



Supported CNC Devices/Machines of FBR-100AN and Collectable Data

Application Notes : AN2011FBR_02
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1. Overview

This document describes CNC devices/machines which "FBR-100AN", silex's protocol converter for CNC machine tools, supports and the collectable data.

2. Supported CNC Devices/Machines

FBR-100AN has been confirmed compatible with the following CNC devices/machines.

| Maker | How to connect | Model | Data to be monitored with FBR-100AN |
|---|-----------------|--|--|
| 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, quantity of processed parts, CNC operation status, running program sequence number, main program name, tool number, various override information, absolute position, spindle load, speed, 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, 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 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 lamp 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: Operation panel light data, counter, cycle time, program number, alarm |

3. Monitored Data

3.1. Fanuc CNC Devices (LAN Connected)

FBR-100AN can connect to Fanuc products of 30i/31i/32i/35i, 0i-M/T, and 16i/18i/21i series in Wired LAN and get their data listed below.

[Procedures]

FBR-100AN carries two methods to collect data.

1. Individual Data Collection

1.1 Default Point Setting

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

1.2 Custom Point Setting

Get PMC data of CNC devices. Unlike the default point setting, users can change the settings each to get data.

The user can change the above settings including data collection setting (On/Off) and the data collection cycle with "Point File Creator Tool", available on silex's product website.

2. Bulk Data Collection

Get all the specified PMC data at once. The user can set the start/end addresses of data to collect with "Device Data Creator Tool", available on silex's product website. The bulk data collection method requires the setting in CNC device, and all the data for MTConnect needs to be defined manually. To use this function, check details with your machine tool builder and CNC device monitoring software vender in advance.

[Conditions]

- When FBR-100AN collects data of up to three CNC devices, the number of collectable data for the custom point setting will be limited to 5.
- This chapter shows data collectable 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 various factors such as network delay, connection speed, and specified number of data to collect.

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

Table 1 : List of Collectable Fanuc CNC Device Data

| Default Point Data | | | | | | | | |
|--------------------|---|----------------|---|--------------------------|--|-----------|-----------|---------------|
| # | Data to Collect | MTConnect Data | | | Value | On or Off | Frequency | |
| | | Category | DataItem | TYPE | | | Default | Default |
| 1 | Emergency stop status | EVENT | n.estop-1 | EMERGENCY_STOP | ARMED / TRIGGERED | ON | < 1 sec | Not Available |
| 2 | CNC operation mode | EVENT | n.mode-1 | CONTROLLER_MODE | MANUAL_DATA_INPUT AUTOMATIC / EDIT / MANUAL | ON | < 1 sec | Not Available |
| 3 | Number of processed parts | EVENT | n.partcnt-1 | PART_COUNT | numerical value | ON | 1 sec | Not Available |
| 4 | CNC operating status | EVENT | n.execution-1 | EXECUTION | READY / STOPPED INTERRUPTED / ACTIVE | ON | < 1 sec | Not Available |
| 5 | Sequence number of the program in operation | EVENT | n.line-1 | LINE | numerical value | ON | < 1 sec | Not Available |
| 6 | Main program name | EVENT | n.program-1 | PROGRAM | character string | ON | 2 sec | Not Available |
| 7 | Main program comment | EVENT | n.progcom-1 | PROGRAM_COMMENT | character string | ON | 2 sec | Not Available |
| 8 | Tool number | EVENT | n.toolnumber-1 | TOOL_NUMBER | numerical value | ON | < 1 sec | Not Available |
| 9 | Feed rate override | EVENT | n.feedoverride-1 | PATH_FEEDRATE_OVERRIDE | numerical value | ON | 1 sec | Not Available |
| 10 | Block of the program in operation | EVENT | n.block-1 | BLOCK | character string | ON | < 1 sec | Not Available |
| 11 | Spindle operation mode | EVENT | n.spdmode-S1_P1 | ROTARY_MODE | SPINDLE / INDEX / CONTOUR | ON | < 1 sec | Not Available |
| 12 | Fast forward override | EVENT | n.rapidoverride-1 | PATH_FEEDRATE_OVERRIDE | numerical value | ON | 1 sec | Not Available |
| 13 | Spindle override | EVENT | n.spdoverride-1 | ROTARY_VELOCITY_OVERRIDE | numerical value | ON | 1 sec | Not Available |
| 14 | Data reception status | EVENT | n.avail- | AVAILABILITY | AVAILABLE / UNAVAILABLE | ON | < 1 sec | Not Available |
| 15 | Active axis name | EVENT | n.actaxes-1 | ACTIVE_AXES | Axis name character string | ON | 5 sec | Not Available |
| 16 | Absolute position (mm) | SAMPLE | n.act-X_P1 n.act-Y_P1 n.act-Z_P1 | POSITION | numerical value | ON | < 1 sec | Not Available |
| 17 | Spindle load (%) | SAMPLE | n.load-S1_P1 | LOAD | numerical value | ON | < 1 sec | Not Available |
| 18 | Moving axis load (%) | SAMPLE | n.load-X_P1 n.load-Y_P1 n.load-Z_P1 | LOAD | numerical value | ON | < 1 sec | Not Available |
| 19 | Spindle speed (rotation/min) | SAMPLE | n.speed-S1_P1 | ROTARY_VELOCITY | numerical value | ON | < 1 sec | Not Available |
| 20 | Feed rate (mm/sec) | SAMPLE | n.pathfdrt-1 | PATH_FEEDRATE | numerical value | ON | < 1 sec | Not Available |
| 21 | Moving axis load current value(A) note: compatible with 30i series only. | SAMPLE | n.loadCurrentPercent-X_P1 n.loadCurrentPercent-Y_P1 n.loadCurrentPercent-Z_P1 | LOAD | numerical value | ON | < 1 sec | Not Available |
| 22 | Moving axis load current value(A) note: compatible with 30i series only. | SAMPLE | n.loadCurrentAmpere-X_P1 n.loadCurrentAmpere-Y_P1 n.loadCurrentAmpere-Z_P1 | AMPERAGE | numerical value | ON | < 1 sec | Not Available |
| 23 | Operator message display | CONDITION | n.opmessage- | SYSTEM | Store alert number in nativeCode Store error message in HTTP encoding | ON | 1 sec | Not Available |
| 24 | 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 | Not Available |
| 25 | 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 | Not Available |
| 26 | 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 | Not Available |
| 27 | 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 | Not Available |
| 28 | 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 | Not Available |
| 29 | 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 | Not Available |
| 30 | 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 | Not Available |
| 31 | 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 | Not Available |

| Custom Point Data (PMC) | | | | | | | | |
|-------------------------|---|----------------|----------|--|--|-----------|---------------|------------|
| # | Data to Collect | MTConnect Data | | | | On or Off | Frequency | |
| | | Category | Dataltem | TYPE | Value | Default | Default | Range (ms) |
| 1 | Custom macro local variable (#1 to #33) | EVENT/SAMPLE | Random | Automatically created from Dataltem (self-defined) | numerical value | OFF | Not Available | 100~10000 |
| 2 | Custom macro common variable (#100 to #199) | EVENT/SAMPLE | Random | Automatically created from Dataltem (self-defined) | numerical value | OFF | Not Available | 100~10000 |
| 3 | Custom macro common variable (#500-#999) | EVENT/SAMPLE | Random | Automatically created from Dataltem (self-defined) | numerical value | OFF | Not Available | 100~10000 |
| 4 | PMC address Bit status | EVENT/SAMPLE | Random | Automatically created from Dataltem (self-defined) | EVENT : TRUE/FALSE SAMPLE : numerical value | OFF | Not Available | 100~10000 |
| 5 | PMC address Byte size | EVENT/SAMPLE | Random | Automatically created from Dataltem (self-defined) | numerical value | OFF | Not Available | 100~10000 |
| 6 | PMC address 2Byte size | EVENT/SAMPLE | Random | Automatically created from Dataltem (self-defined) | numerical value | OFF | Not Available | 100~10000 |
| 7 | PMC address 4Byte size | EVENT/SAMPLE | Random | Automatically created from Dataltem (self-defined) | numerical value | OFF | Not Available | 100~10000 |
| 8 | PMC alarm | EVENT/SAMPLE | Random | Automatically created from Dataltem (self-defined) | character string | OFF | Not Available | 100~10000 |
| 9 | PMC operator message | EVENT/SAMPLE | Random | Automatically created from Dataltem (self-defined) | character string | OFF | Not Available | 100~10000 |

3.2. Brother CNC Devices

FBR-100AN can connect to CNC-C00 and CNC-B00 in Wired LAN and get the data listed below. To do so, Activation Key (licensed option) has to be registered to FBR-100AN.

[Procedures]

FBR-100AN 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.

[Conditions]

- One unit of FBR-100AN can save up to three CNC devices in the command data collection mode (mixed environment of CNC-C00/B00 series), whereas one CNC device in the PLC bulk data collection mode.
- The PLC bulk data collection mode 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 specified number of data to collect.
- Depending on the number of data to collect, data collection cannot be finished within the set time cycle due to communication overhead between FBR-100AN and CNC device. In that case, reduce the number of collecting data under FBR-100AN settings.
- Some versions of CNC device firmware do not support specific data retrieval commands, so CNC device will show an error. In that case, change the setting of the data retrieval command (corresponding to the error code shown in FBR-100AN status screen) to OFF.

[How to Read Data Table]

- Under MTConnect Data, the number "-1" next to Dataltem name means a group number of CNC devices. It is fixed to -1 for Brother CNC devices.
- 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

Table 2 : List of Collectable Brother CNC Device Data

| Command individual data collection | | | | | | | | |
|------------------------------------|---|----------------|--|------------------|---|-----------|---------------|------------|
| # | Data to Collect | MTConnect Data | | | | On or Off | | |
| | | Category | DatalItem | TYPE | Value | Default | Default | Frequency |
| 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 | 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 | EVENT | n.toolnumber-1 | TOOL_NUMBER | numerical value | ON | 1 sec | 100~999900 |
| 10 | Fast forward override | 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 |
| 13 | Absolute position (mm) | 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 |
| 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 | SAMPLE | PRDC2_CycleTime1 PRDC2_CycleTime2 | ACCUMULATED_TIME | hhhhmmss (Hr/Min/0.1 sec) | ON | 1 sec | 100~999900 |
| 20 | Execution time | SAMPLE | MONTR_ExecuteTime | ACCUMULATED_TIME | hhhhmmss (Hr/Min/Sec) | ON | 1 sec | 100~999900 |
| 21 | Operating time | SAMPLE | MONTR_OperationTime | ACCUMULATED_TIME | hhhhmmss (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 | | |
| | | Category | DatalItem | TYPE | Value | Default | Default | Frequency |
| 1 | PLC data | EVENT | PLC_0000~PLC2046 | MESSAGE | Value | OFF | Not Available | 100~999900 |

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

FBR-100AN can connect 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".

[Procedures]

- Set DPRNT commands in the CNC device beforehand.
- Issue the DPRNT command from the CNC device. FBR-100AN will receive character strings or macro variable values from the serial port.
- FBR-100AN has to be set to "Bulk Data Collection (DPRNT)" mode.

[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-100AN's pin assignment information, see the product catalogue or manual.
- One CNC device requires one unit of FBR-100AN.
- FBR-100AN cannot be set with the data collection time cycle since DPRNT data is sent from CNC device.

Table 3 : List of Collectable Data with FBR-100AN's Serial Interface

| Bulk data collection (DPRNT) | | | | | | | | |
|------------------------------|--|----------------|--|-------------------------|-------------------|-----------|---------------|---------------|
| # | Data to Collect | MTConnect Data | | | | On or Off | Frequency | |
| | | Category | DataItem | TYPE | Value | Default | Default | Range (ms) |
| 1 | Numerical type information (up to 10) | SAMPLE | value01~value10 | CNC_DOUBLE | DPRNT output data | – | Not Available | Not Available |
| 2 | Character type information (up to 10) | EVENT | string01~string10 | CNC_STRING | DPRNT output data | – | Not Available | Not Available |
| 3 | DPRNT output string (Product name, total number of processed parts, etc.) | EVENT | PrintOut / ProductName ProductResultNumber | CNC_STRING CNC_INT32 | DPRNT output data | – | Not Available | Not Available |

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

FBR-100AN can collect data of typical signal towers with its digital input interface (DI).

[Procedures]

- FBR-100AN can collect up to three pieces of lamp data. One signal tower requires one unit of FBR-100AN.
- FBR-100AN has to be set to "Bulk Data Collection (DPRNT)" mode.

[Condition]

- One CNC device requires one unit of FBR-100AN.

Table 4 : List of Collectable Data with FBR-100AN's Digital Input Interface

| Bulk data collection (DPRNT) | | | | | | | | |
|------------------------------|---|----------------|----------|-------|---|-----------|-----------|---------------|
| # | 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 UNAVAILABLE | – | 1 sec | Not Available |
| 2 | FBR-100AN digital input terminal "1" status | EVENT | DIO01 | LEVEL | 0: Off/Low 1: On/High UNAVAILABLE | – | 1 sec | Not Available |
| 3 | FBR-100AN digital input terminal "2" status | EVENT | DIO02 | LEVEL | 0: Off/Low 1: On/High UNAVAILABLE | – | 1 sec | Not Available |

3.5. Patlite AirGRID®

FBR-100AN can get lamp data (max. 5 colors) and buzzer data via LAN by linking to Patlite's AirGRID® signal towers.

[Condition]

- AirGRID® transmitter (WDT) has to be set to the immediate transmission mode to associate with FBR-100AN.

[How to Read Data Table]

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

Table 5 : List of Collectable Patlite AirGRID® Device Data

| 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 |

3.6. Muratec Specific System

FBR-100AN can collect data of CNC devices as well as Muratec's specific data including loader system data by connecting to Muratec's machine tools in Wired LAN. To get the maker-specific data, Activation Key (licensed option) needs to be registered to FBR-100AN.

[Conditions]

- One CNC device requires one FBR-100AN.
- The data collecting cycle varies with various factors such as network delay, connection speed, and specified number of data to collect.

[How to Read Data Table]

- Under MTConnect Data, the number "-1" next to Dataltem 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-100AN.
- 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 up to 36 ongoing alarms by sorting them from the lowest number to the highest number.

Table 6 : List of Collectable Muratec Machine Tool and Specific System Data

| NC Program | | | | | | | | |
|------------|--|----------------|---|------------------------------|---|-----------|-----------|-----------|
| # | Data to Collect | MTConnect Data | | | | On or Off | Frequency | |
| | | Category | DataItem | TYPE | Value | | Default | Default |
| 1 | Emergency stop status | EVENT | n.estop-1 | EMERGENCY_STOP | ARMED/TRIGGERED | ON | < 1 sec | 100~10000 |
| 2 | CNC operation mode | EVENT | n.mode-1 | CONTROLLER_MODE | MANUAL_DATA_INPUT AUTOMATIC/EDIT/MANUAL | 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 | 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 | Tool number | EVENT | n.toolnumber-1 | TOOL_NUMBER | numerical value | ON | < 1 sec | 100~10000 |
| 9 | Feed rate override | EVENT | n.feedoverride-1 | PATH_FEEDRATE_OVE RRIDE | numerical value | ON | 1 sec | 100~10000 |
| 10 | Block of the program in operation | EVENT | n.block-1 | BLOCK | character string | ON | < 1 sec | 100~10000 |
| 11 | Spindle operation mode | EVENT | n.spdmode-S1_P1 | ROTARY_MODE | SPINDLE/INDEX/CONTOUR | ON | < 1 sec | 100~10000 |
| 12 | Fast forward override | EVENT | n.rapidoverride-1 | PATH_FEEDRATE_OVE RRIDE | numerical value | ON | 1 sec | 100~10000 |
| 13 | Spindle override | EVENT | n.spdlovrider-1 | ROTARY_VELOCITY_OV ERRIDE | numerical value | ON | 1 sec | 100~10000 |
| 14 | Data reception status | EVENT | n.avail- | AVAILABILITY | AVAILABLE/UNAVAILABLE | ON | < 1 sec | 100~10000 |
| 15 | Active axis name | EVENT | n.actaxes-1 | ACTIVE_AXES | Axis name character string | ON | 5 sec | 100~10000 |
| 16 | Absolute position (mm) | SAMPLE | n.act-X_P1 n.act-Y_P1 n.act-Z_P1 | POSIION | numerical value | ON | < 1 sec | 100~10000 |
| 17 | Spindle load (%) | SAMPLE | n.load-S1_P1 | LOAD | numerical value | ON | < 1 sec | 100~10000 |
| 18 | Moving axis load (%) | SAMPLE | n.load-X_P1 n.load-Y_P1 n.load-Z_P1 | LOAD | numerical value | ON | < 1 sec | 100~10000 |
| 19 | Spindle speed (rotation/min) | SAMPLE | n.speed-S1_P1 | ROTARY_VELOCITY | numerical value | ON | < 1 sec | 100~10000 |
| 20 | Feed rate (mm/sec) | SAMPLE | n.pathfdrt-1 | PATH_FEEDRATE | numerical value | ON | < 1 sec | 100~10000 |
| 21 | Moving axis load current value(%) note: compatible with 30i series only. | SAMPLE | n.loadCurrentPercent-X_P1 n.loadCurrentPercent-Y_P1 n.loadCurrentPercent-Z_P1 | LOAD | numerical value | ON | < 1 sec | 100~10000 |
| 22 | Moving axis load current value(A) note: compatible with 30i series only. | SAMPLE | n.loadCurrentAmpere-X_P1 n.loadCurrentAmpere-Y_P1 n.loadCurrentAmpere-Z_P1 | AMPERAGE | numerical value | ON | < 1 sec | 100~10000 |
| 23 | Operator message display | CONDITION | n.opmessage- | SYSTEM | Store alert number in nativeCode Store error message in HTTP encoding | ON | 1 sec | 100~10000 |
| 24 | 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 |
| 25 | 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 |
| 26 | 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 |
| 27 | 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 |
| 28 | 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 |
| 29 | 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 |
| 30 | 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 |
| 31 | 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 |

| Muratec specific systems data | | | | | | | | |
|-------------------------------|--|----------------|-----------------------|------------------|--|-----------|-------|-----------|
| # | Data to Collect | MTConnect Data | | | On or Off | Frequency | | |
| | | Category | DatalItem | Value | | 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 |
| 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 | Left axis program number | EVENT | n.ProgramNumber-1 | LINE | character string (O (English alphabet O, Capital letter,)+ Program number) | ON | 1 sec | 100~10000 |
| 19 | Right axis program number | EVENT | n.ProgramNumber-2 | LINE | character string (O (English alphabet O, Capital letter,)+ Program number) | ON | 1 sec | 100~10000 |
| 20 | Loader 1 program number | EVENT | n.ProgramNumber-G1 | LINE | character string (O (English alphabet O, Capital letter,)+ Program number) | ON | 1 sec | 100~10000 |
| 21 | Loader 2 program number | EVENT | n.ProgramNumber-G2 | LINE | character string (O (English alphabet O, Capital letter,)+ Program number) | ON | 1 sec | 100~10000 |
| 22 | Left axis cycle time | SAMPLE | n.CycleTime-1 | ACCUMULATED_TIME | character string (per sec) | ON | 1 sec | 100~10000 |
| 23 | Right axis cycle time | SAMPLE | n.CycleTime-2 | ACCUMULATED_TIME | character string (per sec) | ON | 1 sec | 100~10000 |
| 24 | Loader 1 cycle time | SAMPLE | n.CycleTime-Loader1 | ACCUMULATED_TIME | character string (per sec) | ON | 1 sec | 100~10000 |
| 25 | Loader 2 cycle time | SAMPLE | n.CycleTime-Loader2 | ACCUMULATED_TIME | character string (per sec) | ON | 1 sec | 100~10000 |
| 26 | 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 |

Revision History

| Ver. | Revision History | Date |
|--------------|--|-------------|
| AN2008FBR_01 | First Edition | Jul/26/2020 |
| AN2011FBR_02 | <p>Added the following items to "3.1.1 List of Collectable Fanuc CNC Device Data".</p> <ul style="list-style-type: none"> • Moving axis load current value (%) • Moving axis load current value (A) <p>Modified the following item in "3.2.1 List of Collectable Brother CNC Device Data".</p> <ul style="list-style-type: none"> • Dataltem name (n.system-1) of Alarm message <p>Added the following items to "3.6.1 List of Collectable Muratec Machine Tool and Specific System Data".</p> <ul style="list-style-type: none"> • Two items added in 3.1.1. • Operation panel ramp information (Tool counter up/notice and Check counter up/notice) | Nov/19/2021 |

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