Single axis NC controllers equipped with advanced functions for M-signal

Single axis NC table controllers that operate by means of M-signals from the machining center.
Operation can be programmed by machining center under "Remote mode + M" specification.

For small-sized NC rotary tables

TPC-Jr K2／K3

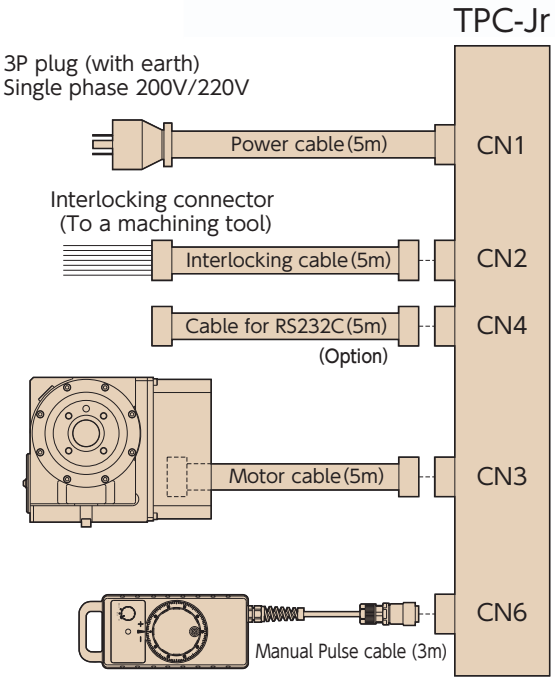
- Single axis NC controllers that operate small-sized TSUDAKOMA NC rotary tables by means of M-signals from machining center.
- TSUDAKOMA rotary tables equipped with super-compact AC servo motors are the most compact among similar models.
- Operation can be programmed by machining center.
  With "Remote mode + M" specification (Parameter change) ☞ P.54
  ※Corresponding to Cable option

Applicable models

	K2	K3
RN-100	●	
RWE/RWA-160	●	
RWE/RWA-200		●
RWA-250*		●
RWA-320*		●
TWA-100	●	
TWA-130	●	
TWA-160	●	
TWA-200		●
TWS-250*	●	
TWS-500*		●
TWM-100*	●	
TWM-160*		●
TBS-130	●	
TBS-160	●(R)	●(T)
TDB-200		●(T)

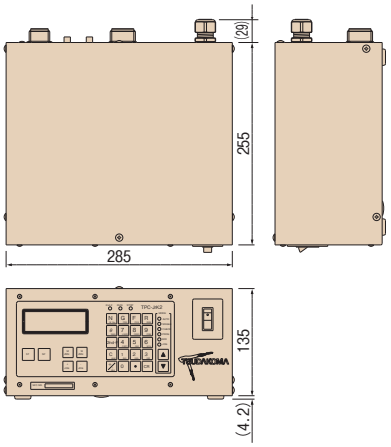
*Table maximum rotation speed is limited.

Cables



Note: The cable for RS232C is an optional item.
Note: Manual pulse generator is an optional item.

Dimensions



TPC-Jr FUNCTIONS

Operation panel

OPERATION MODE

AUTO AUTO :
Automatic operation by an M signal from the machining center.

SINGLE SINGLE :
Single operation of TPC-Jr. By pressing ST , positioning is performed once.

CHECK CHECK :
Block number call, program check and self-diagnosis.

PROG Program mode :
For inputting and editing the program.

MDI MDI mode :
For setup operation. Ten blocks of programs can be carried out.

JOG JOG mode :
For manual feed and step feed.

HANDLE Handle mode :
Manual pulse operation.

Program edit keys

2nd·F + N W No. Workpiece No. (Program No.)
0000 to 9999
100 programs registerable

N W No. Block No.
000 to 999

G PRO Operation command
G0 to G4: Movement command
G5 to G9: Assistance function

F POS Feed rate select command
F0: Rapid positioning speed
F1 to F9: Cutting feed rate

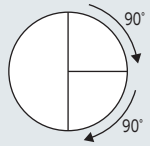
R REM Assistance code for codes

θ DGN Travel distance command (angle, divided number)
Block No./Sub-program No.

G-code		R-code		θ-code	
No.	Command	No.	Command	Command	Setting
G0	Direct angle command	001 to 999	Number of Repetition (INC command)	Command angle	±000.001° to 999.999°
		000	(ABS command)	Command angle	±000.000° to 360.000°
G1	Direct indexing number command	001 to 999	Number of repetitions	Number of divisions for 360°	±1 to 999999div.
G2	Arc-indexing number command	001 to 999	Number of divisions, Number of repetitions	Arc-angle indexed	±000.001° to 360.000°
G3	Lead cutting command	000 to 100	Number of table rotations	Command angle	±0° to 360.000°
G4	Zero point return command	000	1st zero point return (mechanical zero point)	Not required	
		001	2nd zero point return		
		002	3rd zero point return		
G5	Sub-program call command	001 to 999	Number of repetitions	Sub-program No.	0000 to 9999
G6	Subprogram return command	Not required		Not required	
G7	Program end command	Not required		Target address	000 to 999
G8	Workpiece coordinate system setting command	Not required		Reference coordinate	±0° to 360.000°
G9	Declaration command	000	No operation	Not required	
		001/002	Clamp OFF/ON		
		003/004	Dowel OFF/ON	Dwell time	000 to 999 (×10msec)
		005/006	Indexing group control OFF/ON	Not required	
		007/008	Directional positioning OFF/ON		
		009/010	Completion signal control command OFF/ON	Completion signal selection	
		011	Program display selection command	Not required	
		012	Current position display selection command		
		013	Remaining angle display selection command		

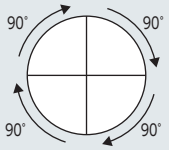
TPC Machining Program Examples by TPC Controller

Direct angle command : G0



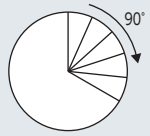
N W No. 000	G PRO 0	F POS 0	R REM 002	θ DGN 90.000	CR	Positioning at 90° twice
		Quick	Number of Repetition	Indexing angle/time		
N W No. 001	G PRO 7			θ DGN 000	CR	Return to N W No. 000 at the program end
	End of program					

Direct indexing number command(even indexing) : G1



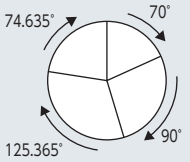
N W No. 000	G PRO 1	F POS 0	R REM 004	θ DGN 000004d	CR	Dividing 360° by 4, four times
				360° is divided into quarters		
N W No. 001	G PRO 7			θ DGN 000	CR	Return to N W No. 000 at the program end

Arc-indexing number command(even indexing by an arbitrarily-set angle) : G2



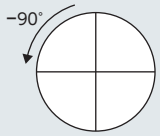
N W No. 000	G PRO 2	F POS 0	R REM 005	θ DGN 120.000	CR	Dividing 120° by 5, five times
			Indexing number	Angle for indexing		
N W No. 001	G PRO 7			θ DGN 000	CR	Return to N W No. 000 at the program end

Uneven indexing



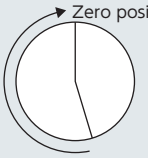
N W No. 000	G PRO 0	F POS 0	R REM 001	θ DGN 70.000	CR	Positioning at 70° once
N W No. 001	G PRO 0	F POS 0	R REM 001	θ DGN 90.000	CR	Positioning at 90° once
N W No. 002	G PRO 0	F POS 0	R REM 001	θ DGN 125.365	CR	Positioning at 125.365° once
N W No. 003	G PRO 0	F POS 0	R REM 001	θ DGN 74.635	CR	Positioning at 74.635° once
N W No. 004	G PRO 7			θ DGN 000	CR	Return to N W No. 000 at the program end

(−) direction indexing



N W No. 000	G PRO 0	F POS 0	R REM 001	θ DGN −90.000	CR	Positioning at −90° once
				Reverse		
N W No. 001	G PRO 7			θ DGN 000	CR	Return to N W No. 000 at the program end

Zero point return command : G4

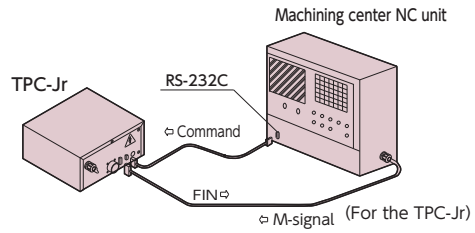


N W No. 000	G PRO 4	R REM 000	Return to 1st zero position
	Zero return	To 1st zero position	

Remote mode + M specification(Parameter change) ※Corresponding to cable option

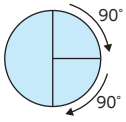
The rotary table is controlled by TPC with M-signal sent from a machining center through RS232C.

Note: This function may not be available for some machining centers. For details, ask the M/C manufacturer.



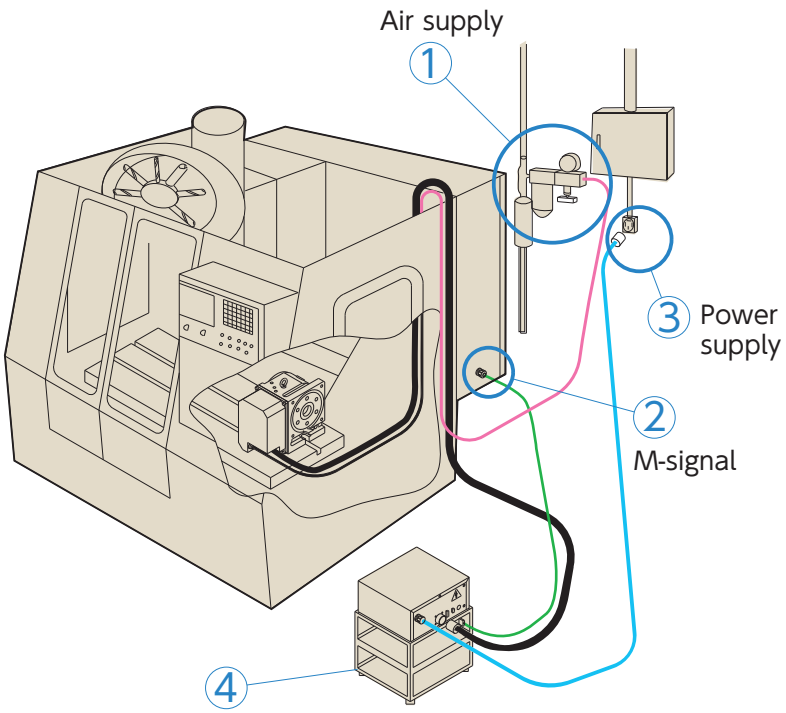
Machining center :

Program using Custom Macro Necessary equipment TPC-Jr : Software for remote mode RS232C/interlock cable, RS232C cross cable
NC unit for a machining tool : RSS232C connector and Custom Macro B (optional) (for FANUC).
For details, ask the machine manufacturer.



POPEN ;	DPRNT[/MOVA180.] ;	RS232C port opens
DPRNT[/MOVA90.] ;	M70 ;	Command of absolute positioning at 90° is transmitted to TPC
M70 ;	GO1Z100.F200 ;	Positioning starts
GO1Z100.F200 ;	PCLOS ;	Machining center in operation
		Command of absolute positioning at 180° is transmitted to TPC
		Positioning starts
		Machining center in operation
		RS232C port closes

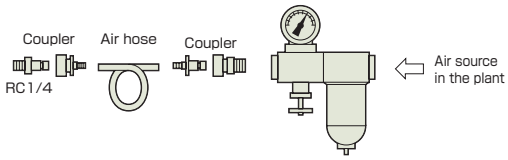
Installation of TPC controller



The figure shows an example for the TPC-Jr controller.

To be provided by customers

① Air supply

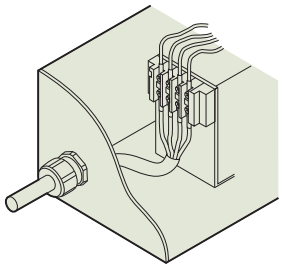


Air supply is necessary the pneumatic or air-hydraulic clamp system of the NC rotary tables with the TPC5 or TPC-Jr controller.

The following are to be provided by customers:
- Air filter and regulator (Air pressure:0.49 MPa)
- Air hose or air tube
- Joint coupler (RC 1/4 for the table)

Some models need a 6 mm diameter tube for connection.

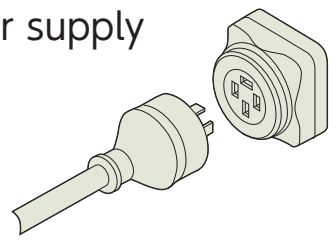
② M-signal



When the machining center controls the rotary table, it uses M-signals. Be sure to confirm with the machine manufacturer that M-signals or M-signal completion signals are transferred to the terminal block of the machine controller. If not, ask the manufacturer to do the required work.

☞ For the connection with an interlocking cable, refer to the examples shown on P.56

③ Power supply



A socket for the TPC controller is necessary. A 3P plug is equipped with the TPC controller, and is recommended. The outlet for the connection is required.

TPC side connector WF4420(Panasonic)
Outer power supply connector WF1420 or the others(Panasonic)
In case of the different type of connector, shall be arranged by the customer.

☞ For the power capacity of each controller, refer to P.52

Conduct grounding (less than 100 ohm earth resistance)

④ Stand

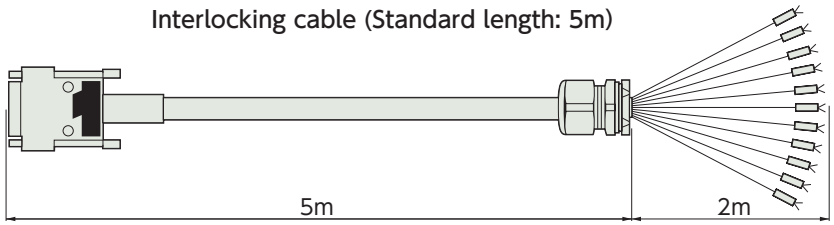
A stand for the TPC controller is to be provided by the customer.

☞ For the dimensions and weight of the controller, refer to P.48 to 50 P.52

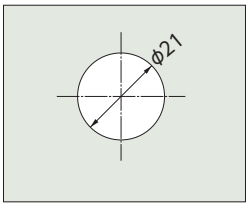
TPC Controllers to Interlock with Machining Tools

TPC-Jr

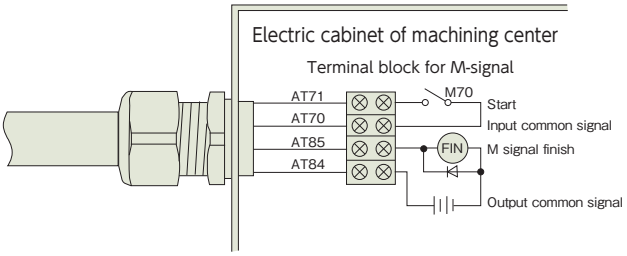
Interlocking cable (Standard length: 5m)



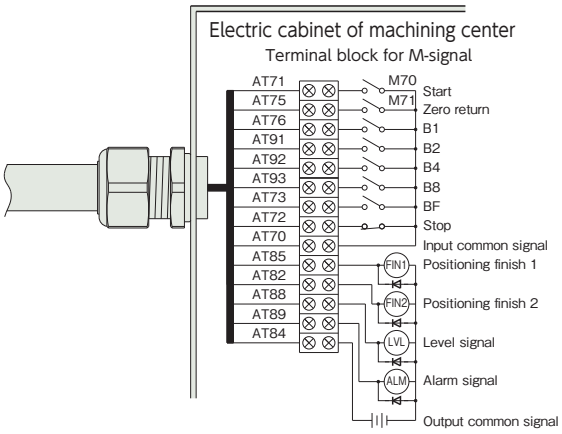
Connector dimension
(on machining center)



a) When a start signal and an indexing completion signal are used:



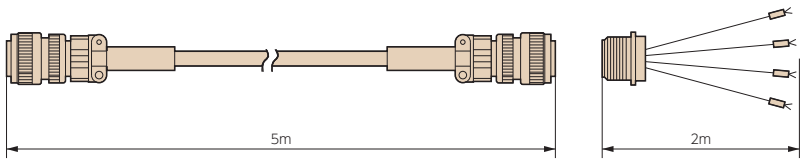
b) When all the signals through interlocking cables are used:



Note 1: When completion signals are received by a relay, the power supply should be 24VDC. Do not apply 100VAC or 200VAC.
Note 2: By changing the switch in the controller, a start signal is also available with the external power supply of 24VDC.
Note 3: Be sure to take countermeasures against electric noise by attaching surge protectors to relays for a machining center.

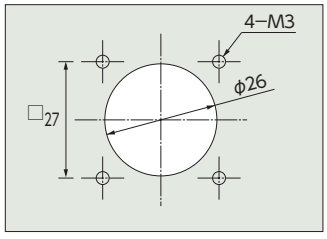
TPC5

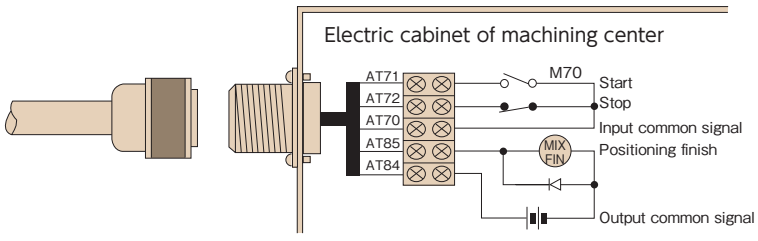
Interlocking cable(Standard length: 5m)



a) Standard interlock cable For interlocking only with M-signal and the completion signal

Connector dimension
(To machining center)



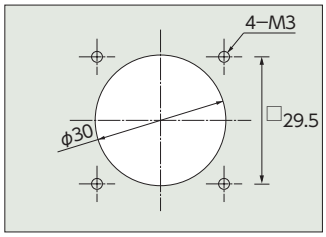


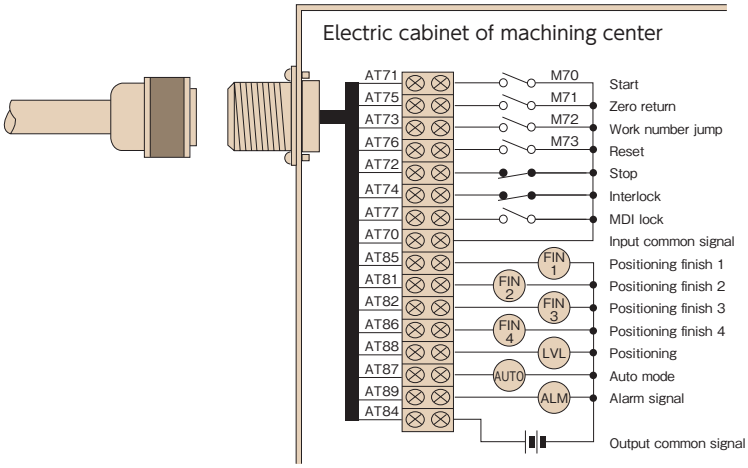
TPC Controllers to Interlock with Machining Tools

b) Fully-equipped interlocking cable (Option)

A variety of signals such as a stop or interlock input signal and a level or alarm output signal are available with this cable.
B signal cable is required when the setting functions for the workpiece number and angle data are used, or when the fixed indexing angle input system by an *M*-signal is used.
If you want to see some examples of the connections with this cable, please contact us.

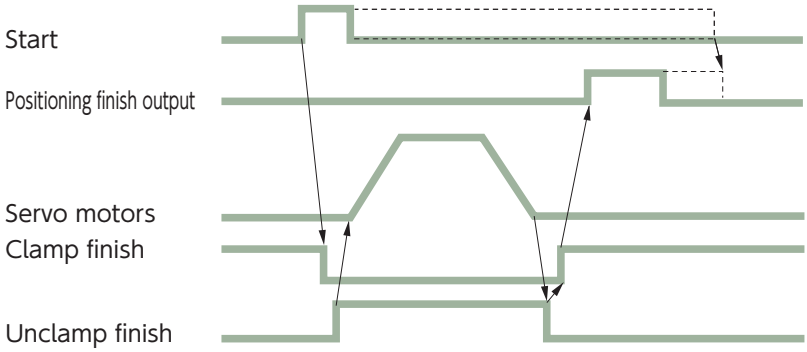
Connector dimension
(To machining center)





Note 1: When completion signals are received by a relay, the power supply should be 24VDC.Do not apply 100VAC or 200VAC.
Note 2: By changing the switch in the controller, a start signal is also available with the external power supply of 24VDC.
Note 3: Be sure to take countermeasures against electric noise by attaching surge protectors to relays for a machining center.

Time Chart



Note 1: A start input signal, in the form of either a pulse signal (of more than 10 msec) or level signal, can be accepted.
Note 2: During the interlocking operation with a machining center carried out through an *M*-signal, the *M*-signal should be completed by the positioning completion signal.

TPC Standard Cable Specifications

The tables below shows the maximum outer diameter and the curved radius of standard cables which are supplied with the rotary tables ready for the TPC5 or TPC-Jr controller.

Unit: mm

	Cable	Order Code	Max. outer diameter	Min. curved radius
TPC5	Motor power cable	NS#20 (SANKEI MANUFACTURING CO.,LTD.)	20	90
	Motor signal cable			
TPC-Jr	Motor cable	NS#25 (SANKEI MANUFACTURING CO.,LTD.)	25	100

Model number, maximum outer diameter and curved radius may differ depending on specifications.