

AC CUT HMI
AC FORM HMI

C User Manual
C12 Options
C12.11 eConnectivity

C12.11.3 MTConnect

(Chapter only in English)

03.2018

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2017

Original instructions



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1. Introduction

The AC MTConnect Software Option is designed for monitoring and traceability of machining of parts in order to fit request of high-technology industries.

The software, running embedded on the computer of the machine, store machining data (machining time) and maintenance data (wire length, deionization, temperature,...) and published these variables.

The user can be using the MTConnect by opening (PC and machine are connected at the internal LAN) on your PC's browser and entering `http:// "IPadresse":5000/FORM/current`

The current state of the machine will be displayed in XML format.

MTConnect is an open standard protocol. The user, can employ a standard software available on the market, or provided by a external supplier to view these datas.

This document describes the information published by the AC CUT and FORM machines.

MTConnect is a manufacturing industry standard to facilitate the organized retrieval of process information from numerically controlled machine tools.

MTConnect is a lightweight, open, and extensible protocol designed for the exchange of data between shop floor equipment and software applications used for monitoring and data analysis. In its current form, MTConnect is referred to as a read-only standard, meaning that it only defines the extraction (reading) of data from control devices, not the writing of data to a control device. Freely available, open standards are used for all aspects of MTConnect. Data from shop floor devices is presented in XML format, and is retrieved from information providers, called Agents, using Hypertext Transfer Protocol (HTTP) as the underlying transport protocol. MTConnect provides a restful interface, which means the interface is stateless. No session must be established to retrieve data from an MTConnect Agent, and no logon or logoff sequence is required (unless overlying security protocols are added which do).

To understand indeed the protocol, it is necessary to read the information of the Standard MTConnect group : <http://www.mtconnect.org/>

2. What is MTConnect standard

MTConnect is based on existing standards and protocols that have proven their extensibility:

- HTTP for communication
- XML for data representation

MTConnect is a very simple protocol:

- Request to an MTConnect Agent is encoded in URI
- URI transmitted to the Agent as HTTP request Machine data is “just another” thing or website on the Web. In fact you can use a Web browser to examine it directly.
- MTConnect is NOT an application. MTConnect is a protocol

What MTConnect Must and Must Not Do:

- MTConnect must
 - Collect data from devices
 - Normalize the units
 - Deliver the data in a standard format
- MTConnect must not
 - Analyze the data
 - Derive additional meaning

MTConnect commands:

How does Client know what data a particular machine can report, in what units, with what sampling frequency...?

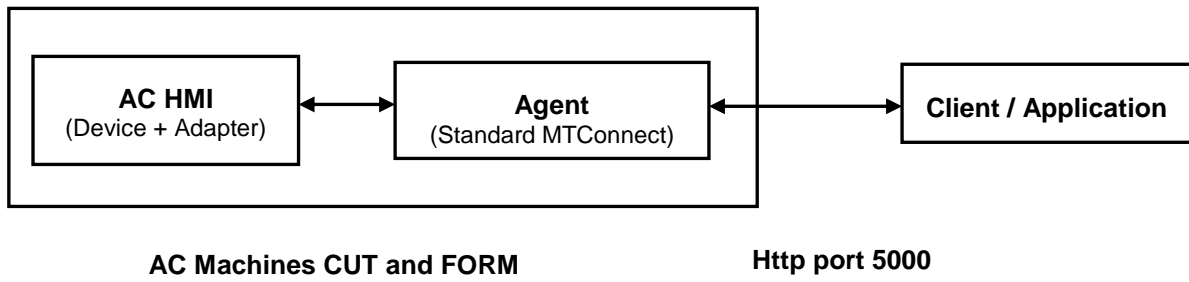
- probe command reports this

How does client specify how to collect data (sample rate, what subset of measurements, how much to gather...)?

- sample and current commands allow this

Command	Arguments	Returns	Representation
probe	<i>none</i>	Metadata describing reportable machine data	Devices Device Components DataItems
current	path	Only return items from probe that match path. If path not given, match everything.	Streams DeviceStream ComponentStream Events Samples
sample	path start count	As for current begin at this sequence # (if omitted, start with oldest sample you have) max # samples to return (if omitted, Agent decides)	

3. AC MTConnect general diagram



4. FORM Machines data

COMPONENTS/ELEMENTS				
Component		Description	DataItems Available	Unity
Device components / Electrical Power				
	Electrical power	Status of the power of the machine		
	Power	Status of the power	POWER_STATUS	-

COMPONENTS/ELEMENTS				
Component		Description	DataItems Available	Unity
Device components / Process Management				
	Machine Health	Information from the machine		
	Alarm	Alarm	ALARM	-
	System	System	SYSTEM	-

COMPONENTS/ELEMENTS				
Component		Description	DataItems Available	Unity
Device components / Linear motion				
	Linear motion	Physical data for the linear axis movement		
	Linear X	Linear axis X	POSITION	MILLIMETER
	Linear Y	Linear axis Y	POSITION	MILLIMETER
	Linear Z	Linear axis Z	POSITION	MILLIMETER

COMPONENTS/ELEMENTS			
Component	Description	Data Items Available	Unity
Device components / Rotary motion			
Rotary motion	Physical data for the axis movement		
Rotary C	Rotary axis C	ANGLE	DEGREE

COMPONENTS/ELEMENTS			
Component	Description	Data Items Available	Unity
Device components / Path			
Process control follow-up	Monitoring of the main actions of the machine		
estop	State of the emergency of the machine	EMERGENCY_STOP	-
exec	State of the machine	EXECUTION	READY, ACTIVE, INTERRUPTED, STOPPED
prg	Program name currently in execution	PROGRAM	-
toolnum	Tool number (unique for the job). If empty, that means there is no current tool	TOOL_NUM	-
toolname	Tool name (unique for the job).	TOOL_NAME	-
toolpos	Position into the magazine. If there's a current tool and the value of toolpos is 0, that means it has to be loaded/unloaded manually If there's a current tool and the value of toolpos is empty, that means it has to be later specified	TOOL_POS	-
tooljobname	Name of the job in which the current tool has been defined	TOOL_JOBNAME	-

partnum	Part number (unique for the job). If empty, that means there is no current part	PART_NUM	-
partname	Part name (unique for the job).	PART_NAME	-
partpos	Position into the magazine. If there's a current part and the value of partpos is 0, that means it has to be loaded/unloaded manually If there's a current part and the value of partpos is empty, that means it has to be later specified	PART_POS	-
partjobname	Name of the job in which the current part has been defined	PART_JOBNAME	-
joblist	Job list of the machine	JOB_LIST	-
sequence	CodeS number of machining pass	MACH_SEQUENCE	-
sequencepass	EDM current setting number	MACH_SEQUENCE_PASS	-
sequencetime	Machining duration for this machining	MACH_SEQUENCE_TIME	-
machiningtime	Total execution time	MACH_EXE_TIME	-
machiningspeed	Machining speed of the current setting	MACH_SPEED	-
lmachcavity	Machining position of the current setting from top of cavity	POSITION	MILLIMETER
rlmachcavity	Machining radius of the current setting from top of cavity	POSITION	MILLIMETER
pulsationbn	Count of pulsation "low level" of current setting Charmilles generator	CAVITY_MACH_BN	PERCENT
pulsationct	Count of on contamination of current setting Charmilles generator	CAVITY_MACH_CT	PERCENT

pulsationcc	Count of pulsation on short circuit of current setting Charmilles generator	CAVITY_MACH_CC	PERCENT
pulsationtl	Count of pulsation "temps long" current setting Charmilles generator	CAVITY_MACH_TL	PERCENT
pulsationta	Count of pulsations "TA" of current setting Charmilles generator	CAVITY_MACH_TA	PERCENT
pulsationno	Count of normal pulsations of current setting Charmilles generator	CAVITY_MACH_NO	COUNT
efficiency	Average efficiency of the current setting Charmilles generator	CAVITY_MACH_EFF	PERCENT
arcvoltage	Bad sparks due to arc voltage IPG generator	CAVITY_MACH_ARCVOLT	PERCENT
delay	Bad sparks due to delay IPG generator	CAVITY_MACH_ARCDELAY	PERCENT
good	Good sparks IPG generator	CAVITY_MACH_ARCGOOD	PERCENT
shortcircuit	Bad sparks due to short-circuit IPG generator	CAVITY_MACH_ARCSHORT	PERCENT
arckill	Actions taken on bad sparks IPG generator	CAVITY_MACH_ARCKILL	PERCENT

5. CUT Machines data

COMPONENTS/ELEMENTS				
Component		Description	DataItems Available	Unity
Device components / Electrical Power				
Electrical power		Status of the power of the machine		
Power		Status of the power	POWER_STATUS	-

COMPONENTS/ELEMENTS				
Component		Description	DataItems Available	Unity
Device components / Process Management				
Machine Health		Information from the machine		
Alarm		Alarm	ALARM	-
System		System	SYSTEM	-

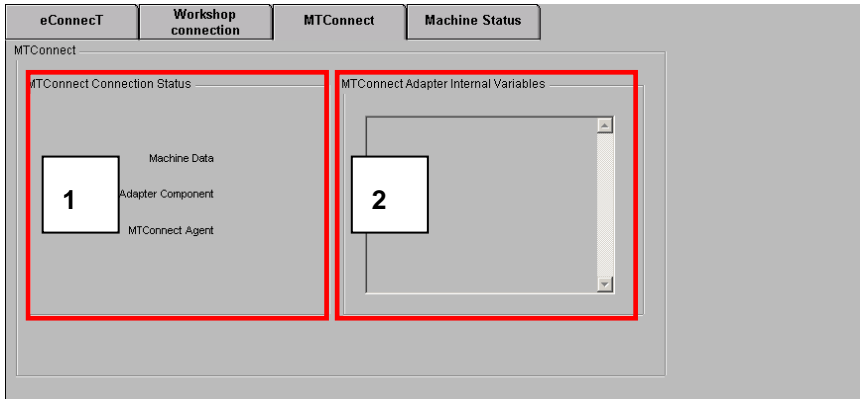
COMPONENTS/ELEMENTS				
Component		Description	DataItems Available	Unity
Device components / Linear motion				
Linear motion		Physical data for the linear axis movement		
Linear X		Linear axis X	POSITION	MILLIMETER
Linear Y		Linear axis Y	POSITION	MILLIMETER
Linear Y		Linear axis Y	POSITION	MILLIMETER
Linear U		Linear axis U	POSITION	MILLIMETER
Linear V		Linear axis V	POSITION	MILLIMETER

COMPONENTS/ELEMENTS				
Component		Description	Data Items Available	Unity
Device components / Path				
	Process control follow-up	Monitoring of the main actions of the machine		
	estop	State of the emergency of the machine	EMERGENCY_STOP	-
	exec	State of the machine	EXECUTION	READY, ACTIVE, INTERRUPTED, STOPPED
	prg	Program name currently in execution	PROGRAM	-
	prgnum	Number of the current execution program number (o...)		-
	wirename	Name of the currently Wire table file (without extension)		-
	wirediam	Currently selected wire diameter		MILLIMETER
	wireleftlength	Wire characteristic		METER
	wirespeed	Wire speed		-
	sequence	Name of the currently selected TEC table file without extension		-
	sequencepass	EDM setting number (ex 501)		-
	executiontime	Total execution time		-
	genontime	Time with generator ON		-
	machiningspeed	Wire speed in machining		-
	machinecounter	Total time machine ON		-
	deio	Deionisation		-
	temperature	Temperature		TEMP
	pressureupper	Upper injection pressure		-
	pressurelower	Lower injection pressure		-
	pressurefilter	Pressure in filters		-

6. Machine User interface

6.1 Dialog box

<Module **Services** - Step **Connections** - Tag **MTConnect**>



1. Connection Status
2. Connection Parameters

6.2 Protocol example

```
<?xml version="1.0" encoding="UTF-8" ?>
- <MTConnectStreams xmlns:m="urn:mtconnect.org:MTConnectStreams:1.2"
xmlns="urn:mtconnect.org:MTConnectStreams:1.2" xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance" xsi:schemaLocation="urn:mtconnect.org:MTConnectStreams:1.2
http://www.mtconnect.org/schemas/MTConnectStreams_1.2.xsd">
  <Header creationTime="2012-10-05T11:24:24Z" sender="GFAC-52D837FDEB" instanceId="1349275743" ver-
sion="1.2.0.11" bufferSize="131072" nextSequence="623286" firstSequence="492214" lastSequence="623285" />
- <Streams>
- <DeviceStream name="FORM" uuid="001">
- <ComponentStream component="Controller" name="Controller" componentId="cn1">
- <Condition>
.....
.....
.....
name="toolnum" sequence="623274">1</ToolNum>
  <ToolPos dataItemId="toolpos" timestamp="2012-10-05T13:24:21.0343+01:00" name="toolpos" se-
quence="623276">0</ToolPos>
</Events>
</ComponentStream>
</DeviceStream>
</Streams>
</MTConnectStreams>
```