N2120E200	400	1.27 (13)	3.82 (39)	3000	5000	2.3		Absolute encoder	17 / 33 bit	□60	●		GSK-14-E-P2 GSK-T4-E-P2 GSKW-14-E-P2 GSKW-T4-E-P2
TS4609N2085E200	400	1.27 (13)	3.82 (39)	3000	5000	2.3				□60		●	

※Resolver specification is custom item.

◆Brake type

Model	Rated output (W)	Rated torque N·m (kgf·cm)	Instantaneous maximum torque N·m(kgf·cm)	Rated rotation speed r/min	Maximum rotation speed r/min	Drive power supply (AC200V) Supply current capacity Rated value [A rms]		Sensor type	Sensor resolution	□ Size	Key way		Corresponding driver
											Yes	No	
TS4603N7066E200	100	0.318 (3.25)	0.95 (9.7)	3000	5000	0.75		Absolute encoder	17/33 bit	□40	●		GSK-14-E-P2 GSK-T4-E-P2 GSKW-14-E-P2 GSKW-T4-E-P2
TS4603N7060E200	100	0.318 (3.25)	0.95 (9.7)	3000	5000	0.75		Absolute encoder	17/33 bit	□40		●	
TS4604N7023E200	150	0.477 (4.87)	1.43 (14.6)	3000	5000	1.2		Absolute encoder	17/33 bit	□40	●		
TS4604N7021E200	150	0.477 (4.87)	1.43 (14.6)	3000	5000	1.2		Absolute encoder	17/33 bit	□40		●	
TS4609N7084E200	400	1.27 (13)	3.82 (39)	3000	5000	2.3		Absolute encoder	17/33 bit	□60	●		
TS4609N7049E200	400	1.27 (13)	3.82 (39)	3000	5000	2.3		Absolute encoder	17/33 bit	□60		●	

■Positioning motor dimension table



◆No brake type

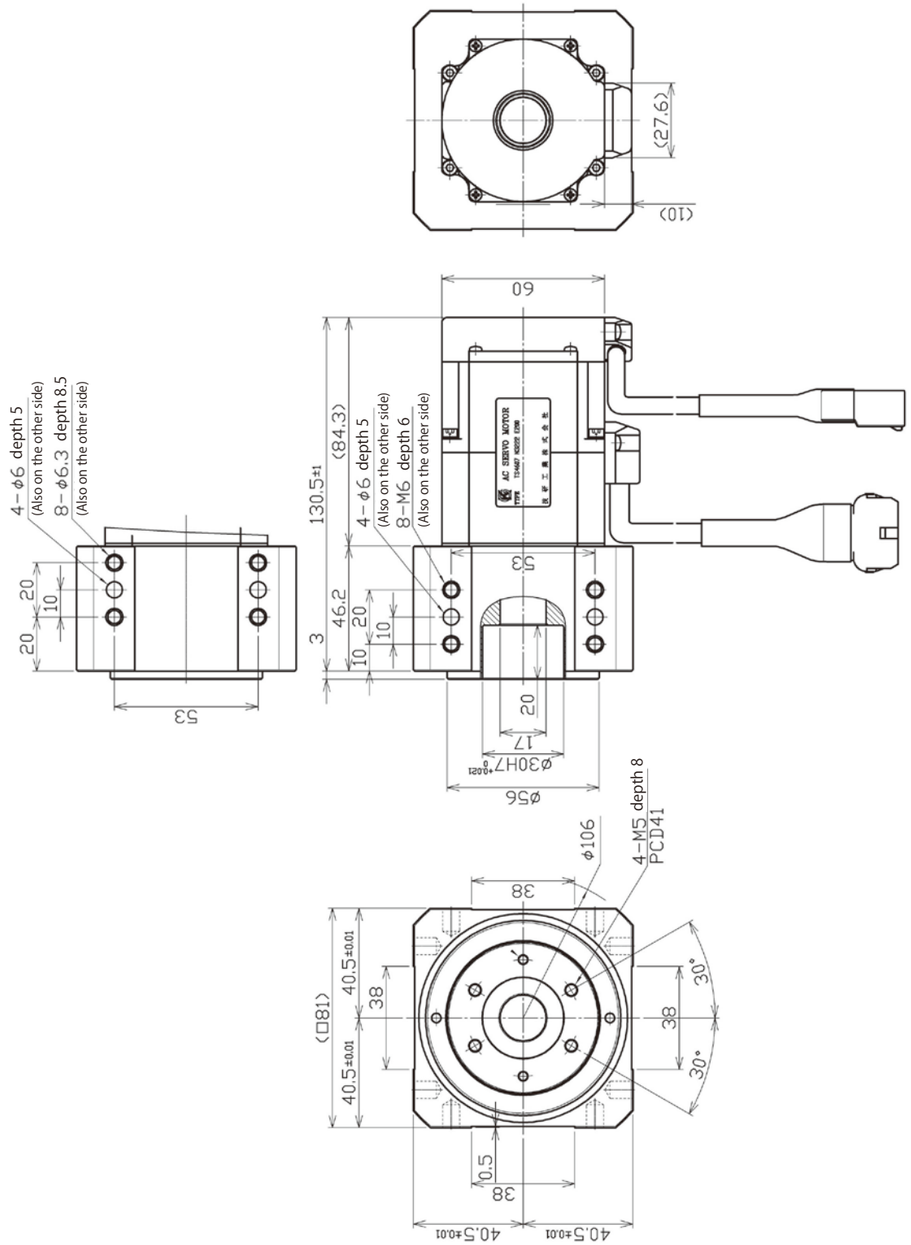
Positioning Motor Model	a	b	c	d	D	f		G		h	I		J		L		L'		M	W
						Dimension	Tolerance	Dimension	Tolerance		Dimension	Tolerance	Dimension	Tolerance	Dimension	Tolerance	Dimension	Tolerance		
TS4603N2099E200	21	9.2	2.5	4.5	46	8	0 -0.009	30	0 -0.021	16	6.2	0 -0.2	3	-0.006 -0.031	73.5	±1	25	±1	55	40
TS4603N2058E200										–	–	–	–	–						
TS4604N2023E200										16	6.2	0 -0.2	3	-0.006 -0.031	87.5					
TS4604N2021E200										–	–	–	–	–						
TS4607N2120E200	27.6	10	3	5.5	70	14	0 -0.011	50	0 -0.025	20	11	0 -0.2	5	-0.012 -0.042	76.1		30		80	60
TS4607N2088E200										–	–	–	–	–						
TS4607N3222E200	See the figure on the right																			
TS4609N2120E200	27.6	10	3	5.5	70	14	0 -0.011	50	0 -0.025	20	11	0 -0.2	5	-0.012 -0.042	98.1	±1	30	±1	80	60
TS4609N2085E200										–	–	–	–	–						

◆Brake type

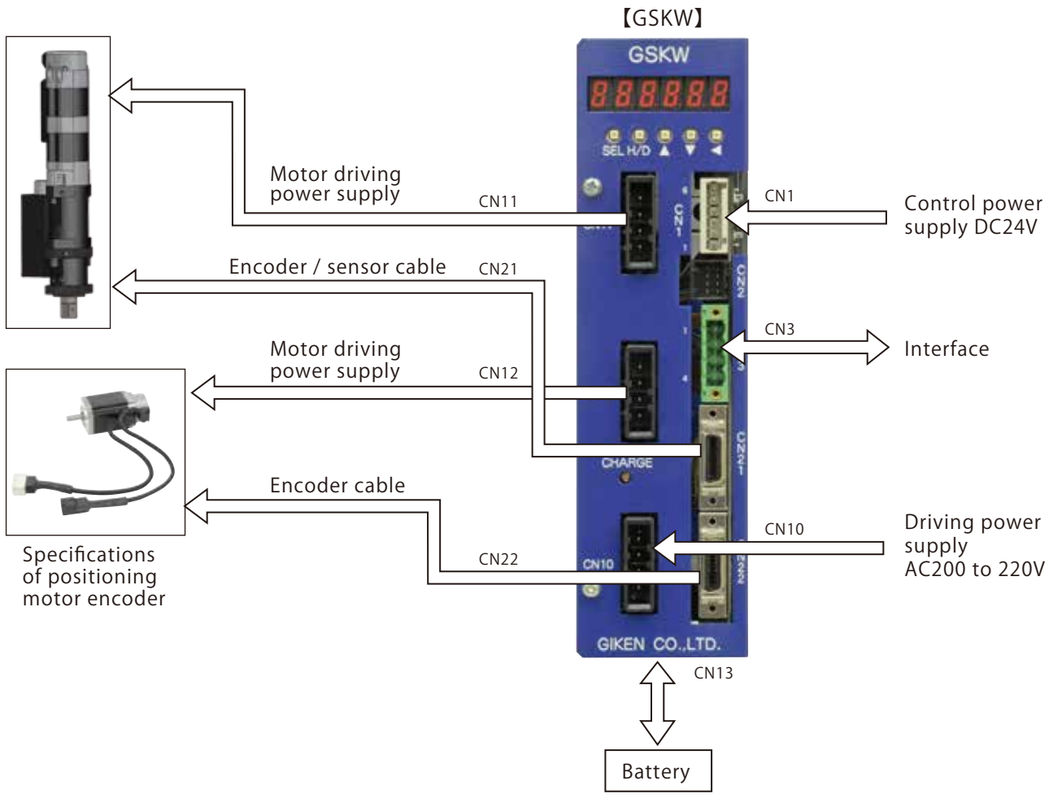
Positioning Motor Model	a	b	c	d	D	f		G		h	I		J		L		L'		M	W
						Dimension	Tolerance	Dimension	Tolerance		Dimension	Tolerance	Dimension	Tolerance	Dimension	Tolerance	Dimension	Tolerance		
TS4603N7066E200	21	9.2	2.5	4.5	46	8	0 -0.009	30	0 -0.021	16	6.2	0 -0.2	3.0	-0.006 -0.031	109.1	±1	25	±1	55	40
TS4603N7060E200										–	–	–	–	–						
TS4604N7023E200										16	6.2	0 -0.2	3.0	-0.006 -0.031	123.1					
TS4604N7021E200										–	–	–	–	–						
TS4609N7084E200	27.6	10	3	5.5	70	14	0 -0.011	50	0 -0.025	20	11	0 -0.2	5	-0.012 -0.042	132.7		30		80	60
TS4609N7049E200										–	–	–	–	–						

■Hollow Motor Dimension

(TS4607N3222E200)



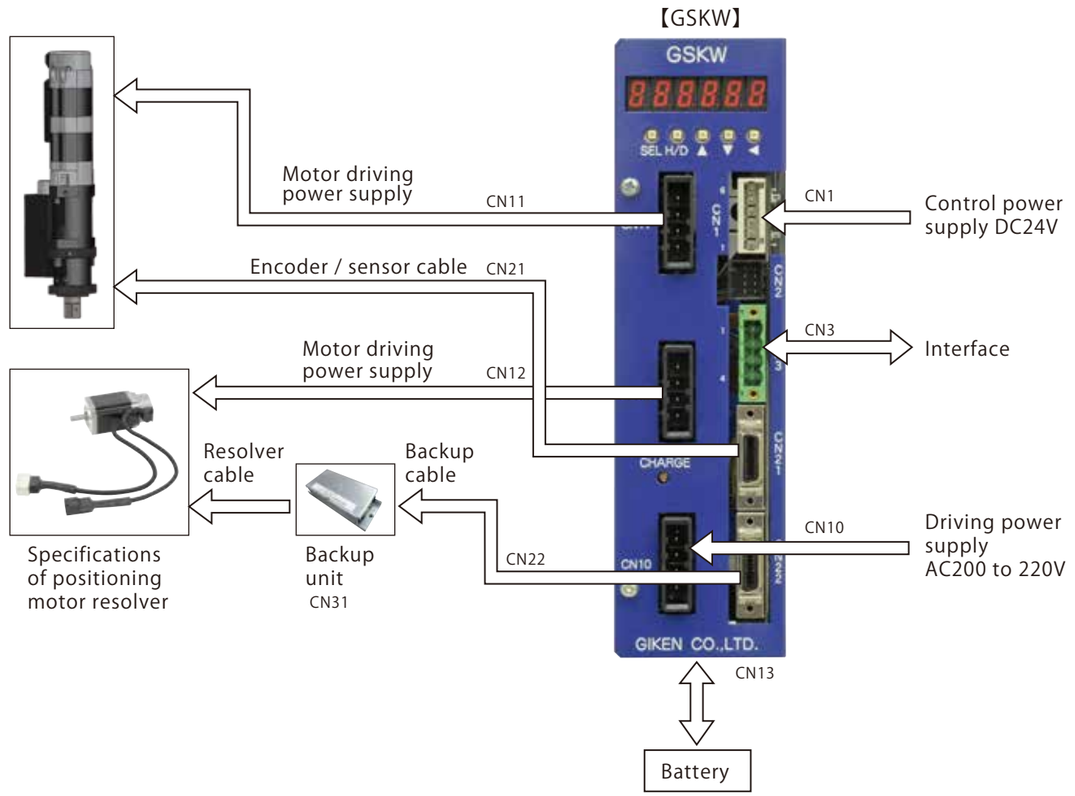
■Specifications of positioning motor encoder



GSK(W)-14-E□-P□

Port No.	Name	Used connector model	Opposing connector housing	Opposing connector pin	Opposing connector included	Remark
CN1	Control power supplyinput port	734-166 (WAGO)	734-106 (WAGO)	–	○	DC24V
CN3	Port for connecting interface / controller	MSTB2.5/4-GF-5.08 (PHOENIX CONTACT)	MSTB2.5/4-STF-5.08 (PHOENIX CONTACT)	–	○	ARC-NET
CN10	Port for inputting driving power supply	1-179277-2 (TE Connectivity)	1-178128-4 (TE Connectivity)	1-175218-2 (TE Connectivity)	○	AC200～220V
CN11	Port for connecting axis 1 motor driving power supply	2-179277-2 (TE Connectivity)	2-178128-4 (TE Connectivity)	1-353717-2 (TE Connectivity)	–	
CN12	Port for connecting axis 2 motor driving power supply	2-179277-2 (TE Connectivity)	2-178128-4 (TE Connectivity)	1-353717-2 (TE Connectivity)	–	
CN13	Battery	–	–	–	–	Battery type:GSK-BATT
CN21	Port for connecting axis 1 sensor	10220-52-A2PL (Sumitomo 3M)	10336-52A0-008 (Sumitomo 3M)	10136-3000VE (Sumitomo 3M)	–	
CN22	Port for connecting axis 2 sensor	10220-52-A2PL (Sumitomo 3M)	10336-52A0-008 (Sumitomo 3M)	10136-3000VE (Sumitomo 3M)	–	

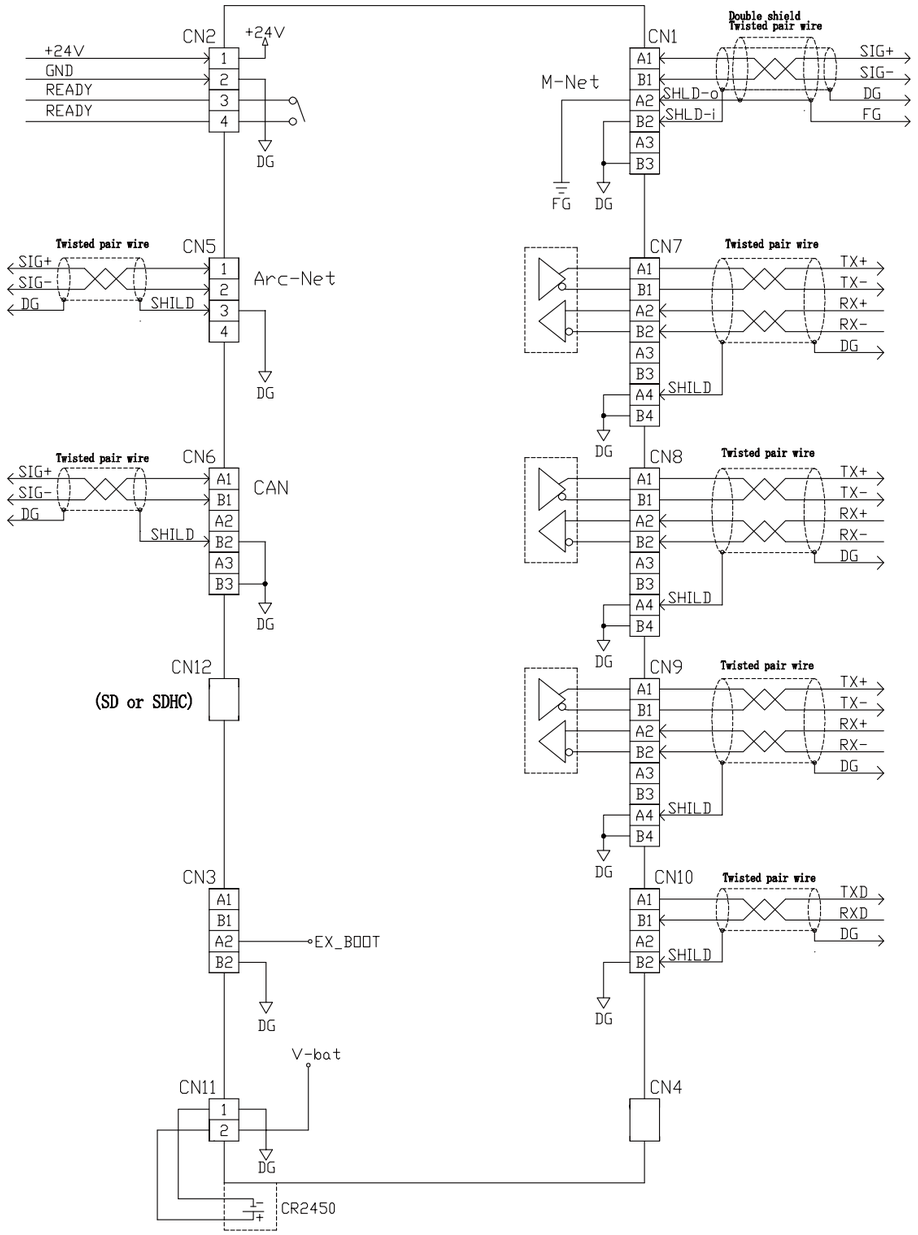
■Specifications of positioning motor resolver



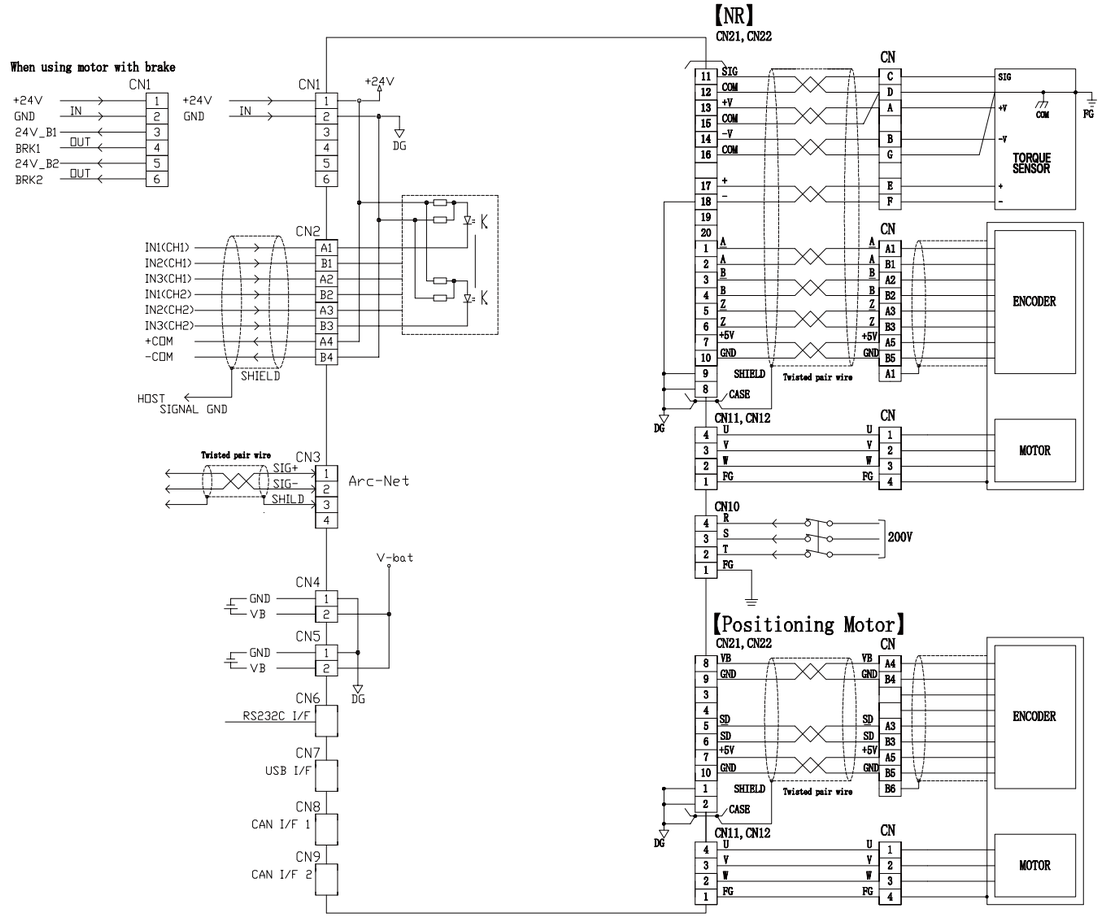
GSK(W)-14-R□-P□

Port No.	Name	Used connector model	Opposing connector housing	Opposing connector pin	Opposing connector included	Remark
CN1	Control power supplyinput port	734-166 (WAGO)	734-106 (WAGO)	–	○	DC24V
CN3	Port for connecting interface / controller	MSTB2.5/4-GF-5.08 (PHOENIX CONTACT)	MSTB2.5/4-STF-5.08 (PHOENIX CONTACT)	–	○	ARC-NET
CN10	Port for inputting driving power supply	1-179277-2 (TE Connectivity)	1-178128-4 (TE Connectivity)	1-175218-2 (TE Connectivity)	○	AC200～220V
CN11	Port for connecting axis 1 motor driving power supply	2-179277-2 (TE Connectivity)	2-178128-4 (TE Connectivity)	1-353717-2 (TE Connectivity)	–	
CN12	Port for connecting axis 2 motor driving power supply	2-179277-2 (TE Connectivity)	2-178128-4 (TE Connectivity)	1-353717-2 (TE Connectivity)	–	
CN13	Battery	–	–	–	–	Battery type:GSK-BATT
CN21	Port for connecting axis 1 sensor	10220-52-A2PL (Sumitomo 3M)	10320-5A0-008 (Sumitomo 3M)	10120-3000VE (Sumitomo 3M)	–	
CN22	Port for connecting axis 2 sensor	10220-52-A2PL (Sumitomo 3M)	10320-5A0-008 (Sumitomo 3M)	10120-3000VE (Sumitomo 3M)	–	
CN31	Backup unit	–	–	–	–	Backup unit model：BU-R001

■Interface (Common to GSK)



■Controller



■Interface (Common to GSK)

◆Model composition

GSK - IF CC – N1
① ②

①Supported communication standard

Blank	: M-NET
CC	: CC-LINK
DN	: Device-NET
PNIO	: PROFI-NET-I/O
PNIRT	: PROFI-NET-IRT
FL	: FL-NET
ET	: Ether-NET
SG	: System GSK (I/O)

②Corresponding series symbol

N1	: Standard item (Common to positioning and nut runner)

◆Model list

Model	Communication standard
GSK-IF-N1	M-NET
GSK-IFCC-N1	CC-LINK
GSK-IFDN-N1	Device-NET
GSK-IFPNIO-N1	PROFI-NET-I/O
GSK-IFPNIRT-N1	PROFI-NET-IRT
GSK-IFFL-N1	FL-NET
GSK-IFET-N1	Ether-NET
GSK-IFSG-N1	System GSK specification (I/O)
GSK-IFDN(ET)-N1	Device-NET + Ether-NET
GSK-IFCC(ET)-N1	CC-LINK + Ether-NET

■Controller

◆Model composition

GSK W – 1 4 – E – E※ P2
① ② ③ ④ ⑤ ⑥

①Number of controllable motor

Blank	: 1 axis type
W	: 2 axis type

②Cooling plate mounting position

1	: Side (Standard type)
T	: Back (T type)

③Angle sensor type ※1

E	: Encoder
R	: Resolver

※1 Depends on motor type.

④Angle sensor spec

Blank	: Standard

⑤Nutrunner angle sensor type

E※	: Encoder Specifications Nutruna
R	: Resolver Specifications Nutruna

⑥Corresponding series symbol

P2	: Standard

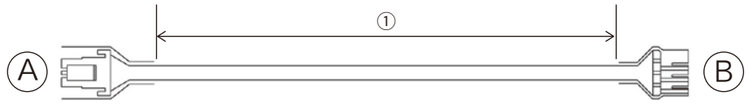
※The mark indicates the nut runner's angle sensor specifications. (Standard type is blank)
※When moving the nut runner and positioning motor with W specification a controller ,
⑤ type selection is required.
In that case, please use nut runner as the first axis.

◆Model list

Model	Number of controllable motor	Cooling plate
GSK-14-□-P2	1 axis specification	No cooling plate
GSKW-14-□-P2	2-axis specification	
GSKW-14-□-□P2	2-axis specification	
GSK-T4-□-P2	1 axis specification	
GSKW-T4-□-P2	2-axis specification	
GSKW-T4-□-□P2	2-axis specification	

■Motor cable

◆Direct cable



【Model】

K I C H I M − □ M − □
① ②

①Cable length

Designation of cable length (Specified unit:1m)

※1 Maximum guaranteed cable length 20 m (nut runner to inter-controller length)
※2 Custom-made cable of 20 m or more is manufacturable, but operation guarantee is not possible. Please check the operation by the customer.
※3 All cables are flex cables.

②Motor brake specification

Blank: For no brakes motor
BK ：For brakes motor

【Model list】

Name	Model	With or without brake
Direct cable	KICHIM-□M	No brake
Direct cable	KICHIM-□M-BK	With brake

【Specification】

Housing model		Contact type	Contact Shape
A	350715-1 (AMP)	350550-1 (AMP)	凹
B	2-178128-4 (AMP)	1-353717-2 (AMP)	

◆Relay cable

【Model】

K I C H I M KA − □ M − □
① ② ③

①Cable division

KA ：Relay movable cable
KO ：Relay fixed cable

②Cable length

Designation of cable length (Specified unit:1m)

※1 Maximum guaranteed cable length 20 m (nut runner to inter-controller length)
※2 Custom-made cable of 20 m or more is manufacturable, but operation guarantee is not possible. Please check the operation by the customer.
※3 All cables are flex cables.

③Motor brake specification

Blank: For no brakes motor
BK ：For brakes motor

【Model list】

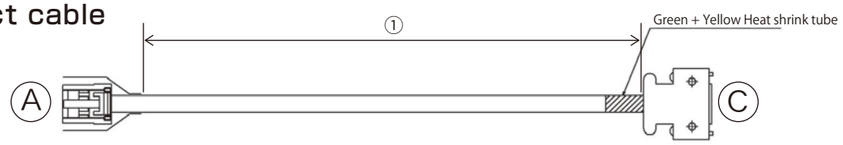
Name	Model
Relay movable cable	KICHIMKA-□M
Relay fixed cable	KICHIMKO-□M

【Specification】

Housing model		Contact type	Contact Shape
A	350715-1 (AMP)	350550-1 (AMP)	凹
B	2-178128-4 (AMP)	1-353717-2 (AMP)	
D	350781-1 (AMP)	350547-3 (AMP) (PinNo.1～3) 350669-1 (AMP) (PinNo.4)	凸

■Encoder cable

◆Direct cable



【Model】

ICHIE-□M
①

①Cable length

Designation of cable length (Specified unit:1m)

※1 Maximum guaranteed cable length 20 m (nut runner to inter-controller length)
※2 Custom-made cable of 20 m or more is manufacturable, but operation guarantee is not possible.
Please check the operation by the customer.
※3 All cables are flex cables.

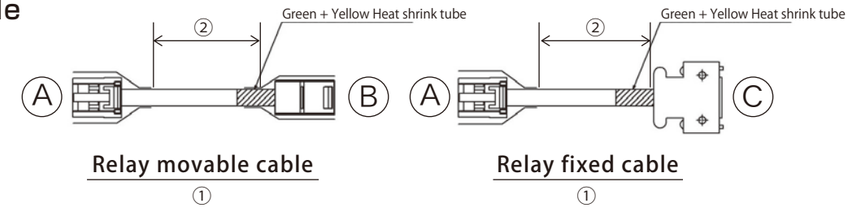
【Model list】

Name	Model
Direct cable	ICHIE-□M

【Specification】

Housing/connector model		Contact type	Contact Shape
A	1-1318118-6（AMP）	1318108-1（AMP）	凹
C	10120-3000VE（3M）	10320-52A0-008（3M）	凸

◆Relay cable



【Model】

ICHIE KA -□M
① ②

①Cable division

KA ：Relay movable cable
KO ：Relay fixed cable

②Cable length

Designation of cable length (Specified unit:1m)

※1 Maximum guaranteed cable length 20 m (nut runner to inter-controller length)
※2 Custom-made cable of 20 m or more is manufacturable, but operation guarantee is not possible.
Please check the operation by the customer.
※3 All cables are flex cables.

【Model list】

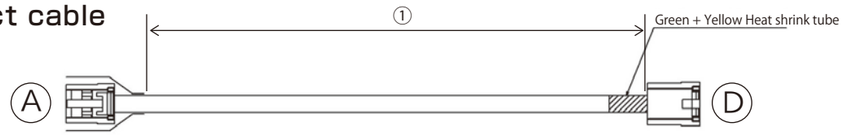
Name	Model
Relay movable cable	ICHIEKA-□M
Relay fixed cable	ICHIEKO-□M

【Specification】

Housing/connector model		Contact type	Contact Shape
A	1-1318118-6（AMP）	1318108-1（AMP）	凹
B	1-1318115-6（AMP）	1318112-1（AMP）	凸
C	10120-3000VE（3M）	10320-52A0-008（3M）	凸

■Resolver cable

◆Direct cable



【Model】

I C H I R − □ M
①

①Cable length

Designation of cable length (Specified unit:1m)

※1 Maximum guaranteed cable length 20 m (nut runner to inter-controller length)
※2 Custom-made cable of 20 m or more is manufacturable, but operation guarantee is not possible.
Please check the operation by the customer.
※3 All cables are flex cables.

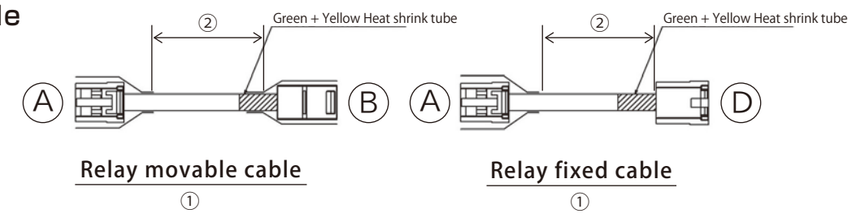
【Model list】

Name	Model
Direct cable	ICHIR-□M

【Specification】

Housing/connector model		Contact type	Contact Shape
A	1-1318118-6 (AMP)	1318108-1 (AMP)	凹
D	1-1827864-4 (AMP)	1827588-2 (AMP)	

◆Relay cable



【Model】

I C H I R KA − □ M
① ②

①Cable division

KA ：Relay movable cable
KO ：Relay fixed cable

②Cable length

Designation of cable length (Specified unit:1m)

※1 Maximum guaranteed cable length 20 m (nut runner to inter-controller length)
※2 Custom-made cable of 20 m or more is manufacturable, but operation guarantee is not possible.
Please check the operation by the customer.
※3 All cables are flex cables.

【Model list】

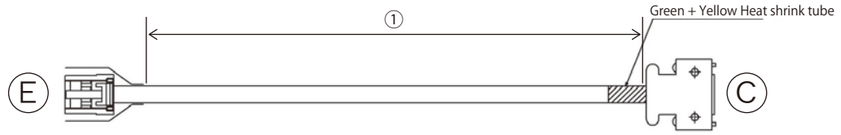
Name	Model
Relay movable cable	ICHIRKA-□M
Relay fixed cable	ICHIRKO-□M

【Specification】

Housing/connector model		Contact type	Contact Shape
A	1-1318118-6 (AMP)	1318108-1 (AMP)	凹
B	1-1318115-6 (AMP)	1318112-1 (AMP)	凸
D	1-1827864-4 (AMP)	1827588-2 (AMP)	凹

■Resolver cable

◆Backup cable



【Model】

ICRKB-□M

①

①Cable length

1	：1m
2	：2m

※1 Other than the above length, can be manufactured as a custom item.
※2 All cables are flex cables.

【Model list】

Name	Model	Remark
Backup cable	ICRKB-1M	Cable length1m
Backup cable	ICRKB-2M	Cable length2m

【Specification】

Housing/connector model		Contact type	Contact Shape
E	1-1827864-2(AMP)	1827588-2(AMP)	凹
C	10120-3000VE(3M)	10320-52A0-008(3M)	凸

※3 Sensor Type　Resolver Positioning When using a motor, a backup unit cable is required.

■Resolver backup unit

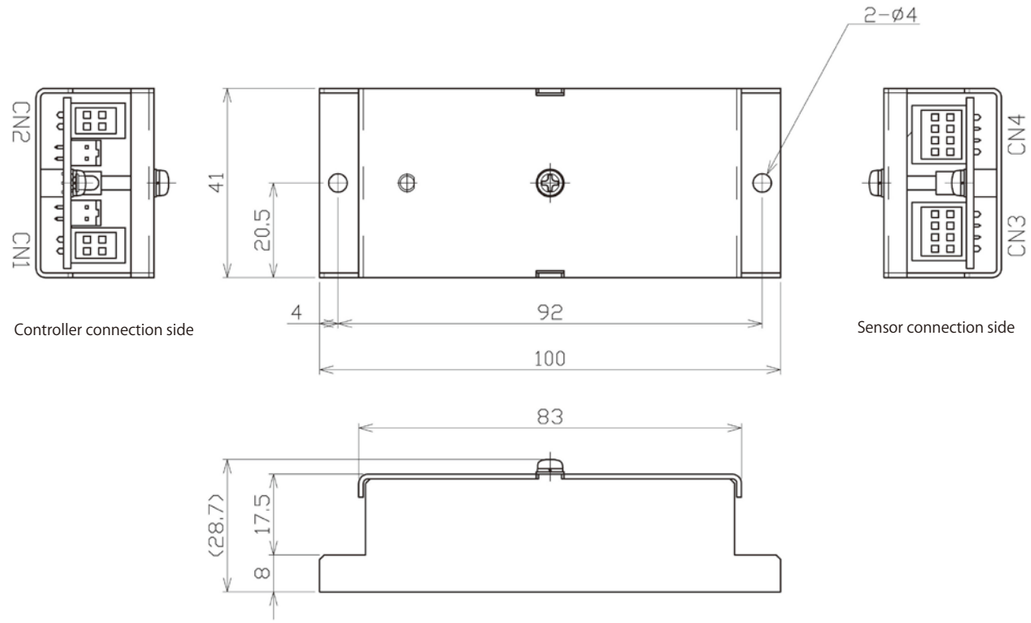
◆Backup unit

【Model list】

Name	Model
Backup unit	BU-R001

※1 Positioning motor To specify the resolver specification, a backup unit is required.
※2 Corresponds to backing up for two motor shafts.
※3 Two batteries are built in the inside.
Corresponding battery: ER17500VC (3.6 V) 2 pieces / made by Toshiba Home Appliance Co., Ltd.

◆Backup unit dimensions



■Cable specification list

◆Motor cable withstand voltage 600 V North American specification compliant

Cable type	Type	Corresponding controller	Cable size	Cable outer diameter	Coating color	Cable type
KICHIM-□M	Direct	GSK(W)-14-P2 GSK(W)-T4-P2	0.5X4 21AWG 600V	8.8mm	Gray	Flex cable
KICHIMKA-□M	Relay movable					
KICHIMKO-□M	Relay fixed					
KICHIM-□M-BK	Direct		0.5X6 21AWG 600V	10.3mm		
KICHIMKA-□M-BK	Relay movable					
KICHIMKA-□M-BK	Relay fixed					

◆Encoder cable

Cable type	Type	Corresponding controller	Cable size	Cable outer diameter	Coating color	Cable type
ICHIE□□-□M	Common to all models	GSK(W)-14-P2 GSK(W)-T4-P2	AWG23	10.8mm	Black	Flex cable

◆Resolver cable

Cable type	Type	Corresponding controller	Cable size	Cable outer diameter	Coating color	Cable type
ICHIR□□-□M	Common to all models	GSK(W)-14-P2 GSK(W)-T4-P2	AWG23	10.8mm	Black	Flex cable
ICRKB-□M						

■Setting software

To carry out various settings of GSK, a PC in which setting software is installed is required Various settings, communication status with upper device, tightening result, and tightening waveform can be confirmed with setting software.

◆Setting software model

Setting software model	Language	Controller type
GSK-SET-SOFT-J	Japanese	GSK GSKW Common to positioning GSK
GSK-SET-SOFT-E	English	

Supported OS win7/8/8.1/10

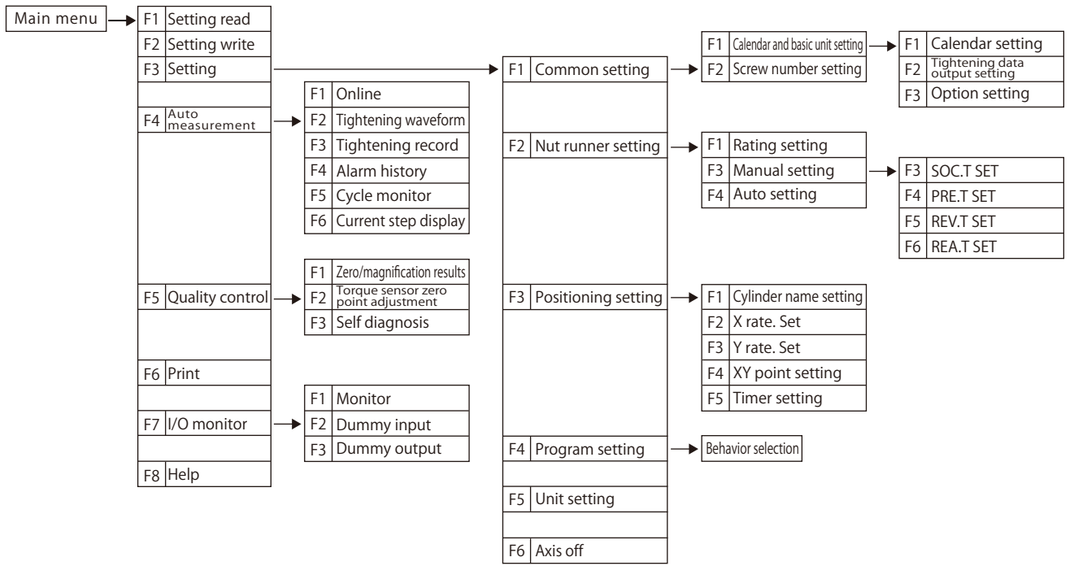
◆Setting cable model

Cable for connecting PC in which setting software of GSK is installed and interface.

Model	Cable length [m]
GK-SET-1.8M	1.8m

The setting cable is common to all setting software.

■Hierarchy of setting software

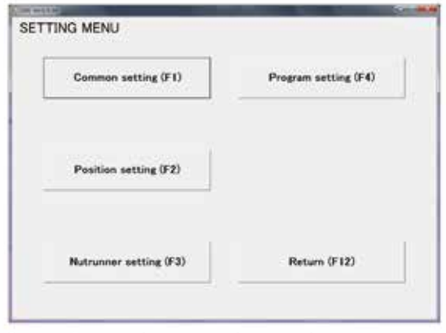


■Setting screen

【Main menu】

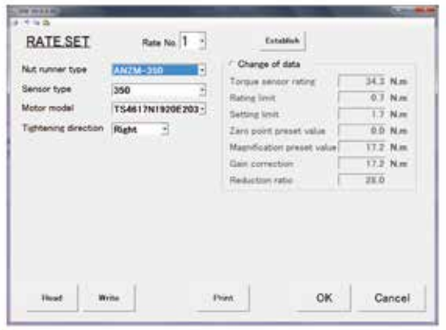
Initial screen that is displayed when the setting software is activated.

【Setting menu】



Screen for carrying out various settings.

【Rate Setting】



Screen for setting the details of used nut runner .

【SOC.T Setting】

Screen for setting the rotation for matching a bolt with a socket.

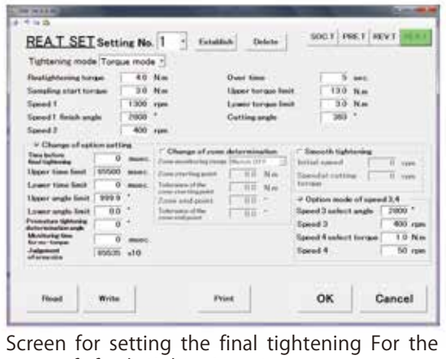
【PRE.T Setting】

Screen for setting bolt setting status to seating. (temporary tightening)

【REV.T Setting】

Screen for setting seizure judgment after temporary tightening of bolt.

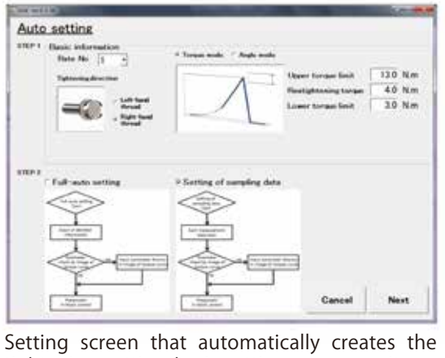
【REA.T Setting】



Screen for setting the final tightening For the type of final tightening, two types; torque method and angle method are available.

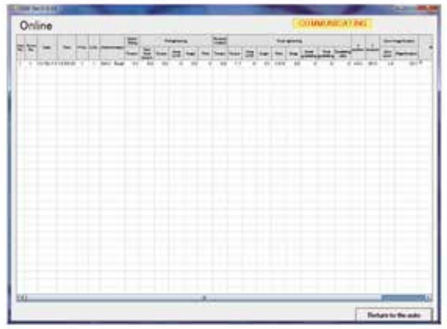
※For the final tightening setting, up to No. 50 can be set.

【Auto setting】



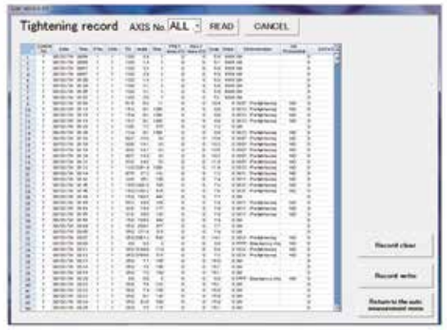
Setting screen that automatically creates the tightening setting by inputting necessary items in case of full auto setting With the sampling setting, detailed setting is enabled by actually tightening a workpiece.

【Online】



Screen for saving the tightening result in PC by making a connection to controller.

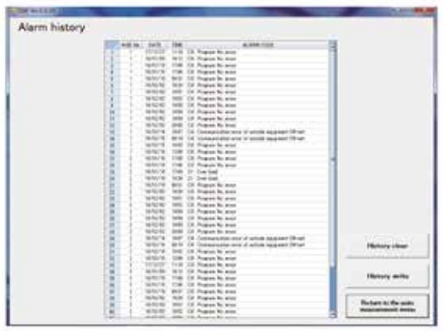
【Tightening history】



Screen for importing the data saved in the controller in PC.

※Maximum number of saved items in tightening historyper axis: 5,000items

【Alarm history】



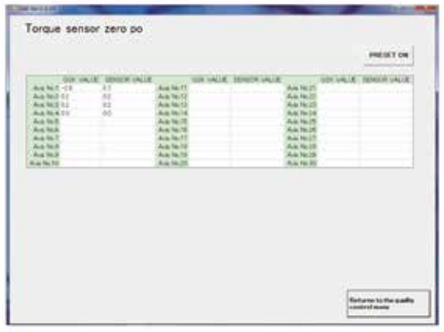
Screen for importing the alarm data saved in the controller in PC.

※Maximum number of saved items in alarm history per axis:16 items

【I/O monitor】

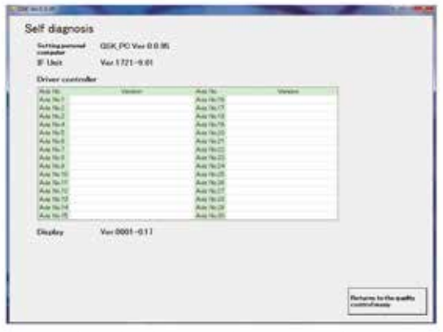
Screen for checking the I/O status with upper link.

【Torque sensor zero point adjustment】



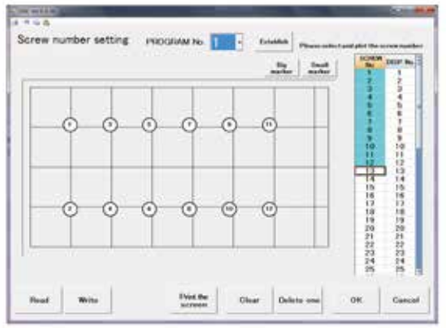
Screen for checking the zero point of current torque sensor.

【Self diagnosis】



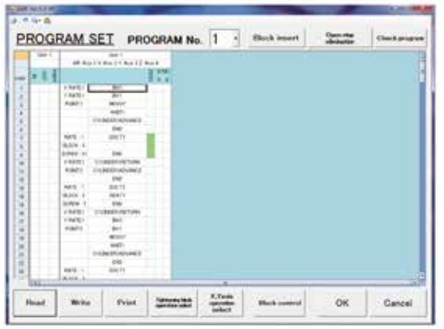
Screen for checking each version of currently configured parts.

【Screw No. array setting】



Screen for setting the screw No. array to be displayed on the display (GSK-D1/ GK-D1 series).

【Program setting】

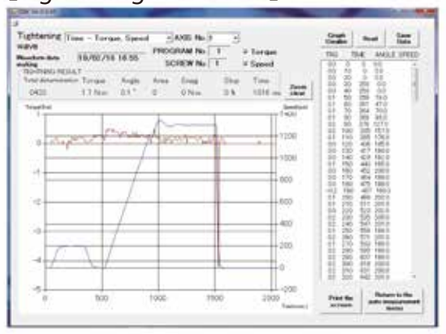


Screen for setting the combination of behaviors related to tightening(socket matching,temporary inversion,final tightening)for each axis tightening, final tightening) for each axis.

※Maximum number of programs

Max.number of axes	Number of programs	Number of steps
30	16	220
30	50	70
8	50	220

【Tightening waveform】



Screen for importing the tightening waveform in PC.

【X-axis rating】

Screen for setting the details of X / Y-axis motor.

【Z-axis rating】

Screen for setting the details of Z-axis motor.

【XYZ point (teaching)】

Screen for setting (teaching) the tightening coordinates.