FBR-100AN / FBR-100: Supported CNC Devices/Machines and Collectable Data with MTConnect

Application Notes: AN2011FBR_07
silex technology, Inc.

When it **Absolutely Must** Connect

Table of Contents

1. Overview

This document describes what CNC devices/machines are supported and what data can be collected by "FBR-100AN (wireless model) / FBR-100 (wired model)" (referred to as "FBR converter" below), silex's MTConnect protocol converters for CNC machine tools.

2. Supported CNC Devices/Machines

FBR converter has been confirmed compatible with the following CNC devices/machines.

Maker	How to connect	Model	Data to be monitored with FBR converter
Fanuc	LAN	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 Others: LAN models of 16i/18i/21i	Emergency stop status, CNC operation mode, the number of processed parts, CNC operation status, running program sequence number, main program name, tool number, various override information, absolute position, spindle load, speed, spindle/axis insulation resistance, power consumption, cycle time, operator message, alarm message, etc. Custom macro variables, PMC address status, PMC alarm, PMC operator messages, etc.
	Serial DPRNT	FANUC Series 15 FANUC Series 16/18/20/21 FANUC Power Mate -D/F/H FANUC Series 16i/18i/21i FANUC Power Mate i FANUC Series 15i, 0i FANUC Series 30i/31i/32i	DPRNT commands can collect various CNC data during processing. - Digital input signal from outside - Numerical data (up to 10) - Character data (up to 10) - Product name, the total number of processed parts, etc.
Brother	LAN	CNC-B00 & CNC-C00 series	Operation data, alarm status, emergency stop status, spindle data, production counter information, axis torque monitor, tool number, program sequence number, cycle time, operation hours, etc.
Mitsubishi Electric	Serial DPRNT	M600, M700 & M800 series	Equivalent to that of Fanuc's CNC serial/DPRNT models
Patlite	LAN	AirGRID® WD series	Following data of signal tower : - Up to 5 colors of pilot lump and buzzer data - Lamp: Off / On / Blinking / Not in use - Buzzer: Not sounding/ Sounding
CNC/Machine Tool Builders (General)	Digital In/Out	Signal towers	
Muratec	LAN		FANU's CNC device data plus the following data of Muratec original system: Opr panel light data, counter, cycle time, program number, alarm
Shibaura Machine	LAN	TOSNUC Series T-999/T-PX100/T-PX200	Emergency stop status, CNC operation Info, main program name, main program comments, production info, tool number, spindle load/axis torque, positions/angles, overrides, alarm message, etc.

3. Monitored Data

3.1. Fanuc CNC Devices (LAN Connected)

FBR converter connects to Fanuc 30i/31i/32i/35i, 0i-M/T, and 16i/18i/21i series in the wired LAN and gets their data listed in this document. Access the CNC device and confirm the IP address and port number, register the information in the MTConnect Setup page of the FBR Converter.

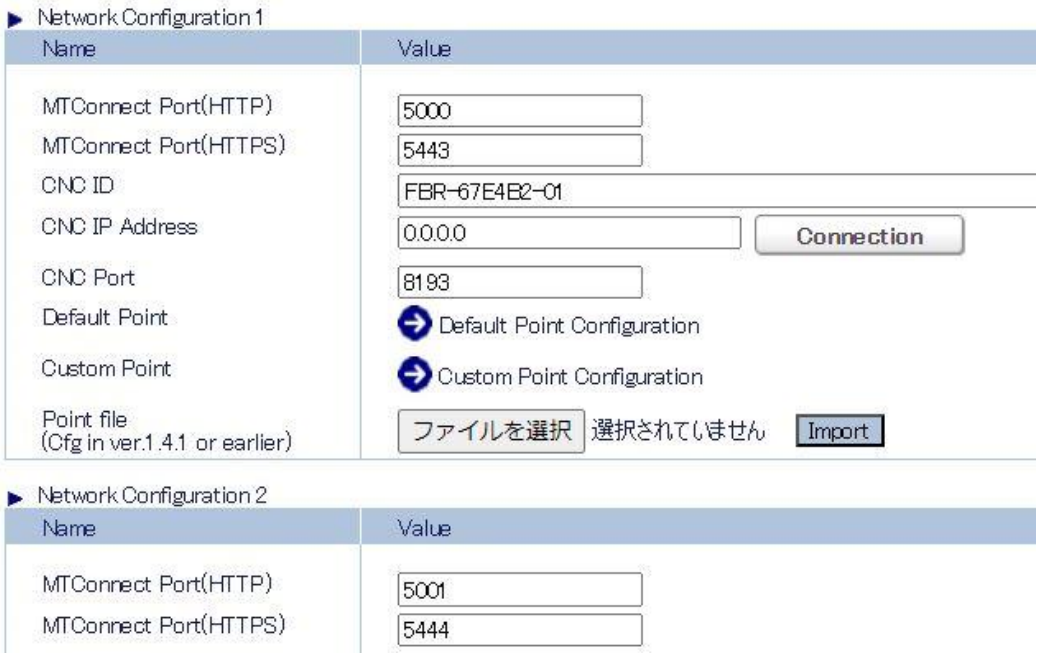

Figure 1: FBR Converter's Web Setup Page (Network Configuration)

Note 1) FBR Converter firmware version 1.4.1 or later does not require a point file to be imported.

[Procedures]

FBR converter provides three different setting methods.

1. Default Point Setting

Get NC program data of CNC devices. This factory default setting is "On (Collect data)".

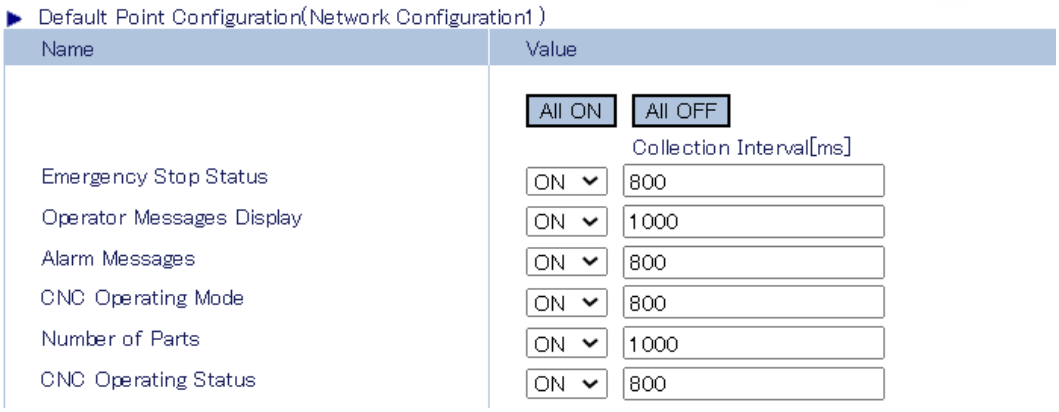

Figure 2: FBR Converter's Web Setup Page (Default Point)

2. Custom Point Setting

Get custom macro variables and PMC data of CNC devices. Unlike the default point setting, users can change the settings individually to get data. Up to 130 custom points can be set.

Note 2) FBR Converter firmware version 1.4.4 or earlier allows only up to 50 points. Version 1.5.0 or later allows up to 130 points.

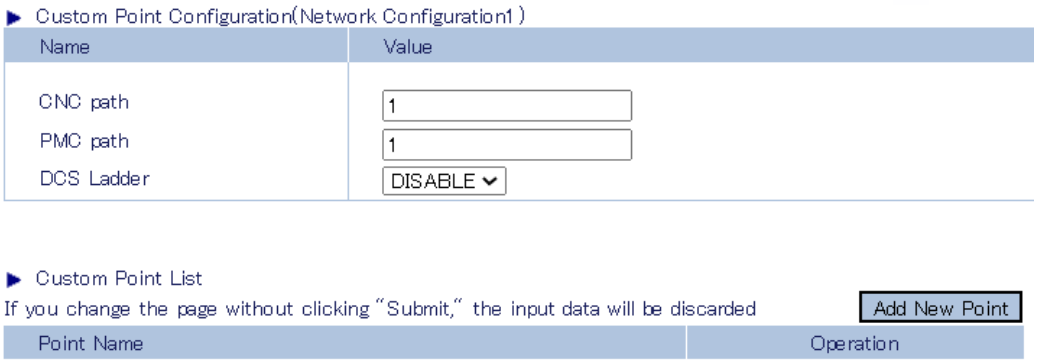

Figure 3: FBR Converter's Web Setup Page (Custom Point)

3. Batch Data Processing

This function gathers specific data values at once in the following three categories. It works only for Network Configuration 1 and requires an FBR converter for every CNC device.

- Custom Macro : Up to 500 variables
- PMC : Up to 3000 Bytes
- Tool Offset (TYPE A and B) : Up to 200 values

Note 3) This is only available with the FBR converter firmware version 1.4.4 or later.

Note 4) The CNC device's PMC must secure an area that stores the data addresses in serial order for batch data processing. Inquire your machine tool maker about the storage.

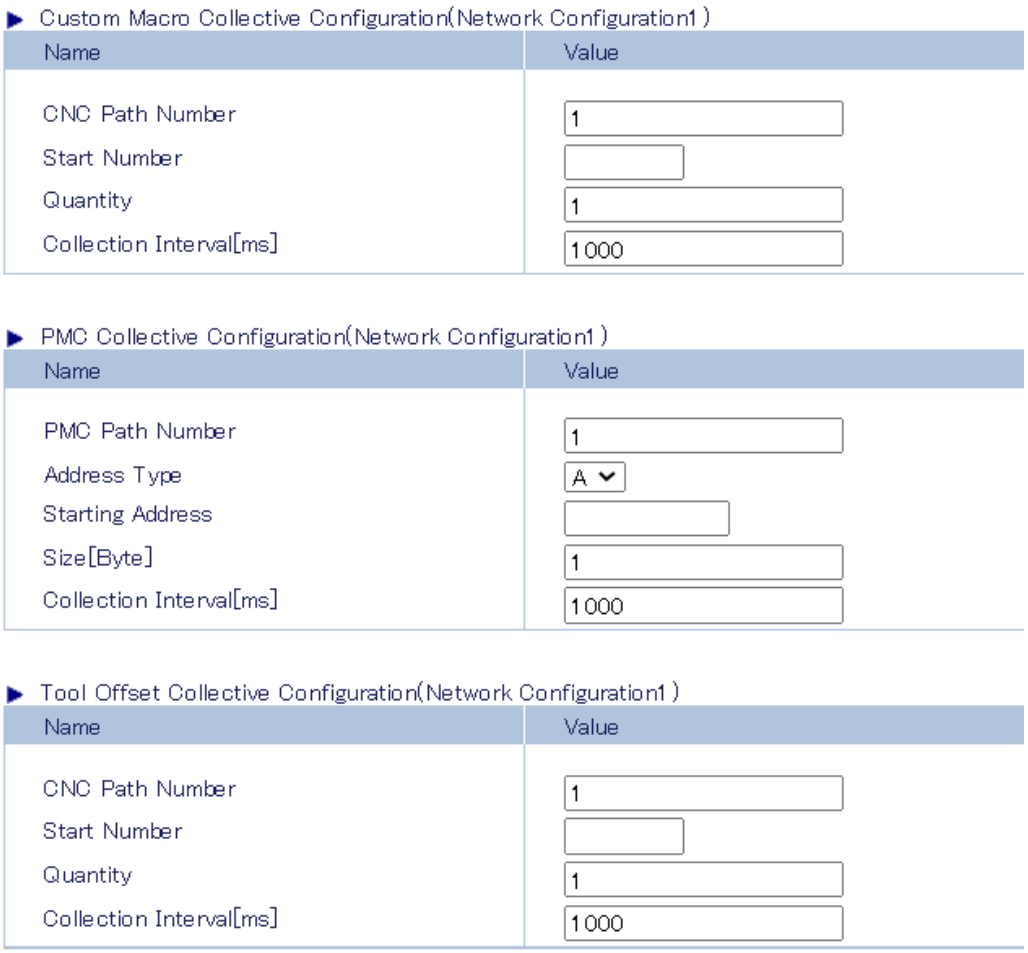

Figure 4: FBR Converter's Web Setup Page (Default Point / Batch Processing)

[Conditions]

- When the FBR converter collects data from up to three CNC devices, the number of collectible data values for the custom point setting will be limited to 5.
- Assign a unique MTConnect port number to each CNC device when FBR connects to multiple CNC devices. The host system will set the connection per CNC device and port.
- This chapter shows data fathered from LAN-connected CNC devices. For serial communication, see Chapter "3.3 Collecting Data from Legacy CNC Devices with Serial Interface/DPRNT ".
- The data collecting cycle varies with several factors, such as network delay, connection speed, and the specified number of collecting data values.

[Tool Offset Batch Configuration]

This function supports TYPE A and TYPE B tool offset functions for FANUC CNC devices. There are two types of tool offset information: Machining Center and Lathe. The FBR Converter reads the information of the connected CNC device and automatically identifies whether it belongs to the Machining Center or Lathe category. The following section explains how to identify the category of the monitoring device.

- Select MTConnect under Status menu on the FBR converter's web setup page. The MTConnect Status section displays the information. To determine the category, look at the last character of the Series Name (Version).
  - M (Machining Center), MM (Machining Center: two channels control)
  - T (Lathe), TT (Lathe: 2/3 channel control), MT (Lathe: compound processing function)
  - P (Punch Press), L (Laser), W (Wire cut)　* FBR converter does not support P, L, and W.

▶ MTConnect Status

Name	Status
Network1	
Series Name (Version)	Series 30i – MODEL B (G31Z 18.0):M
CNC path	1
PMC path	1
Status	Collecting.
Link to MTConnect page	MTConnect page

Figure 5: FBR Converter's Web Setup Page (MTConnect Status)

- Compare the tool offset information listed in the collective data configuration table found in the Appendix: List of Collectable Fanuc CNC Device Data with the collected status information from the connected CNC device. Check the DataItem names to determine the category.

Note 5) The tool offset information gathered by the FBR converter requires unit conversion in the host system based on the CNC device's machine parameters to match the information on the CNC screen (e.g. input

of linear axes in millimeters or inches and rotation of axes). For more details, see the manuals of your machine tool or CNC device.

Note 6) TYPE A and TYPE B are specifications of the CNC's tool offset function. To determine which offset function your monitoring CNC device uses, please refer to the manuals of your machine tool or contact the manufacturer. Note that TYPE B can be used with FBR Converter firmware version 1.5.1 or later.

[Special Operation Settings]

It will be difficult to collect a lot of information in a short cycle (several hundred milliseconds or less) under the FBR converter's normal settings due to the limits on the communication performance of CNC devices. If it is your requirement, please contact silex's sales or customer support team.

[Functions Available with Specific Machine Tools]

The following features are available with the FBR converter's firmware version 1.4.4 or later.

1. Spindle Name Auto-Correction
   When a machine tool maker's CNC device includes identical spindle names, FBR converters automatically create a new unique name based on the MTConnect specifications.

   - When an extended spindle name (bit 0 of parameter 1000) is 1, the CNC path/channel number will be added to the spindle name.
     Example: When the CNC spindle name of CNC path/channel #1 is XR, the MTConnect definition name will be XR1.
   - When an index of the spindle name (parameter 3131) is not 0, the CNC path/channel number will be added to the spindle name.
     Example: When the CNC spindle name of CNC path/channel #1 is X1, the MT connect definition name will be X11.

2. Spindle Speed Monitoring Change
   The machine tool manufacturer's CNC device setting may not allow the FBR converter to collect data with the default setting. This function changes settings for data collection and applies to all the spindles that exist.

- Setting Page URL: http:///*(FBR Converter's IP Address)*/option.htm?lang=eng

Figure 6: FBR Converter's Web Setup Page (Optional Setting)

3.1.1. List of Collectable Fanuc CNC Device Data

See the Appendix in this document.

[How to Read Data Table]

- Under MTConnect Data, the number "-1" next to DataItem name means a channel number of the CNC devices. When a CNC device has multiple channels, channels will be shown as "-1", "-2", and so on.
- CONDITION under Category can collect the status and character strings of alarm/operator messages. Depending on the message status, the XML tag name will be changed and notified to MTConnect client.

  Example)

  1. Operator message: Change to Unavailable, Normal, or Warning
  2. Alarm message: Change to Unavailable, Normal, or Fault

3.2. Brother CNC Devices

FBR converter connects to CNC-C00 and CNC-B00 in Wired LAN and gets the data listed in this document. For the communication, Activation Key (licensed option) has to be registered to the FBR converter.
Follow the Setup Guide provided with FBR to register the Activation Key. Access the CNC device and confirm the IP address and port number, register the information in the MTConnect Setup page of the FBR Converter.

[Procedures]
FBR converter carries two methods to collect data.

1. Command Data Collection
   Issue a command per data to CNC device to get the data.
2. PLC Bulk Data Collection
   Store data, which needs to be collected in a short cycle, in PLC's data register beforehand, and then send all the data at once.

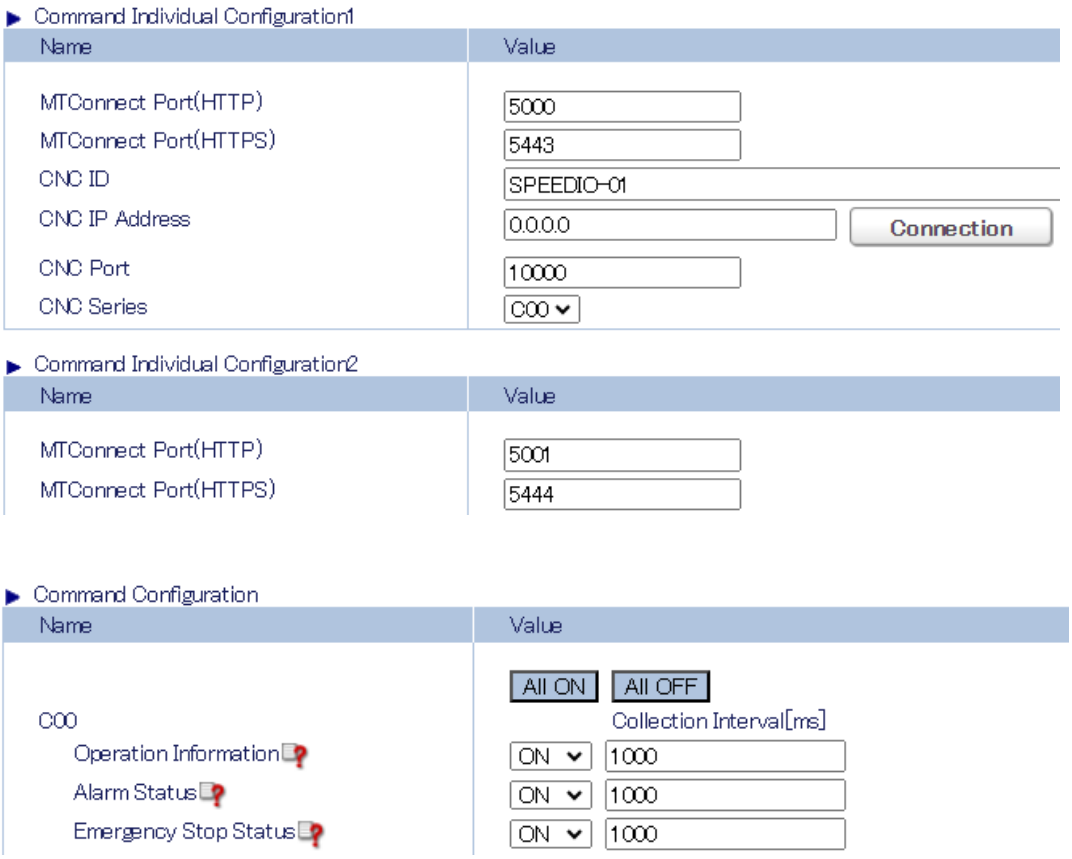

Figure 7: FBR Converter's Web Setup Page (Command Individual Configuration)

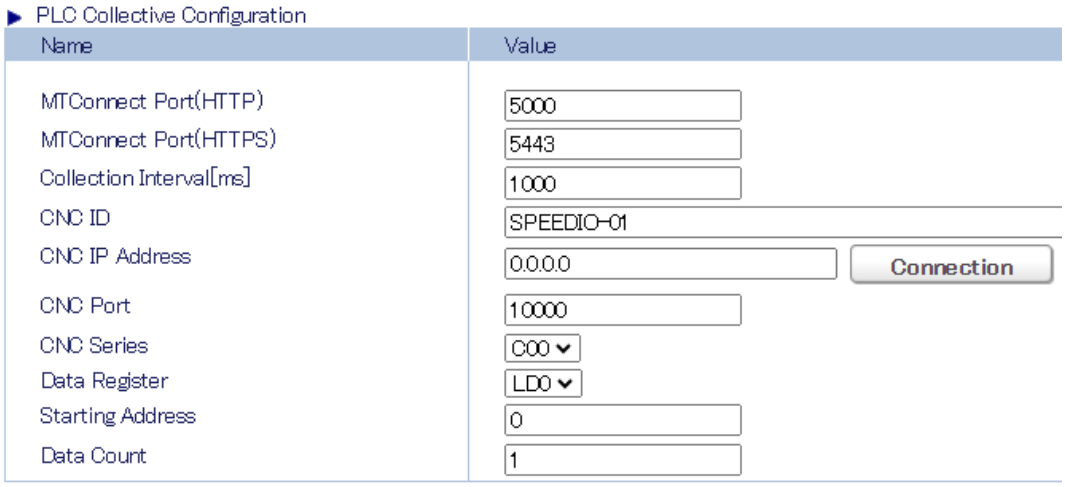

Figure 8: FBR Converter's Web Setup Page (PLC Collective Configuration)

[Conditions]

- One unit of FBR converter can save up to three CNC devices in the collection mode of command data (mixed environment of CNC-C00/B00 series), whereas one CNC device in the collection mode of PLC bulk data.
- Assign a unique MTConnect port number to each CNC device when FBR connects to multiple CNC devices. The host system will set the connection per CNC device and port.
- The collection mode of PLC bulk data supports CNC-C00 series only. CNC devices' firmware has to support the mode as well. Contact your machine tool builder to check the firmware beforehand.
- The data collecting cycle varies with various factors such as network delay, connection speed, and the specified number of data values to be collected.
- Depending on the number of data values to be collected, data collection may not be finished within the set time cycle due to the communication overhead between the FBR converter and CNC device. In this case, reduce the number of data values to be collected under FBR converter settings.
- Since some versions of CNC device firmware do not support specific data retrieval commands, CNC device will show an error. In that case, disable (OFF) the data retrieval command, which is corresponding to the error code shown in FBR converter status screen.
- When FBR Converter connects to CNC device and retrieves data, the CNC device may display a message "CM7522 Receive Command Abnormal End". This happens when the CNC device does not allow remote connection/operation. Go to the control panel of the CNC device, press "Data Bank" followed by "6. Communication Parameter" and change "Remote Operation" to "1: Valid" to clear the error message.

[How to Read Data Table]

- Under MTConnect Data, the number "-1" next to DataItem name means a group number of CNC devices. It is fixed to -1 for Brother CNC devices.
- The category "CONDITION" provides CNC alarm information.
  - C00 series:

    FBR converter gets the alarm information as a 10-digit number from the CNC device, converts the first two digits into a character string, and assigns it to nativeCode.

    Example)
    nativeCode="EX7015">017015</Message>
    nativeCode="CM75220008">0975220008</Message>

  - B00 series:

    FBR converter gets the alarm information as a 4-digit number from the CNC device.

3.2.1. List of Collectable Brother CNC Device Data

See the Appendix in this document.

3.3. Collecting Data from Legacy CNC Devices with Serial Interface/DPRNT

FBR converter connects to a legacy CNC device (no LAN/Ethernet connectivity) with RS-232C to get the CNC data. For the collectable data, see Chapter "2. Supported CNC Devices/Machines ".
To obtain DPRNT, the FBR converter automatically converts the output information from the RS-232C of the CNC device to MTConnect and sends it to the host system. Enter the MTConnect communication port numbers to DPRNT Configuration and the serial communication settings according to the CNC device.

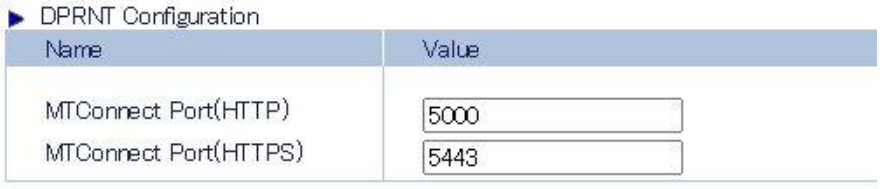

Figure 9: FBR Converter's Web Setup Page (DPRNT Configuration)

Figure 10: FBR Converter's Web Setup Page (Serial Configuration)

[Procedures]

- Set DPRNT commands in the CNC device beforehand.
- Issue the DPRNT command from the CNC device. FBR converter will receive character strings or macro variable values from the serial port.
- FBR converter has to be set to the mode "DPRNT Collection".

[Conditions]

- Though the same CNC device is installed onto machines, RS-232C pin assignment and DPRNT command specifications may be different from each other because each machine tool builder has their own installation specifications. Contact your machine tool builder to check those specifications in advance. For FBR converter's pin assignment information, see the product catalogue or manual.
- One CNC device requires one unit of FBR converter.
- Supports ISO code only as CNC serial communication output.

- FBR converter cannot be set with the data collection time cycle since DPRNT data is sent from CNC device.

[Collecting Data with DPRNT]

- DPRNT Command and Identifier
  Issue DPRNT commands between POPEN and PCLOS. Specify the identifier listed in the Appendix of this document along with the CNC data. The following is an example of the DRPNT command.

```
#100=2;
POPEN;
DPRNT[PC*#100[10]];
DPRNT[PN*ABC];
DPRNT[SR01*DEF];
PCLOS;
```

Executing the DPRNT command shown on the left stores 2 in the DataItem's ProductResultNumber, ABC in the DataItem's ProductName, and DEF in the DataItem's String01, and forwards the values to the host system in MTConnect. All output data, including POPEN and PCLOS, is stored in the PrintOutput of the DataItem.

- Receiving DPRINT Output Data and MTConnect Communication Cycle
  The CNC device sends data to FBR converter with DPRNT commands executed on the CNC device. The FBR converter does not provide a periodic data collection interval setting, converts the data sent with DPRNT to MTConnect and forwards it to the host system.

  When FBR converter receives a data transmission request from the host system (MTConnect client software), it transfers the latest data received with DPRNT. If the same DataItem name receives a different value, it is overwritten with the latest data (see Figure 11).

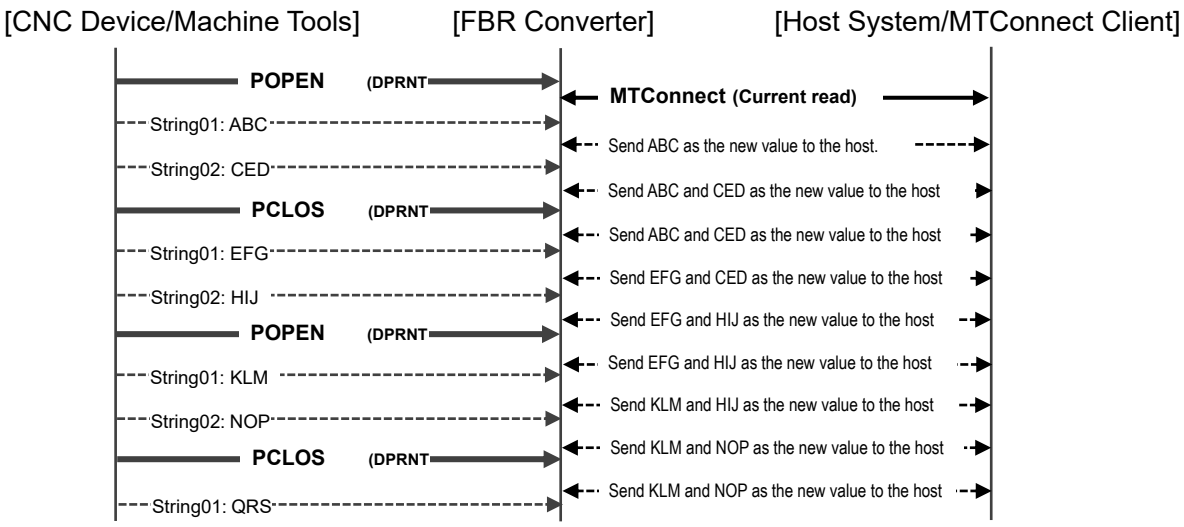

Figure 11: DPRNT Communication Example

Figure 11 shows an example of updating values in the DPRNT command cycle (POPEN to PCLOS), storing them in MTConnect DataItems String01 and String02, and transferring them to the host system.

Make sure that the data provided by the CNC device with DPRNT is not lost in the host system. To do this, set the host's access cycle to the FBR, taking into account the DPRNT output cycle (time).

3.3.1. List of Collectable Data with FBR Converter's Serial Interface

See the Appendix in this document.

3.4. Data Collection from Typical Signal Towers with Digital Input Interface

FBR converter collects data of typical signal towers with its digital input interface (DI). This function transfers data to the host system using the same communication port number as the DPRNT collection setting described in 3.3. Collecting Data from Legacy CNC Devices with Serial Interface/DPRNT.

[Procedures]

- FBR converter can collect up to three pieces of lamp data. One signal tower requires one unit of FBR converter.
- FBR converter has to be set to the mode "DPRNT Collection".

[Condition]

- One CNC device requires one unit of FBR converter.
- This function cannot be used with the DPRNT collection function.

3.4.1. List of Collectable Data with FBR Converter's Digital Input Interface

See the Appendix in this document.

3.5. Patlite AirGRID®

FBR converter gets lamp data (max. 5 colors) and buzzer data via LAN by linking to Patlite's AirGRID® signal towers. For more details, see "Patlite AirGrid® Setup Procedure" on Silex's website.

[Condition]

- AirGRID® transmitter (WDT) has to be set to the immediate transmission mode to associate with FBR converter.

[How to Read Data Table]

- Values of buzzer and lamps are defined as follows:
  - Buzzer: Off (Not sounding) / On (Sounding) / UNAVALABLE (No data)
  - Lamp: Off / On / Blinking / Unused (Not registered, Not in use) / UNAVAILABLE (No data)

3.5.1. List of Collectable Patlite AirGRID® Device Data

See the Appendix in this document.

3.6. Muratec Specific System

FBR converter collects data of CNC devices as well as Muratec's specific data including loader system data by connecting to Muratec's machine tools in the wired LAN. To get the maker-specific data, Activation Key (licensed option) needs to be registered to the FBR converter.
Register the Activation Key according to the Setup Guide provided with the product. Access the CNC device and confirm the IP address and port number, register the information in the MTConnect Setup page of the FBR Converter.

[Procedures]

- The factory default setting is "ON (Collect Data)" for the CNC device information of Muratec's machine tools and manufacturer-specific information, such as loader systems attached to the machines.
- The user must set individual specific custom macros and PMC data as custom points in order to monitor them. Up to 130 custom points can be set.

Note 7) FBR Converter firmware version 1.5.0 or later allows the individual settings for custom macro variables and PMC data.

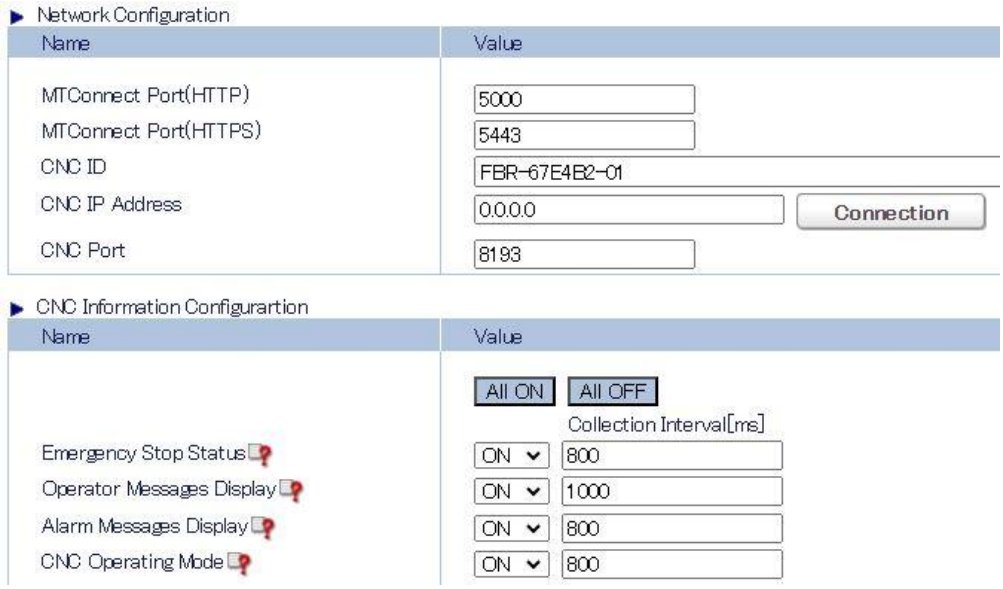

Figure 12: FBR Converter's Web Setup Page (Network Configuration)

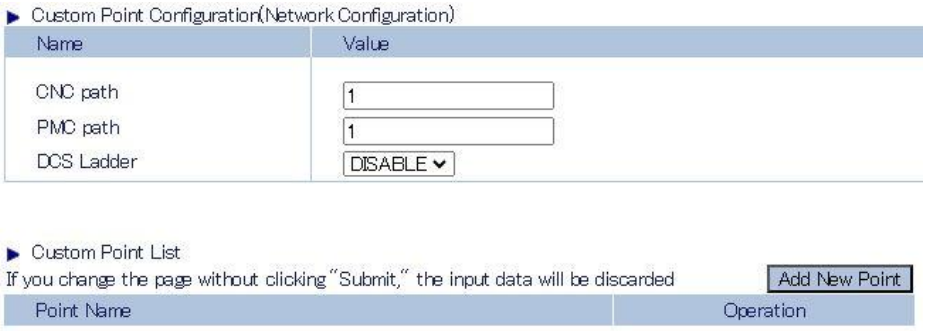

Figure 13: FBR Converter's Web Setup Page (Custom Point Configuration)

[Conditions]

- One CNC device requires one FBR converter.
- The data collecting cycle varies with various factors such as network delay, connection speed, and the specified number of data values to collect.

[How to Read Data Table]

- **Under MTConnect Data, the number "-1" next to DataItem name means a channel number of** CNC devices. When a CNC device has multiple channels, channels will be shown as "-1", "-2", and so on.
- CONDITION under Category can collect the status and character strings of alarm/operator messages. Depending on the message status, the XML tag name will be changed and notified to MTConnect client.

  Example)

  1. Operator message: Change to Unavailable, Normal, Warning, or Fault
  2. Alarm message: Change to Unavailable, Normal, or Fault

- The cycle time data, "n.CycleTime-Loader2" and "n.ProgramNumber-G2", in Muratec specific system will be shown only for twin-loader machines.
- The left/right axis cycle time is not the prepared machine data for Fanuc CNC 18i series. Users need to create NC program, store the data to macro variable values, and specify the variables from FBR converter.
- Names in the data list, such as X/Y/Z/S1/P1/X2/Y2/Z2/S2/P2, vary by quantity and name of spindles.
- The alarm data "n.Msystem-" in Muratec's specific system will show max. 36 ongoing alarms in ascending order (arranged from the smallest to the largest number).
- FBR Converter, with its tool offset batch configuration function, automatically identifies the FANUC tool offset TYPE supported by Muratec's machine tools.

3.6.1. List of Collectable Muratec Machine Tool and Specific System Data

See the Appendix in this document.

3.7. Shibaura Machine TOSNUC Series

FBR Converter collects the listed data by connecting to Shibaura Machine's TOSNUC series in the wired LAN. To enable this function, Activation Key (licensed option) must be registered on the FBR converter.

Register the Activation Key according to the Setup Guide provided with the product. Access the CNC device and confirm the IP address and port number, register the information in the MTConnect Setup page of the FBR Converter.

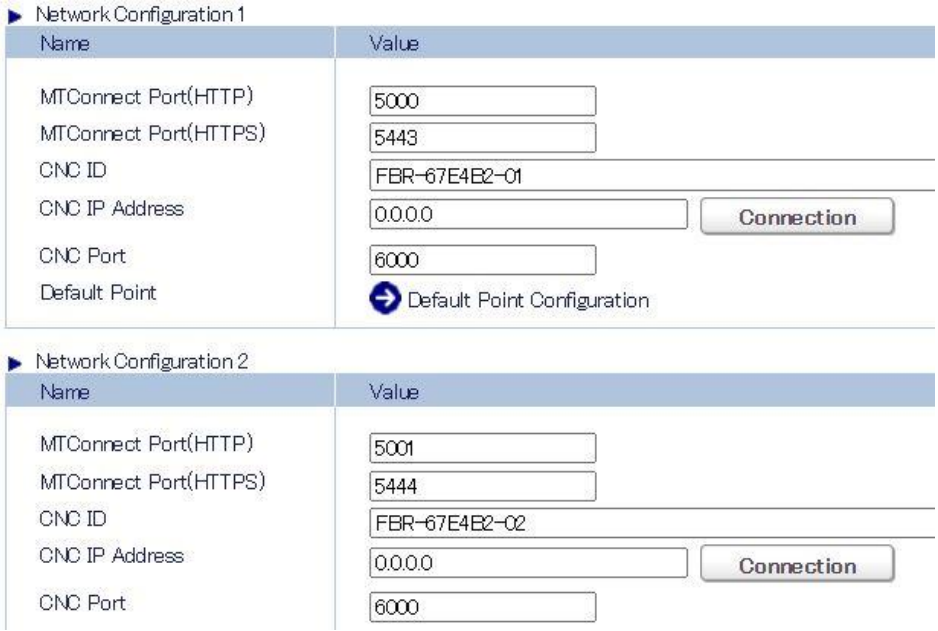

Figure 14: FBR Converter's Web Setup Page (Network Configuration)

[Procedures]

The data collection setting (ON/OFF) and the collection cycle can be set for the individual collectable data of the TOSNUC series. The factory setting is "ON (Collect Data)" for all values.

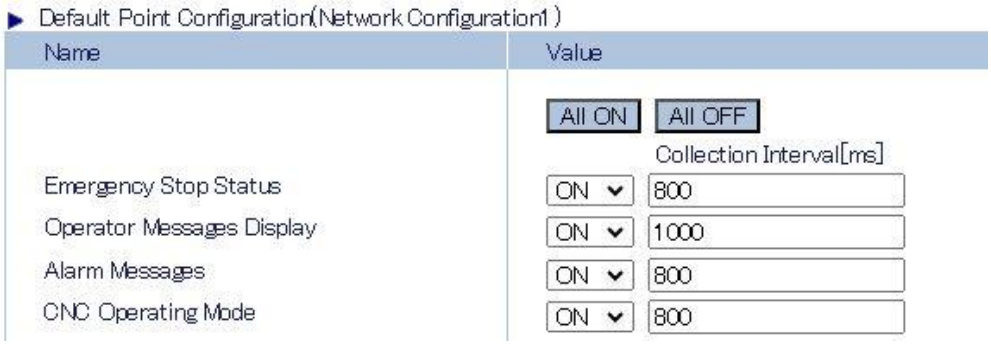

Figure 15: FBR Converter's Web Setup Page (Default Point Configuration)

[Conditions]

- One FBR Converter can collect data from up to 3 TOSNUC devices. To connect FBR Converter to multiple TOSNUC devices, assign MTConnect port number to each device. Configure the connection per device and port on the host system.
- If the FBR converter cannot communicate with the TOSNUC devices at startup, it sets all DataItem values to UNAVAILABLE and sends them as the MTConnect data to the host system.
- For any data that cannot be collected from the TOSNUC devices, the FBR converter sets their DataItem values to UNAVAILABLE and sends them as MTConnect data to the host system.
- FBR Converter only receives one alarm value in MTConnect when multiple alarms occur.
- The collection cycle varies depending on several factors, such as network delay, connection speed, and the specified number of data values to be collected.
- Depending on the number of data values to be collected, data collection may not be completed within the set time cycle due to the communication overhead between the FBR converter and CNC devices. In this case, reduce the number of data values to be collected under FBR converter settings.

[How to Read Data Table]

- For TOSNUC series, the CNC's channel number is not given to the DataItem of the MTConnect Data.
- CONDITION under Category can collect the alarm data of the CNC.

3.7.1. List of Collectable Shibaura Machine TOSNUC Data

See the Appendix in this document.

3.8 Operation Note

- How to check CNC device's communication settings
  In order to update FBR converter with the CNC device's network information (IP addresses and communication ports), go through the following steps to find the necessary information.

  - Fanuc CNC devices:
    - Press [SYSTEM] on the control panel of the CNC device. -> Press the soft key [EMBED PORT]. -> Press the soft key [COMMON] -> Find its IP address and subnet mask.
    - Press the soft key [FOCAS] -> Find the TCP port number. It is typically 8193, but is not always assigned.

  Note 8) To connect FBR converter with Fanuc fast Ethernet board, press [Ethernet Board] instead of [Embedded Port].

  Note 9) If no IP address, subnet mask or port number is assigned, set up the CNC device according to the manual. CNC devices usually require a reboot (power OFF/ON) to apply changes.

  - Brother CNC devices:
    - Press [Data Bank] on the control panel of the CNC device. -> Press [F6] (Communication Parameter). -> Press [F2] (Ethernet/FTP). -> Find its IP address, mask bit (subnet mask), and port number.

  Note 10) If no IP address, mask bit or port number is assigned, set up the CNC device according to the manual. You must enter an IP address without periods into the input field. (Example. 192168000001)

  - Shibaura TOSNUC Series:
    - Press the [PARAM] or [SETTINGS] on the control panel of the CNC device. -> Press [DATA EDIT]. -> Press [F1 (JUMP)]. -> Move the cursor to [LAN] on the index screen and press [YES]. -> Find out the IP address, subnet mask, and port number.

  Note 11) Use the TOSNUC's optional "Top Macro Variable Communication" function. For the communication details, please contact the machine manufacturer.

  Note 12) If no IP address, subnet mask or port number is assigned, set up the CNC device according to the manual. CNC devices usually require a reboot (power OFF/ON) to apply changes. Follow the directions on the screen.

- Time Setting

  When the NTP (time setting) client of the FBR Converter is enabled, the MTConnect function will start after time synchronization with the NTP server. If the time does not synchronize with the NTP server within 120 seconds after the FBR Converter starts up, the MTConnect function will start without waiting for time synchronization.

  - If the NTP server cannot be connected, the FBR Converter will attempt to reconnect every 60 seconds.
  - When the FBR converter is powered by the processing machine, turning off the machine power will also turn off the FBR Converter. In such cases, MTConnect may be slow to start collecting operation information after the power is restored. If this occurs, please check the NTP settings and the factory's network connection.

Revision History

Ver.	Revision History	Date
AN2008FBR_01	First Edition	Jul 26, 2020
AN2011FBR_02	Added the following items to "3.1.1 List of Collectable Fanuc CNC Device Data". ・Moving axis load current value (%) ・Moving axis load current value (A) Modified the following item in "3.2.1 List of Collectable Brother CNC Device Data". ・DataItem name (n.system-1) of Alarm message Added the following items to "3.6.1 List of Collectable Muratec Machine Tool and Specific System Data". ・Two items added in 3.1.1. ・Operation panel ramp information (Tool counter up/notice and Check counter up/notice)	Nov 19, 2021
AN2011FBR_03	Included FBR-100 wired LAN model. Deleted the following descriptions since the firmware version 1.4.3 introduced the updated setting pages of FBR converter: ・Settings to collect individual and bulk data, and the setting tool information Added the procedure to 3.7 Operation Note: How to check IP address and communication port number assigned to Fanuc/Brother CNC devices Added more information that can be collected with ver. 1.4.3 and more remarks in the tables. ・Appendix : List of Collectable Fanuc CNC Device Data ・Appendix : List of Collectable Muratec Machine Tool and Specific System Data	Feb 09, 2022
AN2008FBR_04	Added some restrictions to" Appendix : List of Collectable Fanuc CNC Device Data"	Mar 22, 2022
AN2011FBR_05	Added the following new functionality available with the firmware ver. 1.4.4 to 3.1 Fanuc CNC Devices (LAN Connected): ・3. Batch Data Processing under [Procedures] ・1. Spindle Name Auto-Correction and 2. Spindle Speed Monitoring Change under [Functions available with Specific Machine Tools].	Jan 16, 2023

Ver.	Revision History	Date
AN2011FBR_06	Added the following descriptions along with new functions in the firmware ver. 1.5.0. • 3.1. Fanuc CNC Devices (LAN Connected) Increased number of the custom points that can be configured (up to 130) • 3.2. Brother CNC Devices Instruction for the CM7522 message "Receive Command Abnormal End" • 3.3. Collecting Data from Legacy CNC Devices with Serial Interface Data collection with DPRNT. • 3.6. Muratec Specific System Individual setting function for the custom macro and PMC addresses • 3.7. Shibaura Machine TOSNUC Series • 3.8. Operation Note How to find the network information with Shibaura Machine TOSNUC series Added the new collectable data and more descriptions to the following documents according to the firmware ver. 1.5.0. • Appendix: List of Collectable Fanuc CNC Device Data • Appendix: List of Collectable Muratec Machine Tool and Specific System Data • Appendix: List of Collectable Shibaura Machine TOSNUC Data Made some minor changes to the text in this document.	Mar 11, 2024
AN2011FBR_07	Added the following descriptions along with new functions in the firmware ver. 1.5.1. 3.1. Fanuc CNC Devices (LAN Connected) • Tool offset TYPE B • Tool offset batch setting 3.6. Muratec Specific System • Tool offset batch setting 3.8. Operation Note • Time settings	May 26, 2025

	Appendix: List of Collectable Data • [Fanuc]: Added explanations for the CNC device values related to the emergency stop, CNC operation mode, CNC operating status, and spindle operation mode. • [Fanuc]: Added data related to tool offset in the collective data configuration list. • [Muratec]: Added data related to tool offset and tool counter in the Muratec machine tool and specific system data lists. • [Shibaura]: Changed the collecting data range of Rapid Traverse Speed and Final Coordinates (Final Position) from 16 to 12 axes.	

DataItem ID of FANUC CNC device is the same as DataItem name without the period, hyphen and underscore.

Default Point Data								
#	Data to Collect	MTConnect Data				On or Off	Frequency	
		Category	DataItem	TYPE	Value	Default	Default	Range (ms)
1	Emergency stop status	EVENT	n.estop-1	EMERGENCY_STOP	ARMED / TRIGGERED [Meaning of Values] -ARMED: release or reset or wait -TRIGGERED: stop	ON	800	100～10000
2	CNC operation mode	EVENT	n.mode-1	CONTROLLER_MODE	MANUAL_DATA_INPUT AUTOMATIC / EDIT / MANUAL [Meaning of Values] -MANUAL DATA INPUT: MDI opr -AUTOMATIC: memory or DNC opr -EDIT: memory edit -MANUAL: JOG feed or manual incremental feed or manual reference position return or manual handle feed	ON	800	100～10000
3	Number of processed parts	EVENT	n.partcnt-1	PART_COUNT	numerical value	ON	1000	100～10000
4	CNC operating status	EVENT	n.execution-1	EXECUTION	READY / STOPPED INTERRUPTED / ACTIVE [Meaning of Values] -READY: reset or manual numerical command start or tool retract/returun starting state -STOPPED：automatic opr stopped -INTERRUPTED：automatic opr paused -ACTIVE: automatic opr	ON	800	100～10000
5	Sequence number of the program in operation	EVENT	n.line-1	LINE	numerical value	ON	800	100～10000
6	Main program name	EVENT	n.program-1	PROGRAM	character string	ON	2000	100～10000
7	Main program comment	EVENT	n.progcom-1	PROGRAM_COMMENT	character string	ON	2000	100～10000
8	Specified Program Comment	EVENT	n. specifiedProgcom-1	PROGRAM_COMMENT	character string	OFF	2000	100～10000

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9	Tool number	EVENT	n.toolnumber-1	TOOL_NUMBER	numerical value	ON	800	100～10000
10	Feed rate override	EVENT	n.feedoverride-1	PATH_FEEDRATE_OVERRIDE	numerical value	ON	1000	100～10000
11	Block of the program in operation	EVENT	n.block-1	BLOCK	character string	ON	800	100～10000
12	Spindle operation mode	EVENT	n.spdlmode-S1_P1	ROTARY_MODE	SPINDLE / INDEX / CONTOUR [Meaning of Values] -SPINDLE：normal opr or sync control or rigid tapping or others -INDEX：orientation -CONTOUR：Cs continuous path control	ON	800	100～10000
13	Rapid traverse override	EVENT	n.rapidoverride-1	PATH_FEEDRATE_OVERRIDE	numerical value	ON	1000	100～10000
14	Spindle override	EVENT	n.spdloverride-1	ROTARY_VELOCITY_OVERRIDE	numerical value	ON	1000	100～10000
15	Data reception status	EVENT	n.avail-	AVAILABILITY	AVAILABLE / UNAVAILABLE	ON	800	100～10000
16	Active axis name	EVENT	n.actaxes-1	ACTIVE_AXES	Axis name character string	ON	5000	100～10000
17	Axis total travel amount note: Legacy CNC devices including 16i series require an optional function to show the total travel amount.	EVENT	n.axisTotalTravelAmt-X_P1 n.axisTotalTravelAmt-Y_P1 n.axisTotalTravelAmt-Z_P1	MESSAGE	character string	ON	800	100～10000
18	Dry run note: compatible with 30i/0i series only.	EVENT	n.dryrun-1	INTERFACE_STATE	ENABLED / DISABLED	ON	800	100～10000
19	Cutting feed note: compatible with 30i/0i series only.	EVENT	n.feedrate-1	INTERFACE_STATE	ENABLED / DISABLED	ON	800	100～10000
20	M00 note: compatible with 30i/0i series only.	EVENT	n.M00-1	INTERFACE_STATE	ENABLED / DISABLED	ON	800	100～10000
21	M01 note: compatible with 30i/0i series only.	EVENT	n.M01-1	INTERFACE_STATE	ENABLED / DISABLED	ON	800	100～10000
22	Absolute position (mm)	SAMPLE	n.act-X_P1 n.act-Y_P1 n.act-Z_P1	ANGLE (for spindle) POSITION (for moving axis)	numerical value	ON	800	100～10000
23	Spindle load (%)	SAMPLE	n.load-S1_P1	LOAD	numerical value	ON	800	100～10000
24	Moving axis load (%)	SAMPLE	n.load-X_P1 n.load-Y_P1 n.load-Z_P1	LOAD	numerical value	ON	800	100～10000

DataItem ID of FANUC CNC device is the same as DataItem name without the period, hyphen and underscore.

Default Point Data								
#	Data to Collect	MTConnect Data				On or Off	Frequency	
		Category	DataItem	TYPE	Value	Default	Default	Range (ms)
25	Spindle speed (rotation/min) note: For machines not equipped with a position coder, NC parameters may need to be changed (change bit No. 3118 to 1).	SAMPLE	n.speed-S1_P1	ROTARY_VELOCITY	numerical value	ON	800	100～10000
26	Feed rate (mm/sec)	SAMPLE	n.pathfdrt-1	PATH_FEEDRATE	numerical value	ON	800	100～10000
27	Moving axis load current value (%) note: compatible with 30i/0i series only.	SAMPLE	n.loadCurrentPercent-X_P1 n.loadCurrentPercent-Y_P1 n.loadCurrentPercent-Z_P1	LOAD	numerical value	ON	800	100～10000
28	Moving axis load current value (A) note: compatible with 30i/0i series only.	SAMPLE	n.loadCurrentAmpere-X_P1 n.loadCurrentAmpere-Y_P1 n.loadCurrentAmpere-Z_P1	AMPERAGE	numerical value	ON	800	100～10000
29	Spindle insulation resistance value (MΩ) note: compatible with 30i/0i series only.	SAMPLE	n.spindleInsInRes-S1_P1	RESISTANCE	numerical value	ON	5000	100～10000
30	Moving axis insulation resistance value (MΩ) note: compatible with 30i/0i series only.	SAMPLE	n.movingAxisInsInRes-X_P1 n.movingAxisInsInRes-Y_P1 n.movingAxisInsInRes-Z_P1	RESISTANCE	numerical value	ON	5000	100～10000
31	All servo and spindle power consumption (0.001kWh) note: compatible with 30i/0i series only.	SAMPLE	n.allServoSpindlePwrCons-1	ELECTRICAL_ENERGY	numerical value	ON	5000	100～10000
32	Cycle time (sec)	SAMPLE	n.cycletime-1	ACCUMULATED_TIME	numerical value	ON	800	100～10000
33	Real speed for servo adjustment (rotation/min)	SAMPLE	n.servoAdjRealSpeed-X_P1 n.servoAdjRealSpeed-Y_P1 n.servoAdjRealSpeed-Z_P1	ROTARY_VELOCITY	numerical value	ON	800	100～10000

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34	Operator message display	CONDITION	n.opmessage-	SYSTEM	Store alert number in nativeCode Store error message in HTTP encoding	ON	1000	100～10000
35	Alarm message display PW alarm, DS alarm, IE alarm SN alarm, EX alarm OT alarm (non-axis type), OH alarm (non-axis type)	CONDITION	n.system-1	SYSTEM	Store alert number in nativeCode Store error message in HTTP encoding	ON	800	100～10000
36	Alarm message display SV alarm	CONDITION	n.servo-X_P1 n.servo-Y_P1 n.servo-Z_P1 n.servo-S1_P1	ACTUATOR	Store alert number in nativeCode Store error message in HTTP encoding	ON	800	100～10000
37	Alarm message display OH alarm	CONDITION	n.overheat-X_P1 n.overheat-Y_P1 n.overheat_Z_P1	TEMPERATURE	Store alert number in nativeCode Store error message in HTTP encoding	ON	800	100～10000

DataItem ID of FANUC CNC device is the same as DataItem name without the period, hyphen and underscore.

Default Point Data								
#	Data to Collect	MTConnect Data				On or Off	Frequency	
		Category	DataItem	TYPE	Value	Default	Default	Range (ms)
38	Alarm message display OT alarm	CONDITION	n.travel-X_P1 n.travel-Y_P1 n.travel-Z_P1	POSITION	Store alert number in nativeCode Store error message in HTTP encoding	ON	< 1 sec	100～10000
39	Alarm message display SW alarm, PC alarm	CONDITION	n.logic-1	LOGIC_PROGRAM	Store alert number in nativeCode Store error message in HTTP encoding	ON	< 1 sec	100～10000
40	Alarm message display IO alarm, SR alarm	CONDITION	n.comms-1	COMMUNICATIONS	Store alert number in nativeCode Store error message in HTTP encoding	ON	< 1 sec	100～10000
41	Alarm message display PS alarm, MC alarm, BG alarm	CONDITION	n.motion-1	MOTION_PROGRAM	Store alert number in nativeCode Store error message in HTTP encoding	ON	< 1 sec	100～10000
42	Alarm message display SV alarm (non-axis type)	CONDITION	n.servonoaxis-1	ACTUATOR	Store alert number in nativeCode Store error message in HTTP encoding	ON	< 1 sec	100～10000
Custom Point Data (PMC)								
#	Data to Collect	MTConnect Data				On or Off	Frequency	
		Category	DataItem	TYPE	Value	Default	Default	Range (ms)
1	Custom macro local variable (#1 to #33)	EVENT/ SAMPLE	Random	Automatically created from DataItem (self-defined)	numerical value	OFF	Not Available	100～10000
2	Custom macro common variable (#100 to #199)	EVENT/ SAMPLE	Random	Automatically created from DataItem (self-defined)	numerical value	OFF	Not Available	100～10000
3	Custom macro common variable (#500-#999)	EVENT/ SAMPLE	Random	Automatically created from DataItem (self-defined)	numerical value	OFF	Not Available	100～10000
4	PMC address Bit status	EVENT/ SAMPLE	Random	Automatically created from DataItem (self-defined)	EVENT：TRUE/FALSE SAMPLE：numerical value	OFF	Not Available	100～10000
5	PMC address Byte size	EVENT/ SAMPLE	Random	Automatically created from DataItem (self-defined)	numerical value	OFF	Not Available	100～10000
6	PMC address 2Byte size	EVENT/ SAMPLE	Random	Automatically created from DataItem (self-defined)	numerical value	OFF	Not Available	100～10000

DataItem ID of FANUC CNC device is the same as DataItem name without the period, hyphen and underscore.

7	PMC address 4Byte size	EVENT/ SAMPLE	Random	Automatically created from DataItem (self-defined)	numerical value	OFF	Not Available	100～10000
8	PMC alarm	EVENT/ SAMPLE	Random	Automatically created from DataItem (self-defined)	character string	OFF	Not Available	100～10000
9	PMC operator message	EVENT/ SAMPLE	Random	Automatically created from DataItem (self-defined)	character string	OFF	Not Available	100～10000

DataItem ID of FANUC CNC device is the same as DataItem name without the period, hyphen and underscore.

Collective Data Configurations on Network Configuration1								
#	Data to Collect	MTConnect Data				On or Off	Frequency	
		Category	DataItem	TYPE	Value	Default	Default	Range (ms)
1	Macro (Collective)	EVENT	n.macroCollectiveXXXXX (XXXXX: macro#)	MESSAGE	character string	OFF	1000	100～10000
2	PMC (Collective)	EVENT	n.pmcCollectiveXYYYY (X:PMC type, YYYY:PMC#)	MESSAGE	character string	OFF	1000	100～10000
3	Machining Center (TYPE A/Collective) Tool offset amount	EVENT	n.toolOffset*** (***:# of tool offset)	MESSAGE	character string	OFF	1000	100～10000
4	Machining Center (TYPE A/Collective) Tool offset tip direction	EVENT	n.toolTipDir*** (***:# of tool offset)	MESSAGE	character string	OFF	1000	100～10000
5	Machining Center (TYPE B/Collective) Geometry	EVENT	n.toolOffsetGeom*** (***:# of tool offsett)	MESSAGE	character string	OFF	1000	100～10000
6	Machining Center (TYPE B/Collective) Wear	EVENT	n.toolOffsetWear*** (***:# of tool offset)	MESSAGE	character string	OFF	1000	100～10000
7	Machining Center (TYPE B/Collective) Tip direction	EVENT	n.toolTipDir*** (***:# of tool offset)	MESSAGE	character string	OFF	1000	100～10000
8	Lathe (TYPE A/Collective) X-axis compensation amount	EVENT	n.toolOffsetX*** (***:# of tool offset)	MESSAGE	character string	OFF	1000	100～10000
9	Lathe (TYPE A/Collective) Y-axis compensation amount	EVENT	n.toolOffsetY*** (***:# of tool offset)	MESSAGE	character string	OFF	1000	100～10000
10	Lathe (TYPE A/Collective) Z-axis compensation amount	EVENT	n.toolOffsetZ*** (***:# of tool offset)	MESSAGE	character string	OFF	1000	100～10000
11	Lathe (TYPE A/Collective) Tool nose radius compensation amount	EVENT	n.toolOffsetNR*** (***:# of tool offset)	MESSAGE	character string	OFF	1000	100～10000
12	Lathe (TYPE A/Collective) Tip direction	EVENT	n.toolTipDir*** (***:# of tool offset)	MESSAGE	character string	OFF	1000	100～10000

DataItem ID of FANUC CNC device is the same as DataItem name without the period, hyphen and underscore.

13	Lathe (TYPE B/Collective) X-axis geometry compensation amount	EVENT	n.toolOffsetGeomX*** (***:# of tool offset)	MESSAGE	character string	OFF	1000	100～10000
14	Lathe (TYPE B/Collective) Y-axis geometry compensation amount	EVENT	n.toolOffsetGeomY*** (***:# of tool offset)	MESSAGE	character string	OFF	1000	100～10000
15	Lathe (TYPE B/Collective) Z-axis geometry compensation amount	EVENT	n.toolOffsetGeomZ*** (***:# of tool offset)	MESSAGE	character string	OFF	1000	100～10000
16	Lathe (TYPE B/Collective) tool nose radius geometry compensation amount	EVENT	n.toolOffsetGeomNR*** (***:# of tool offset)	MESSAGE	character string	OFF	1000	100～10000
17	Lathe (TYPE B/Collective) X-axis wear compensation amount	EVENT	n.toolOffsetWearX*** (***:# of tool offset)	MESSAGE	character string	OFF	1000	100～10000
18	Lathe (TYPE B/Collective) Y-axis wear compensation amount	EVENT	n.toolOffsetWearY*** (***:# of tool offset)	MESSAGE	character string	OFF	1000	100～10000
19	Lathe (TYPE B/Collective) Z-axis wear compensation amount	EVENT	n.toolOffsetWearZ*** (***:# of tool offset)	MESSAGE	character string	OFF	1000	100～10000
20	Lathe (TYPE B/Collective) Tool nose radius wear compensation amount	EVENT	n.toolOffsetWearNR*** (***:# of tool offset)	MESSAGE	character string	OFF	1000	100～10000
21	Lathe (TYPE B/Collective) Tip direction	EVENT	n.toolTipDir*** (***:# of tool offset)	MESSAGE	character string	OFF	1000	100～10000

DataItem ID of Brother CNC device is the same as DataItem name without the period, hyphen and underscore.

Command individual data collection								
#	Data to Collect	MTConnect Data				On or Off	Frequency	
		Category	DataItem	TYPE	Value	Default	Default	Range (ms)
1	Emergency stop status	EVENT	n.estop-1	EMERGENCY_STOP	ARMED / TRIGGERD	ON	1 sec	100～999900
2	CNC operation mode	EVENT	n.mode-1	CONTROLLER_MODE	MANUAL_DATA_INPUT AUTOMATIC / EDIT / MANUAL	ON	1 sec	100～999900
3	Number of processed parts	EVENT	n.partcnt-1	PART_COUNT	numerical value	ON	1 sec	100～999900
4	Production counter (current) Production counter (completion) Production counter (remaining)	EVENT	MONTR_ProductionCounter01_Current MONTR_ProductionCounter01_Completion MONTR_ProductionCounter01_Remaining MONTR_ProductionCounter02_Current MONTR_ProductionCounter02_Completion MONTR_ProductionCounter02_Remaining MONTR_ProductionCounter03_Current MONTR_ProductionCounter03_Completion MONTR_ProductionCounter03_Remaining MONTR_ProductionCounter04_Current MONTR_ProductionCounter04_Completion MONTR_ProductionCounter04_Remaining	PART_COUNT	numerical value	ON	1 sec	100～999900
5	CNC operating status	EVENT	n.execution-1	EXECUTION	READY/STOPPED/ INTERRUPTED/ACTIVE	ON	1 sec	100～999900
6	Operating program number	EVENT	MONTR_ExecuteProgramNumber	LINE	4 digit number	ON	1 sec	100～999900
7	Sequence number of the program in operation note: compatible with C00 only.	EVENT	n.line-1	LINE	numerical value	ON	1 sec	100～999900
8	Main program name	EVENT	n.program-1	PROGRAM	character string	ON	1 sec	100～999900
9	Tool number note: compatible with C00 only.	EVENT	n.toolnumber-1	TOOL_NUMBER	numerical value	ON	1 sec	100～999900
10	Rapid traverse speed	EVENT	PDSP_RapidOverride	MESSAGE	0:Speed 1 / 1:Speed 2 / 2:Speed 3 3:Speed 4 / 4:100% / 5:0%	ON	1 sec	100～999900
11	Macro variable	EVENT	MCRNDD_500～MCRNDD_999	MESSAGE	numerical value	ON	1 sec	100～999900
12	Data reception status	EVENT	n.avail-	AVAILABILITY	AVAILABLE/UNAVAILABLE	ON	1 sec	100～999900

DataItem ID of Brother CNC device is the same as DataItem name without the period, hyphen and underscore.

13	Absolute position (mm) note: B00 does not support P1-P4 information.	SAMPLE	PDSP_AbsoluteCoordPos_AxisX PDSP_AbsoluteCoordPos_AxisY PDSP_AbsoluteCoordPos_AxisZ PDSP_AbsoluteCoordPos_AxisP1 PDSP_AbsoluteCoordPos_AxisP2 PDSP_AbsoluteCoordPos_AxisP3 PDSP_AbsoluteCoordPos_AxisP4	POSITION	numerical value	ON	1 sec	100～999900
14	Absolute position (angle)	SAMPLE	PDSP_AbsoluteCoordPos_Axis4 PDSP_AbsoluteCoordPos_Axis5 PDSP_AbsoluteCoordPos_Axis6 PDSP_AbsoluteCoordPos_Axis7 PDSP_AbsoluteCoordPos_Axis8	ANGLE	numerical value	ON	1 sec	100～999900

DataItem ID of Brother CNC device is the same as DataItem name without the period, hyphen and underscore.

Command individual data collection								
#	Data to Collect	MTConnect Data				On or Off	Frequency	
		Category	DataItem	TYPE	Value	Default	Default	Range (ms)
15	Spindle load (%)	SAMPLE	n.load-S1_P1	LOAD	numerical value	ON	1 sec	100～999900
16	Moving axis load (%)	SAMPLE	PLC_TorqueMonitor_AxisX PLC_TorqueMonitor_AxisY PLC_TorqueMonitor_AxisZ PLC_TorqueMonitor_Axis4 PLC_TorqueMonitor_Axis5 PLC_TorqueMonitor_Axis6 PLC_TorqueMonitor_Axis7 PLC_TorqueMonitor_Axis8	LOAD	numerical value	ON	1 sec	100～999900
17	Spindle Speed (Rotation/min)	SAMPLE	n.speed-S1_P1	ROTARY_VELOCITY	numerical value	ON	1 sec	100～999900
18	Feed Speed (mm/sec)	SAMPLE	n.pathfdrt-1	PATH_FEEDRATE	numerical value	ON	1 sec	100～999900
19	Cycle time note: compatible with C00 only.	SAMPLE	PRDC2_CycleTime1 PRDC2_CycleTime2	ACCUMULATED_TIME	hhhhhmmsss (Hr/Min/0.1 sec)	ON	1 sec	100～999900
20	Execution time	SAMPLE	MONTR_ExecuteTime	ACCUMULATED_TIME	hhhhhmmss (Hr/Min/Sec)	ON	1 sec	100～999900
21	Operating time	SAMPLE	MONTR_OperationTime	ACCUMULATED_TIME	hhhhhmmss (Hr/Min/Sec)	ON	1 sec	100～999900
22	Alarm message (Up to 36)	CONDITON	n.system-1	SYSTEM	Store alert number in nativeCode	ON	1 sec	100～999900
PLC bulk data collection								
#	Data to Collect	MTConnect Data				On or Off	Frequency	
		Category	DataItem	TYPE	Value	Default	Default	Range (ms)
1	PLC data note: compatible with C00 only.	EVENT	PLC_0000～PLC2046	MESSAGE	Value	OFF	Not Available	100～999900

DPRNT Configuration									
#	Data to Collect	MTConnect Data					On or Off	Frequency	
		Category	Identifier	DataItem	TYPE	Value	Default	Default	Range (ms)
1	DPRNT output string	EVENT	(None)	PrintOutput	CNC_STRING	DPRNT output data	–	Not Available	Not Available
2	Product name	EVENT	PN*	ProductName	CNC_STRING	DPRNT output data	–	Not Available	Not Available
3	Total number of processed parts	EVENT	PC*	ProductResultNumber	CNC_INT32	DPRNT output data	–	Not Available	Not Available
4	Numerical type general-purpose information (up to 10)	SAMPLE	VA01*	value01	CNC_DOUBLE	DPRNT output data	–	Not Available	Not Available
5		SAMPLE	VA02*	value02	CNC_DOUBLE	DPRNT output data	–	Not Available	Not Available
6		SAMPLE	VA03*	value03	CNC_DOUBLE	DPRNT output data	–	Not Available	Not Available
7		SAMPLE	VA04*	value04	CNC_DOUBLE	DPRNT output data	–	Not Available	Not Available
8		SAMPLE	VA05*	value05	CNC_DOUBLE	DPRNT output data	–	Not Available	Not Available
9		SAMPLE	VA06*	value06	CNC_DOUBLE	DPRNT output data	–	Not Available	Not Available
10		SAMPLE	VA07*	value07	CNC_DOUBLE	DPRNT output data	–	Not Available	Not Available
11		SAMPLE	VA08*	value08	CNC_DOUBLE	DPRNT output data	–	Not Available	Not Available
12		SAMPLE	VA09*	value09	CNC_DOUBLE	DPRNT output data	–	Not Available	Not Available
13		SAMPLE	VA10*	value10	CNC_DOUBLE	DPRNT output data	–	Not Available	Not Available
14	Character type general-purpose information (up to 10)	EVENT	SR01*	string01	CNC_STRING	DPRNT output data	–	Not Available	Not Available
15		EVENT	SR02*	string02	CNC_STRING	DPRNT output data	–	Not Available	Not Available
16		EVENT	SR03*	string03	CNC_STRING	DPRNT output data	–	Not Available	Not Available
17		EVENT	SR04*	string04	CNC_STRING	DPRNT output data	–	Not Available	Not Available
18		EVENT	SR05*	string05	CNC_STRING	DPRNT output data	–	Not Available	Not Available
19		EVENT	SR06*	string06	CNC_STRING	DPRNT output data	–	Not Available	Not Available
20		EVENT	SR07*	string07	CNC_STRING	DPRNT output data	–	Not Available	Not Available
21		EVENT	SR08*	string08	CNC_STRING	DPRNT output data	–	Not Available	Not Available
22		EVENT	SR09*	string09	CNC_STRING	DPRNT output data	–	Not Available	Not Available
23		EVENT	SR10*	string10	CNC_STRING	DPRNT output data	–	Not Available	Not Available

DPRNT Configuration								
#	Data to Collect	MTConnect Data				On or Off	Frequency	
		Category	DataItem	TYPE	Values	Default	Default	Range (ms)
1	FBR-100AN digital input terminal "0" status	SAMPLE	DIO00	LEVEL	0: Off/Low 1: On/High UNAVEILABLE	–	1 sec	Not Available
2	FBR-100AN digital input terminal "1" status	EVENT	DIO01	LEVEL	0: Off/Low 1: On/High UNAVEILABLE	–	1 sec	Not Available
3	FBR-100AN digital input terminal "2" status	EVENT	DIO02	LEVEL	0: Off/Low 1: On/High UNAVEILABLE	–	1 sec	Not Available

Patlite AirGRID® data collection								
#	Data to collect	MTConnect Data				On or Off	Frequency	
		Category	DataItem	TYPE	Value	Default	Default	Range (ms)
1	WDT MAC address	EVENT	n.WDTMacAddress-	MESSAGE	MAC address	OFF	Not Available	Not Available
2	Buzzer	EVENT	n.Buzzer-	MESSAGE	Off / On / ANAVAILABLE	OFF	Not Available	Not Available
3	Green lamp	EVENT	n.GreenLamp-	MESSAGE	Off / On / Blinking Unused / UNAVAILABLE	OFF	Not Available	Not Available
4	Red lamp	EVENT	n.RedLamp-	MESSAGE	Off / On / Blinking Unused / UNAVAILABLE	OFF	Not Available	Not Available
5	Blue lamp	EVENT	n.BlueLamp-	MESSAGE	Off / On / Blinking Unused / UNAVAILABLE	OFF	Not Available	Not Available
6	Yellow lamp	EVENT	n.YellowLamp-	MESSAGE	Off / On / Blinking Unused / UNAVAILABLE	OFF	Not Available	Not Available
7	White lamp	EVENT	n.WhiteLamp-	MESSAGE	Off / On / Blinking Unused / UNAVAILABLE	OFF	Not Available	Not Available

DataItem ID of Muratec Lathe is the same as DataItem name without the period, hyphen and underscore.

NC Program								
#	Data to Collect	MTConnect Data				On or Off	Frequency	
		Category	DataItem	TYPE	Valued	Default	Default	Range (ms)
1	Emergency stop status	EVENT	n.estop-1	EMERGENCY_STOP	ARMED / TRIGGERED [Meaning of Values] -ARMED: release or reset or wait -TRIGGERED: stop	ON	< 1 sec	100～10000
2	CNC operation mode	EVENT	n.mode-1	CONTROLLER_MODE	MANUAL_DATA_INPUT AUTOMATIC / EDIT / MANUAL [Meaning of Values] -MANUAL DATA INPUT: MDI opr -AUTOMATIC: memory or DNC opr -EDIT: memory edit -MANUAL: JOG feed or manual incremental feed or manual reference position return or manual handle feed	ON	< 1 sec	100～10000
3	Number of processed parts	EVENT	n.partcnt-1	PART_COUNT	numerical value	ON	1 sec	100～10000
4	CNC operating status	EVENT	n.execution-1	EXECUTION	READY / STOPPED INTERRUPTED / ACTIVE [Meaning of Values] -READY: reset or manual numerical command start or tool retract/returun starting state -STOPPED：automatic opr stopped -INTERRUPTED：automatic opr paused -ACTIVE: automatic opr	ON	< 1 sec	100～10000
5	Sequence number of the program in operation	EVENT	n.line-1	LINE	numerical value	ON	< 1 sec	100～10000
6	Main program name	EVENT	n.program-1	PROGRAM	character string	ON	2 sec	100～10000
7	Main program comment	EVENT	n.progcom-1	PROGRAM_COMMENT	character string	ON	2 sec	100～10000
8	Specified Program Comment	EVENT	n. specifiedProgcom-1	PROGRAM_COMMENT	character string	OFF	2000	100～10000
9	Tool number	EVENT	n.toolnumber-1	TOOL_NUMBER	numerical value	ON	< 1 sec	100～10000
10	Feed rate override	EVENT	n.feedoverride-1	PATH_FEEDRATE_OVERRIDE	numerical value	ON	1 sec	100～10000
11	Block of the program in operation	EVENT	n.block-1	BLOCK	character string	ON	< 1 sec	100～10000

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12	Spindle operation mode	EVENT	n.spdlmode-S1_P1	ROTARY_MODE	SPINDLE / INDEX / CONTOUR [Meaning of Values] -SPINDLE : normal opr or sync control or rigid tapping or others -INDEX : orientation -CONTOUR : Cs continuous path control	ON	< 1 sec	100～10000
13	Rapid traverse speed	EVENT	n.rapidoverride-1	PATH_FEEDRATE_OVERRIDE	numerical value	ON	1 sec	100～10000
14	Spindle override	EVENT	n.spdloverride-1	ROTARY_VELOCITY_OVERRIDE	numerical value	ON	1 sec	100～10000
15	Data reception status	EVENT	n.avail-	AVAILABILITY	AVAILABLE/UNAVAILABLE	ON	< 1 sec	100～10000
16	Active axis name	EVENT	n.actaxes-1	ACTIVE_AXES	Axis name character string	ON	5 sec	100～10000
17	Axis total travel amount note: Legacy CNC devices including 16i series require an optional function to show the total travel amount.	EVENT	n.axisTotalTravelAmt-X_P1 n.axisTotalTravelAmt-Y_P1 n.axisTotalTravelAmt-Z_P1	MESSAGE	character string	ON	< 1 sec	100～10000
18	Dry run note: compatible with 30i/0i series only.	EVENT	n.dryrun-1	INTERFACE_STATE	ENABLED / DISABLED	ON	< 1 sec	100～10000
19	Cutting feed note: compatible with 30i/0i series only.	EVENT	n.feedrate-1	INTERFACE_STATE	ENABLED / DISABLED	ON	< 1 sec	100～10000
20	M00 note: compatible with 30i/0i series only.	EVENT	n.M00-1	INTERFACE_STATE	ENABLED / DISABLED	ON	< 1 sec	100～10000
21	M01 note: compatible with 30i/0i series only.	EVENT	n.M01-1	INTERFACE_STATE	ENABLED / DISABLED	ON	< 1 sec	100～10000
22	Absolute position (mm)	SAMPLE	n.act-X_P1 n.act-Y_P1 n.act-Z_P1	ANGLE (for spindle) POSITION (for moving axis)	numerical value	ON	< 1 sec	100～10000
23	Spindle load (%)	SAMPLE	n.load-S1_P1	LOAD	numerical value	ON	< 1 sec	100～10000
24	Moving axis load (%)	SAMPLE	n.load-X_P1 n.load-Y_P1 n.load-Z_P1	LOAD	numerical value	ON	< 1 sec	100～10000

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NC Program								
#	Data to Collect	MTConnect Data				On or Off	Frequency	
		Category	DataItem	TYPE	Valued	Default	Default	Range (ms)
25	Spindle speed (rotation/min) note: For machines not equipped with a position coder, NC parameters may need to be changed (change bit No. 3118 to 1).	SAMPLE	n.speed-S1_P1	ROTARY_VELOCITY	numerical value	ON	< 1 sec	100～10000
26	Feed rate (mm/sec)	SAMPLE	n.pathfdrt-1	PATH_FEEDRATE	numerical value	ON	< 1 sec	100～10000
27	Moving axis load current value (%) note: compatible with 30i/0i series only.	SAMPLE	n.loadCurrentPercent-X_P1 n.loadCurrentPercent-Y_P1 n.loadCurrentPercent-Z_P1	LOAD	numerical value	ON	< 1 sec	100～10000
28	Moving axis load current value (A) note: compatible with 30i/0i series only.	SAMPLE	n.loadCurrentAmpere-X_P1 n.loadCurrentAmpere-Y_P1 n.loadCurrentAmpere-Z_P1	AMPERAGE	numerical value	ON	< 1 sec	100～10000
29	Spindle insulation resistance value (MΩ) note: compatible with 30i/0i series only.	SAMPLE	n.spindleInsInRes-S1_P1	RESISTANCE	numerical value	ON	5 sec	100～10000
30	Moving axis insulation resistance value (MΩ) note: compatible with 30i/0i series only.	SAMPLE	n.movingAxisInsInRes-X_P1 n.movingAxisInsInRes-Y_P1 n.movingAxisInsInRes-Z_P1	RESISTANCE	numerical value	ON	5 sec	100～10000
31	All servo and spindle power consumption (0.001kWh) note: compatible with 30i/0i series only.	SAMPLE	n.allServoSpindlePwrCons-1	ELECTRICAL_ENERGY	numerical value	ON	5 sec	100～10000
32	Cycle time (sec)	SAMPLE	n.cycletime-1	ACCUMULATED_TIME	numerical value	ON	< 1 sec	100～10000
33	Real speed for servo adjustment (rotation/min)	SAMPLE	n.servoAdjRealSpeed-X_P1 n.servoAdjRealSpeed-Y_P1 n.servoAdjRealSpeed-Z_P1	ROTARY_VELOCITY	numerical value	ON	< 1 sec	100～10000
34	Operator message display	CONDITION	n.opmessage-	SYSTEM	Store alert number in nativeCode Store error message in HTTP encoding	ON	1 sec	100～10000
35	Alarm message display PW alarm, DS alarm, IE alarm SN alarm, EX alarm OT alarm (non-axis type), OH alarm (non-axis type)	CONDITION	n.system-1	SYSTEM	Store alert number in nativeCode Store error message in HTTP encoding	ON	< 1 sec	100～10000
36	Alarm message display SV alarm	CONDITION	n.servo-X_P1 n.servo-Y_P1 n.servo-Z_P1 n.servo-S1_P1	ACTUATOR	Store alert number in nativeCode Store error message in HTTP encoding	ON	< 1 sec	100～10000

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37	Alarm message display OH alarm	CONDITION	n.overheat-X_P1 n.overheat-Y_P1 n.overheat_Z_P1	TEMPERATURE	Store alert number in nativeCode Store error message in HTTP encoding	ON	< 1 sec	100～10000
38	Alarm message display OT alarm	CONDITION	n.travel-X_P1 n.travel-Y_P1 n.travel-Z_P1	POSITION	Store alert number in nativeCode Store error message in HTTP encoding	ON	< 1 sec	100～10000

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NC Program								
#	Data to Collect	MTConnect Data				On or Off	Frequency	
		Category	DataItem	TYPE	Valued	Default	Default	Range (ms)
39	Alarm message display SW alarm, PC alarm	CONDITION	n.logic-1	LOGIC_PROGRAM	Store alert number in nativeCode Store error message in HTTP encoding	ON	< 1 sec	100～10000
40	Alarm message display IO alarm, SR alarm	CONDITION	n.comms-1	COMMUNICATIONS	Store alert number in nativeCode Store error message in HTTP encoding	ON	< 1 sec	100～10000
41	Alarm message display PS alarm, MC alarm, BG alarm	CONDITION	n.motion-1	MOTION_PROGRAM	Store alert number in nativeCode Store error message in HTTP encoding	ON	< 1 sec	100～10000
42	Alarm message display SV alarm (non-axis type)	CONDITION	n.servonoaxis-1	ACTUATOR	Store alert number in nativeCode Store error message in HTTP encoding	ON	< 1 sec	100～10000

Custom Point Data (PMC)								
#	Data to Collect	MTConnect Data				On or Off	Frequency	
		Category	DataItem	TYPE	Value	Default	Default	Range (ms)
1	Custom macro local variable (#1 to #33)	EVENT/ SAMPLE	Random	Automatically created from DataItem (self-defined)	numerical value	OFF	Not Availabl e	100～10000
2	Custom macro common variable (#100 to #199)	EVENT/ SAMPLE	Random	Automatically created from DataItem (self-defined)	numerical value	OFF	Not Availabl e	100～10000
3	Custom macro common variable (#500-#999)	EVENT/ SAMPLE	Random	Automatically created from DataItem (self-defined)	numerical value	OFF	Not Availabl e	100～10000
4	PMC address Bit status	EVENT/ SAMPLE	Random	Automatically created from DataItem (self-defined)	EVENT：TRUE/FALSE SAMPLE：numerical value	OFF	Not Availabl e	100～10000
5	PMC address Byte size	EVENT/ SAMPLE	Random	Automatically created from DataItem (self-defined)	numerical value	OFF	Not Availabl e	100～10000
6	PMC address 2Byte size	EVENT/ SAMPLE	Random	Automatically created from DataItem (self-defined)	numerical value	OFF	Not Availabl e	100～10000

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7	PMC address 4Byte size	EVENT/ SAMPLE	Random	Automatically created from DataItem (self-defined)	numerical value	OFF	Not Available	100～10000
8	PMC alarm	EVENT/ SAMPLE	Random	Automatically created from DataItem (self-defined)	character string	OFF	Not Available	100～10000
9	PMC operator message	EVENT/ SAMPLE	Random	Automatically created from DataItem (self-defined)	character string	OFF	Not Available	100～10000

Muratec specific systems data

#	Data to Collect	MTConnect Data				On or Off	Frequency	
		Category	DataItem	TYPE	Value	Default	Default	Range
1	Operation panel ramp information: In operation	EVENT	n.RunLamp-	INTERFACE_STATE	DISABLED (off) / ENABLED (on)	ON	1 sec	100～10000
2	Operation panel ramp information: In alarm	EVENT	n.AlarmLamp-	INTERFACE_STATE	DISABLED (off) / ENABLED (on)	ON	1 sec	100～10000
3	Operation panel ramp information: Warning	EVENT	n.WarningLamp-	INTERFACE_STATE	DISABLED (off) / ENABLED (on)	ON	1 sec	100～10000
4	Operation panel ramp information: Tool counter up	EVENT	n.ToolCounterUp-	INTERFACE_STATE	DISABLED(Normal) /ENABLED(at Event)	ON	1 sec	100～10000

Collective Data Configurations on Network Configuration1

#	Data to Collect	MTConnect Data				On or Off	Frequency	
		Category	DataItem	TYPE	Value	Default	Default	Range (ms)
1	Lathe (TYPE B/Collective) X-axis geometry compensation amount	EVENT	n.toolOffsetGeomX*** (***:# of tool offset)	MESSAGE	character string	OFF	1000	100～10000
2	Lathe (TYPE B/Collective) Y-axis geometry compensation amount	EVENT	n.toolOffsetGeomY*** (***:# of tool offset)	MESSAGE	character string	OFF	1000	100～10000
3	Lathe (TYPE B/Collective) Z-axis geometry compensation amount	EVENT	n.toolOffsetGeomZ*** (***:# of tool offset)	MESSAGE	character string	OFF	1000	100～10000
4	Lathe (TYPE B/Collective) tool nose radius geometry compensation amount	EVENT	n.toolOffsetGeomNR*** (***:# of tool offset)	MESSAGE	character string	OFF	1000	100～10000
5	Lathe (TYPE B/Collective) X-axis wear compensation amount	EVENT	n.toolOffsetWearX*** (***:# of tool offset)	MESSAGE	character string	OFF	1000	100～10000
6	Lathe (TYPE B/Collective) Y-axis wear compensation amount	EVENT	n.toolOffsetWearY*** (***:# of tool offset)	MESSAGE	character string	OFF	1000	100～10000

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7	Lathe (TYPE B/Collective) Z-axis wear compensation amount	EVENT	n.toolOffsetWearZ*** (***:# of tool offset)	MESSAGE	character string	OFF	1000	100～10000
8	Lathe (TYPE B/Collective) Tool nose radius wear compensation amount	EVENT	n.toolOffsetWearNR*** (***:# of tool offset)	MESSAGE	character string	OFF	1000	100～10000
9	Lathe (TYPE B/Collective) Tip direction	EVENT	n.toolTipDir*** (***:# of tool offset)	MESSAGE	character string	OFF	1000	100～10000

DataItem ID of Muratec Lathe is the same as DataItem name without the period, hyphen and underscore.

Muratec specific systems data								
#	Data to Collect	MTConnect Data				On or Off	Frequency	
		Category	DataItem	TYPE	Value	Default	Default	Range
5	Operation panel ramp information: Tool counter up notice	EVENT	n.ToolCounterNotice-	INTERFACE_STATE	DISABLED(Normal) /ENABLED(at Event)	ON	1 sec	100～10000
6	Operation panel ramp information: Check counter up	EVENT	n.CheckCounterUp-	INTERFACE_STATE	DISABLED(Normal) /ENABLED(at Event)	ON	1 sec	100～10000
7	Operation panel ramp information: Check counter notice	EVENT	n.CheckCounterNotice-	INTERFACE_STATE	DISABLED(Normal) /ENABLED(at Event)	ON	1 sec	100～10000
8	Total counter 1	EVENT	n.TotalCount-1	PART_COUNT	numerical value	ON	1 sec	100～10000
9	Work counter 1 set value	EVENT	n.WorkCountSet-1	PART_COUNT	numerical value	ON	1 sec	100～10000
10	Work counter 1 count value	EVENT	n.WorkCount-1	PART_COUNT	numerical value	ON	1 sec	100～10000
11	Check counter 1 set value	EVENT	n.CheckCountSet-1	PART_COUNT	numerical value	ON	1 sec	100～10000
12	Check counter 1 count value	EVENT	n.CheckCount-1	PART_COUNT	numerical value	ON	1 sec	100～10000
13	Total counter 2	EVENT	n.TotalCount-2	PART_COUNT	numerical value	ON	1 sec	100～10000
14	Work counter 2 set value	EVENT	n.WorkCountSet-2	PART_COUNT	numerical value	ON	1 sec	100～10000
15	Work counter 2 count value	EVENT	n.WorkCount-2	PART_COUNT	numerical value	ON	1 sec	100～10000
16	Check counter 2 set value	EVENT	n.CheckCountSet-2	PART_COUNT	numerical value	ON	1 sec	100～10000
17	Check counter 2 count value	EVENT	n.CheckCount-2	PART_COUNT	numerical value	ON	1 sec	100～10000
18	Tool counter 1 set value	EVENT	n.ToolCounter01～16-1	PART_COUNT	numerical value	ON	1000	100～10000
19	Tool counter 1 remaining life current value	EVENT	n.ToolCounterLife01～16-1	PART_COUNT	numerical value	ON	1000	100～10000
20	Tool counter 2 set value	EVENT	n.ToolCounter01～16-2	PART_COUNT	numerical value	ON	1000	100～10000
21	Tool counter 2 remaining life current value	EVENT	n.ToolCounterLife01～16-2	PART_COUNT	numerical value	ON	1000	100～10000
22	Left axis program number	EVENT	n.ProgramNumber-1	LINE	character string (O (English alphabet O, Capital letter,)+ Program number)	ON	1 sec	100～10000
23	Right axis program number	EVENT	n.ProgramNumber-2	LINE	character string (O (English alphabet O, Capital letter,)+ Program number)	ON	1 sec	100～10000
24	Loader 1 program number	EVENT	n.ProgramNumber-G1	LINE	character string (O (English alphabet O, Capital letter,)+ Program number)	ON	1 sec	100～10000
25	Loader 2 program number	EVENT	n.ProgramNumber-G2	LINE	character string (O (English alphabet O, Capital letter,)+ Program number)	ON	1 sec	100～10000
26	Left axis cycle time	SAMPLE	n.CycleTime-1	ACCUMULATED_TIME	character string (per sec)	ON	1 sec	100～10000
27	Right axis cycle time	SAMPLE	n.CycleTime-2	ACCUMULATED_TIME	character string (per sec)	ON	1 sec	100～10000
28	Loader 1 cycle time	SAMPLE	n.CycleTime-Loader1	ACCUMULATED_TIME	character string (per sec)	ON	1 sec	100～10000

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29	Loader 2 cycle time	SAMPLE	n.CycleTime-Loader2	ACCUMULATED_TIME	character string（per sec）	ON	1 sec	100～10000
30	Muratec-specific alarm	CONDITION	n.Msystem-	SYSTEM	The 18i series has an MMA at the beginning, and the 30i series has an MMB. E.g. 18i series: nativeCode=MMA2000 30i series: nativeCode=MMB2000	ON	2 sec	100～10000