

# Protocol Converter for CNC Machine Tools FBR-100AN/FBR-100

## Modbus TCP Activation Program

### Leverages PLC/HMI to Monitor Machines in Manufacturing



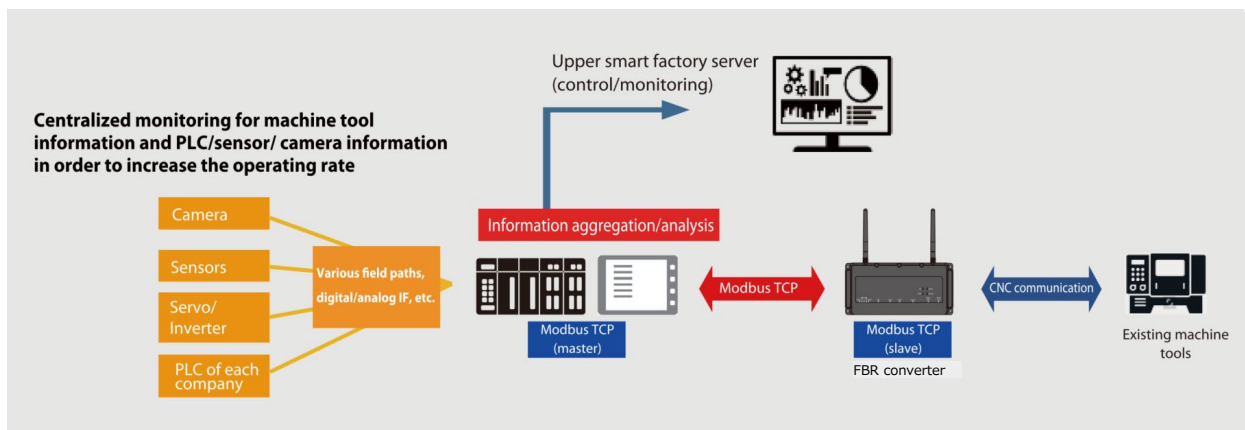
#### Overview

The Modbus TCP Activation is an optional program that enables FBR converter, a protocol converter for CNC devices, in Modbus TCP communications. With this activation, the FBR converter enables Modbus TCP devices such as PLC and HMI to collect the operation data of CNC machine tools in a factory. This activation program is an enabler of IoT in manufacturing sites by allowing factory operators to leverage their familiar FA control/display devices.

#### Features

##### Simple Structure of FBR-100AN/FBR100 Connecting to CNC Machine Tools

The FBR converter's Modbus TCP function serves as a slave to be used with a Modbus TCP master device. The FBR converter gets the operation information of a connected CNC machine tool and sends it to the master device in Modbus TCP communications. The FBR converter will improve not only the machine usage by preventing minor downtime but also the preventive maintenance and the processing quality by monitoring the machine operation and data of sensors, servo motors, and inverters connected to an IoT-enabled PLC or HMI.



##### Advantage of FBR-100AN/FBR-100 with Modbus TCP

- Retrofittable to an existing CNC machine tool.
- Enables PLC or HMI installed in a manufacturing site to directly monitor a CNC machine tool.
- Easy installation and easy operation per production line without a dedicated PC server or an IT system.

Actual Manufacturing Environment: **Connect** → **Visualize** → **Analyze** → Improve & Prevent!



## Product Specifications

Model	FBR-100AN (Wireless LAN model)	FBR-100 (Wired LAN model)
Wired LAN Interface	RJ-45 x 2 ports (MAC address x 2) 10BASE-T/100BASE-TX/1000BASE-T (Auto-recognition)	
Wireless LAN Interface	IEEE 802.11a/b/g/n 2T x 2R	N/A
Device Interfaces	D-Sub9 male x 1 port (RS-232C/422A/485*1, configurable) Digital input: 3 bits (Input from external equipment such as a signal tower)	
Switch	PUSH switch x 1 (For factory reset) DIP switch: 4 bits (For device setting)	
LED	Two-color LED x 4	
Operating Environment	Temperature: -20 to +50°C *2 Humidity: 20 to 90%RH (No condensation)	
Storage Condition	Temperature: -20 to +55°C Humidity: 20 to 90%RH (No condensation)	
Power Supply	AC Adapter (sold separately) or DC 12 - 24V	
Power Consumption	24V/0.28A, 12V/0.54A	24V/0.15A, 12V/0.28A
Dimensions	230 x 105 x 36 mm (Excluding antennas)	
Weight	450g (Excluding antennas)	440g
Package Contents	Main unit, Standard pole antennas (only FBR-100AN), Warranty, Setup guide, Simplified Declaration of Conformity, GPL inquiry sheet	
Regulatory Compliance *3	[EMC] Japan: VCCI Class-A US: FCC Part15 Subpart B Class-A Canada: ICES-003 Issue 7 Class-A EU/UK: EN55032 Class-A, EN301489-1/-17(FBR-100AN)) EN55035(FBR-100) [Radio cert] Certified in Japan, US, Canada, and EU/UK (only for FBR-100AN) [RoHS] Compliant with EU RoHS Directive	
System	CPU: NXP i.MX6 SoloX RAM: 256MB Embedded storage: eMMC 2 GB (Pseudo SLC: 1.2 GB available to the user)	
Enclosure	Plastic case	
Dust/Waterproof	Compliant with IP53 (with included protective caps and connectors for wall mounting)	
Shock Resistant	Sinusoidal: 1.0G (XY direction) 10 to 500 Hz	
Antistatic, Noise	Antistatic: Contact discharge ±4 kV, Air discharge ±8 kV Noise immunity: Power line ±2 kV, Signal line ±1 kV	
Corrosive Gas Resistance	40±2°C / 80±5%RH / 15 ppm (H2S hydrogen sulfide gas) / 96H	
Wi-Fi security	Open/Shared (WEP) WPA-PSK/EAP (AUTO) WPA2-PSK/EAP (AES/AUTO) IEEE 802.1X Authentication	N/A
Supported Software	Client software that supports MTConnect ver.1.3.1 and later verified software: • Fanuc MT-LINKI ver.3.6 and later • iQ Edgexross MTConnect Data Collector ver 1.1.3.0 and later • Device Explorer OPC server V6.2.0 and later and Device Gateway V2.2.0 and later (Takebishi) • IoT Data Share Ver.1.14.1 and later (Denso wave)	
Supported Hardware	Supported CNC device: Fanuc's and Brother Industries' CNC devices*4 Supported signal towers: Patlite's AirGRID**5	
Warranty	5 years	

- \*1: To use RS-485, a communication program is additionally needed.
- \*2: Able to operate at a temperature of max. 55°C when a sizeable amount of data (dozens Mbps) is not consecutively sent or received over the wireless LAN.
- \*3: As of February 2022.
- \*4: Please check FBR converter's application note for supported CNC devices.
- \*5: Any maker's signal towers can be used via the digital interface of FBR converter.

## Modbus TCP Communication Functions

Modbus TCP Communication Specifications	Operation Mode		Modbus TCP Slave
	Number of Connectable Devices (Modbus TCP Master)		Up to one master device
	Max Data Size for Read		125 words per communication transaction (Compliant with Modbus specifications)
CNC Device Data Collection Specifications	Supported Command		Function code only 0x04 (Read out of input register value)
	Communication Interface	Ethernet/LAN	Supported
		RS-232C/DPRNT	Not supported
Compatible Modbus TCP Master Device *8	Supported CNC Device		FANUC CNC devices: 30i-MODEL A, 30i-MODEL B 31i-MODEL A, 31i-MODEL B 31i-MODEL A5, 31i-MODEL B5 32i-MODEL A, 32i-MODEL B 35i-MODEL B 0i-M/T MODEL F, 0i-M/T MODEL D Other 16i/18i/21i LAN supported models *7
	Number of Connectable CNC Devices		Up to 1
	Collectable Operation Data	NC Data	Supported *7
		Macro Variables	Supported
		PMC Data	Supported
			Keyence KV-8000 series Schneider Electric SP5000/GP4000/ST6000/LT4000M/PS6000 series

- Note:  
\*7: The information that can be collected from the FANUC CNC device varies between the Modbus TCP activation program and the default program (without activation). Please check the product page on Silex website for details.  
\*8: As of February 2022

## FBR Converter Activation Comparison

Features	Standard (without activation)	Brother Activation	Muratec Activation	OPC UA Activation	Modbus TCP Activation
Supported Machines	FANUC	BROTHER	Muratec Lathe Machine & Loader	FANUC	FANUC
RS-232C/DPRNT	Yes *9	N/A	N/A	N/A	N/A
Patlite AirGRID® Support	Yes	N/A	N/A	N/A	N/A
IoT Comm.	MTConnect	MTConnect	MTConnect	OPC UA	Modbus TCP

- \*9: RS-232C/DPRNT specification is compatible with Mitsubishi's CNC M600/700/800 series

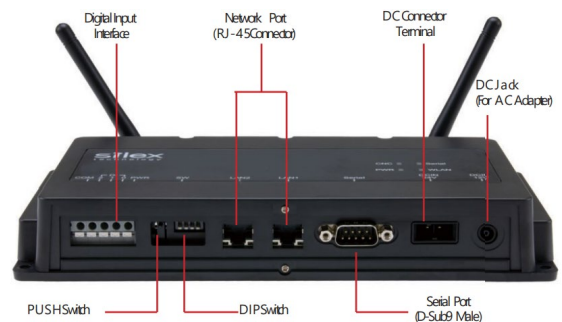
## Accessories / License / Software (Sold Separately)

Product	Model	Description	Price
AC Adapter	WB-18D12RU-ECAA	AC adapter and power code supporting JP, US, EU and CN	Open
Antenna	Dust/Waterproof Antenna	IP 67 rated antenna x 1, 2.9m cable x 1	Open
License	Activation for Brother Industries	Activation key to enable connection with Brother Industries' CNC devices	Open
License	Activation for Murata Machinery's machine tools *6	Activation key to monitor Murata Machinery's original system	Open
License	Activation for OPC UA Communication *6	Activation key to enabling OPC UA Communication	Open
License	Activation for ModbusTCP Communication *6	Activation key to enabling ModbusTCP communication	Open
License	Development kit	Development environment, DVD including documentation	Open

- \*6: Required per main unit.

## External Interfaces

(Antenna is included in only FBR-100AN)



Any questions about the product?  
Contact our customer support team!

<https://www.silextechnology.com/support/contact-silex-support>

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