## NC ROTARY TABLE NC Rotary Table controller



### [Features]

- Color LCD enables to show various information
  - As well as current position, the high resolution color LCD can show the running program, motor information and more.

### Easy to input a program

In editing program, interactive display screen prevents easy mistakes.

### Reduce indexing time

Adopting EtherCAT enables high speed communication and shortens the time of indexing.

### Easy to manage programs

Innput/output programs and parameters can be managed by MMC (Multi Media Card) that is on the market.



### Two types of panels with different operational feeling

Touch panel type that follows up soft operation and quick operation. Click emboss panel type (CS) that offers a sense of security with a firm click feeling.

### Select motors in accordance to a use or environment

There are many variations of motors, and a motor suitable for a particular machining condition can be selected.

### [Selectable motor list]

Quinte		Single Axis	Double Axis	Powered
Model		QTC101CS	QTC201CS	QTC301
Matching motor	200W	0	0	_
	400W	$\bigcirc$	$\bigcirc$	_
	750W	0	0	_
	1000W	$\bigcirc$	$\bigcirc$	_
	1200W	0	0	-
	1800W	_	_	0
	2000W	_	_	0
	3500W	_	_	0

### To use extension I/O enables a variety of usage

To use extension I/O option enables to select programs and to output WZRN position and M signal from machines.

### Manual pulse generator is available

Manual pulse generator is available to all models as option.

### Compatible with a remote control function

Remote control function by serial communication with machine is available as an option. Operation confirmed CNC manufacturer and machine manufacturer. FANUC CORPORATION, Mitsubishi Electric Corporation, Okuma Corporation, Yamazaki Mazak Corporation, BROTHER INDUSTRIES, LTD.

### Conforming to CE and KC standard

As well as EMC Directive, all models conform to KC mark.

### Compatible with absolute encoder [Custom support]

Batteries are unnecessary with the adoption of a battery-less absolute encoder<sup>\*\*1</sup>. Coordinates never deviate even with reconnection after removal of cables for Quinte and the rotary table.



## **Outside view / Dimensions**





Quists

QTC201CS



999.999



QTC301



## **Quinte Specification**

Quinte	Single Axis	Double Axis	Powered	
Item	QTC101CS	QTC201CS	QTC301	
Controlled axes	1 axis	2 axes	1 axis	
Servo Motor	AC servo motor with absolute detector			
Setting Unit	0.001°/0.0001°(Can be changed by parameters):0.001°			
Controlled unit	0.0001°			
Max. setting angle	9999 rotation +360° ±999.999°			
Equal partition	$0\sim$ 9999 partition (divisible to sector)			
Program capacity	Max.program No. 999, Max.2000 blocks pe	r program (depending on program capacit	ty)	
Command method	Absolute / incremental methods(selectab	ble G90/G91)		
Zero position return	Machine zero return and Workpiece zero re	eturn(commandable by external input)		
Manual feed	Rapid traverse, slow speed feed, step feed			
EM Stop	Emergency stop button or forced servo stop by the external interlock input+master stop			
	Two pairs of EM stop wires output signal available			
Halt	Halt of rotary table by key input or external SP input			
Feedrate override	Settable to 1-200% (Can be notched to 1-10	00%)		
Preparatory function (G code)	Dwell, Lead Cutting, Buffer function, Clamp presence, Deviation check function, Interlock start, continuous start, Machine zero return, Workpiece zero return, Repeating function, Loop jump function, Absolute/Incremental, Fin signal control command			
Sub-program function	Enable at M98 command			
Uni-directional approach	Even if rotary direction is changed, positioning from uni-direction is available			
Software limit function	Software limit can be set from machine zero position to prevent interference with the machine by mounting jigs or workpiece.			
Over travel stop function	The hard limit mode can control the rotary range of rotary table			
Backlash compensation	The backlash compensation of rotary table can be set.			
Remote control function	The rotary table is operated by transferring program data for the machine and starting the transferred program.			
Auto notch filter function	Notch filter is automatically detected and can be set up to four stages to suppress machine vibration.			
Alarm function	In case of Error detected, alarm No. and alarm message are automatically displayed. 100 Alarms history log are displayed			
Angle display	Machine coordinate, Work coordinate, Relative coordinate Remained shift, Overall coordinate			
Comment display function	Comments can be added to program data files and programs, and can be displayed on the screen.		on the screen.	
Input power	Single-phase AC200-230V±10% 50/60Hz         3-phase AC200-230V±10% 50/6		3-phase AC200-230V±10% 50/60Hz	
Power requirement(A)	30	30×2	100	
Dimensions(mm)	320(W)×190(H)×290(D)	320(W)×190(H)×400(D)	400(W)×270(H)×400(D)	
Mass of product(kg)	10.0	13.0	19.0	
Environment	Use temperature : $0 \sim 45^{\circ}$ Store temperature : $-10^{\circ}$ $\sim 60^{\circ}$ Use humidity : $20 \sim 80\%$ Rh or less (dew condensation, freezing not to be found)Vibration proof : $0.5G$ or lessShock resistant : 1G or lessAmbient atmosphere : to pollution level 3 (However, do not wet directly with water or oil)			
Display	TFT color liquid crystal 480x272 dot			
External I/O signal	(Input) Start, Stop, External EMG Stop1, External EMG Stop2 (Output) Block completed, EMG Stop output signal1, EMG Stop output signal2, Alarm output signal(B-contact)			
Multiple choice I/O signal (Option)	<ul> <li>(Input : 6) Ext Workpiece zero return request 1, Ext Workpiece zero return request 2, Ext Machine zero return request 1, Ext Machine zero return request 2, Ext Program select 1-5, Ext Program set,Ext Auto operation function, Ext reset, Over travel, M Fin signal 1-6</li> <li>(Output : 6) Workpiece zero return completed 1, Workpiece zero return completed 2, Machine zero return completed 1, Machine zero return completed 2, Workpiece zero return confirmation 1, Workpiece zero return position confirmation 2, Machine zero return position confirmation 2, Machine zero return position confirmation 2, Alarm signal output(A-contact), AUTO mode selected, External program select completed, External program No. output 1-6, M signal output1-6</li> </ul>			
MMC Slot	Programs and parameters can be uploaded or downloaded by memory card			



## **Quinte front surface**



### ①Emergency stop button

Stop the table during operation in an emergency.

### 2Power switch

Turn ON/OFF controller power.

### **3**Color LCD screen

Display current position, programs, parameters and more.

### (4) APP box

Battery and MMC slot are in the APP box.

### **⑤**Auto operation key

The key to start and stop the program.

### 6 Reset key

Reset programs and alarms.

### ⑦Line feed key/Manual axis feed key

The key is for cursor movement and for jog feed operation in manual mode.

(B) Confirm (ENTER) key/Manual rapid forward key Determine and confirm things that have been selected and perform a Manual rapid forward by sliding from the manual axis feed key in the manual mode. ⑨Confirm (ENTER)key

Determine and confirm input for each part, popup etc., in various ways.

### <sup>10</sup>Page change key

The key to change the page.

### 11 Menu key

Display menu window.

### 12 Return key

Return to the previous screen

### <sup>(13)</sup>Feed override change mode key

Adjust the feed speed.

### <sup>14</sup>Date input key

Input program and data.

### **15**Delete key

Delete one letter of numerical values input such as program or parameter.



## LCD EXAMPLES

AUTO STOP		POS RT OVR 100%
WORKPIECE	CLAMP A	0
A -111.111	UNCLAMP A	۲
B 987.654	SOLENOID A	0
PRG100 (FILE010) N0050 G 9 1 A — 9 9 9 . 9 9 9 B — 9 9 9 . 9 9 9 F 9 9 9 . 9 9 9 M 9 8 P 1 0 0 0	CLAMP B UNCLAMP B SOLENOID B +OVER TRAVEL -OVER TRAVEL	0

### [Screen for Auto mode]

Monitoring the present coordinate (machining coordinate), programming and condition of the Rotary table in real-time.



[Present coordinate screen at manual mode] Enlarged to show present coordinate At the bottom of the screen, the wizard for origin return and Jog operation are displayed.

PRG	RESET	PRG EDIT OVR 100%
PRG001 (F	· I L E O O 1)	
N0010 G91 A-9 F999.99	999.999 B—999.99 99 D9999 M98 P99	9 9 L999
PROGRAM EDIT		and the second second
N 0010	D	Overwrite
G	C	
A	M	Insert
F	- [	Cancel

ALM	RE	SET	ALM HISTORY OVR 100%
ALM No	AXIS	DATE	1. St. 1976
SV020	<a></a>	2012-07-09T08:25	
SV020	<b></b>	2012-07-09T08:25	
SY005		2012-06-25T13:40	
SY022	<b></b>	2012-06-12T10:38	
SY045	<a></a>	2012-05-30T19:20	
SY071	<a></a>	2012-05-29T23:15	
SY071	<a></a>	2012-05-29T23:01	( Contraction of the
SY071	<a></a>	2012-05-29T22:05	
SY071	<a></a>	2012-05-29T21:45	

### [Program edit screen]

Reducing the mistakes and shortening the programing time are expected through inserting the section corresponding to the code

### [Alarm history screen]

This screen displays history of the past 100 alarms.



## **PROGRAM EXAMPLES**



subprogram command point



## Connection





Supply power to controller. Customer shall prepare exclusive circuit breaker. Specifications of circuit breaker are as follows:

Туре	Capacity
QTC101CS	10A
QTC201CS	15A
QTC301	20A

Connect an earth wire of Class D (Class No. 3). Moreover, when the earth leakage breaker is used, it is recommended to use the breaker for which sensitivity current is 100mA or more, an operation time is 0.1 second or more, or a high frequency measure is taken in order to prevent the motor from the malfunction caused by a motor's high frequency.

### Connection for external interlock

When the rotary table is interlocked with the external equipment, it is need to be controlled with M signals from the external equipment.

The external equipment must be equipped with the connection (terminal board) for M signal OUTPUT, M signal completed INPUT etc., by machine maker.



## Entrate Quinte series

## **Mutual Connection diagram**

Block completed	BLKFIN
Block completed common	BLKFINCOM
Alarm output at B-contact	*ALARM
(%1) General-purpose output 1	DO01Y
(%1) General-purpose output 2	DO02Y
(%1) General-purpose output 3	DOO3Y
(%1) General-purpose output 4	DO04Y
(%1) General-purpose output 5	D005Y
(%1) General-purpose output 6	DO06Y
Output common	OUTCOM
(%1) Output common	OUTCOM
Emergency stop output	*EMG1 OUT
Emergency stop output 1 common	EMG1 OUTC
Emergency stop output common 2	*EMG2 OUT

Stop	*STOP
Start	START
External interlock	*EXT INT
(%1) General-purpose input 1	DI01X
(%1) General-purpose input 2	DI02X
(%1) General-purpose input 3	DIO3X
(%1) General-purpose input 4	DI04X
(%1) General-purpose input 5	DI05X
(%1) General-purpose input 6	DI06X
Input common	INCOM
(%1) Input common	INCOM
Emergency stop input 1	*EMG1 IN
Emergency stop input 1 common	EMG1 INCO
Emergency stop input 2	*EMG2 IN
Emergency stop input 2 common	EMG2 INCO



DC24V DC24V

The power for output signal must be supplied from the machine. Provide a surge protection on

the external load connected to the output.

Use no-voltage contacts for input signals.

\*1 It will be enable to use by using expansion I/O cable.



## Machine Connection Diagram (Example)



(\*1) General-purpose output 6 PRGSEL+10 Output common PRGSEL-10 (\*1) Output common BLKFIN Block completed common BLKFINCOM BLKFIN \*The channels available on M-signal mode are PRG001 through PRG999.

> \*For external program selection, extension I/O option is required.



### Control Flow-Chart

It is in principle recommended for Kitagawa's NC rotary table control to turn the servo OFF while clamping.



Note1) The delay timing here is a recommended value. It may differ with different parameters or specifications.

### Methods for Controlling NC Rotary Table



- NC Rotary Table is controlled as the NC Axis of the machine.
- Interpolation machining is possible with X- , Y- and Z-axis of the machine.
- Program can be controlled on the machine.
- NC Rotary Table is controlled by a separate controller, and not as the NC Axis of the machine.
- NC Rotary Table can be fitted with machine with no compatibility for an additional axis, as long as M-signal is available.
- ◆NC Rotary Table can easily be transferred to another machine.

### Ð

**ita**gawa

# Incrotary Quinte series

## **Quinte Series OPTION**

### Manual Pulse Generator (Holder attached)

This pulse generator can operate the table at 0.1°,0.01° and 0.001°, and it adjusts jig easily. The QTC200 series can support with one hand-operated pulse generator by an axis select.

### Manual pulse generator internal cable [HC1-IC-Q]

A relay cable for the inside of the Quinte panel is necessary for use of the manual pulse generator. A dust cap and 4 installation screws are included with the HC1-IC-Q.

### Extended I/O cable (5m)

With the Expansion I/O cable, extended functions like External program selection, M signal output and more are enabled.

%For the enable signals, refer to multiple choice I/O signal on the Quinte Specification page.%Cable length can be changed.

### ■Remote control function cable (5m) ○RS232C Cable [RSCB0909/RSCB0925]

In order to use the remote control function, a RS232C Cable (for use between machines) is required.

RSCB0925 is 9-25 pin, and RSCB0909 is 9-9 pin. Please select according to the shape of the RS232C port on the machine side.

%Cable length can be selected from 2m/3m/5m.

### ORemote relay cable [RC2-IC-Q]

In order to use the remote control function, a relay cable for inside the Quinte panel is required. A dust cap and 4 installation screws are included with the RC2-IC-Q.



[RSCB0909]









## **Quinte Series OPTION**

For Kitagawa own controller Quinte series Manual Operation Pendant

#### [Features]

- Enables to operate NC rotary table with watching its movement closer
   Easy holding style with one hand expands operating range
   Light weight cable allows high-accessibility to fixtures
   OEL display
   The light-emitting character with a high contrast ratio achieves high visibility even in a dark place or machine.
   Smooth touch operating key switchs
   Achieve smooth operability without moving part in the operation part and key layout by function.
   Water and dust resistance
- Ensure water and dust resistance by the protection grade IP54. Easy installation by a strong magnet
- Able to be temporarily placed on vertical surface without sudden fall off. Able to be additionally installed to Quinte
- MOP is available with Quinte by installing a dedicated cable to Quinte and updating the F / W of Quinte.



### Dimensions



### Specifications

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Display device	OEL display	
Display type	Character display	
Display resolution	20 characters × 4 lines	
Operating specifications		
Operating type	Capacitance switch, mutual capacitance type	
Enable switch	2 positions	
Buzzer	Frequency:3520Hz Sound pressure:0~75dB(10 steps)	
Environmental specifications		
Operating temperature range	0~45℃	
Operating humidity range	Less than 20~80%RH(no condensation)	
Structure specifications		
Cable length	3m	
Protection structure	IP54(Except cable connector part)	
Mass	450g (Except cable)	

### Option

### MOP internal cable [MOP-IC]

When using MOP, a relay cable to the inside Quinte panel must be prepared.

4 screws are supplied with MOP-IC for installation.

### MOP Dummy Connector [MOP-DCN]

Connector for short-circuiting an emergency stop circuit when not connected to MOP.

In case using one MOP to plural Quinte units, MOP-DCN is needed for Quinte which is not connected to MOP.

MOP-DCN is needed to cancel the emergency stop.





### **Manual operation pendant features**



### 1 Emergency stop switch

Emargency stop for NC rotary table in operation.

### 2 OEL display

Display coordinate system, coordinate data and operation state.

### **3**Operation Enable / Disable selector switch

Prevent unintended erroneous operations by selecting the Enable / Disable of the MOP operation.

### ④Reset switch

Reset the alarm.

### **5**Display selection switch

Switch the coordinate screen and alarm screen.

### ⑥Coordinate switch

Switch machine coordinate and work coordinate.

### 7 Axis switch

In case using MOP for QTC201CS, switch axis operating (axis A/B)

⑧Origin return switch

Return to original position. \*1

⑨Origin setting switch

Set the origiin. <sup>%1</sup>

### 10 Enable switch

This switch will allow the operation such as JOG, returning to zero position, and origin setting which unintended changes might lead to dangerous. \*2

### 1)Jog-feeding switch

JOG operation of the NC rotary table.

Select 3 levels of the rotating speed.

While operating reset switch and jog-feeding switch at the same time, the buzzer volume can be adjusted.

<sup>12</sup>Manual pulse generator scale selection switch Select the pulse magnification.

### **13**Manual Pulse Generator

Generate pluse for operating NC rotary table.

%2 Simultaneously operated with keys which have the yellow  $\bullet$  marks on the right side.

<sup>%1</sup> This switch is for the axis and coordinate systems which selected at 6 and 7.