Intouch Monitoring Ltd

intouchi4 API

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1. Introduction

This document provides a brief overview of the API for the Intouch i4 MES software. It is not intended as a full technical specification or instructions for use, rather as a guideline to the endpoints that will be available and the data exchanges they will provide for.

The Intouch i4 API, it is accessible in the Enterprise pricing plan for paying clients and is an optional addon in the Expert pricing plan for paying clients.

The Intouch API is an Application Programming Interface. Use of the API is a software development task and should only be carried out by a suitable qualified and experienced software development engineer.

Our API is a powerful tool that allows you to access and manipulate data from our platform. You can use it to create custom applications, integrate with other services, automate workflows, and more. However, we do not provide any assistance or support for setting up or using our API. You need your own programmer who can understand and implement the API documentation, handle authentication, error handling, and data parsing. We are not responsible for any issues or damages that may arise from your use of our API.

The Intouch i4 API would typically be used for:

- Importing works orders, usually from and ERP/MRP system, into the Intouch job schedule.
- Retrieving production data
- Retrieving status information about production machines

1.1 Technical Outline

The API will be a restful API requiring HTTPS.

Authentication will be via an access key which will be submitted in the header of each call. This API key may also be used for Authorisation.

All data will be JSON encoded and will therefore require conversion to/from the appropriate type at either end.

All double value less than 1 must have a preceding zero (i.e. .7 will not be accepted, must be 0.7).

DateTime values shall use the following format: "yyyy-MM-ddTHH:mm:ss.fffZ"

A throttling algorithm will be used to limit the rate of calls.

2. Entities

The following are outlines of the data structures used in the API:

2.1 Configuration Entities

2.1.1 Machine

Field Name	Type	Comments
MachineID	String	GUID, automatically allocated by the Intouch system and used to uniquely identify each machine.
MachineName	String	Text fields which are used to display data in the Intouch system related to each machine. One of these fields could be used to store a reference to a machine entity in a 3rd party system.
MachineDescription	String	
MachineText1	String	
MachineText2	String	
MachineText3	String	
MachineText4	String	
MachineText5	String	
Properties	List<Property>	
Active	Boolean	

2.1.2 MachineList

Field Name	Type	Comments
Machines	List<Machine>	

2.1.3 EventCode

Field Name	Type	Comments
ID	String	GUID, automatically allocated by the Intouch system and used to uniquely identify each event code.
Name	String	Text fields which are used to display data in the Intouch system related to each event code. One of these fields could be used to store a reference to a event code entity in a 3rd party system.
Description	String	
Details	String	
Text1	String	
Text2	String	
Properties	List<Property>	
Active	Boolean	

2.1.4 EventCodeList

Field Name	Type	Comments
EventCodes	List<EventCode>	

2.1.5 User

Field Name	Type	Comments
UserID	String	GUID, automatically allocated by the Intouch system and used to uniquely identify each user.
UserName	String	This field could be used as a reference to a user entity in a 3rd party system.
FirstName	String	
LastName	String	
Email	String	
Properties	List<Property>	
Active	Boolean	

2.1.6 UserList

Field Name	Type	Comments
Users	List<User>	

2.1.7 Property

Field Name	Type	Comments
Name	String	GUID, automatically allocated by the Intouch system and used to uniquely identify each reject code.
Type	Integer	String = 0 Integer = 1 Double = 2 Boolean = 3 Date = 4
Value	String	

2.1.8 IdentList

Field Name	Type	Comments
Idents	List<String>	

2.2 Job Entities

2.2.1 i4Job

Field Name	Type	Comments
JobID	String	GUID, automatically allocated by the Intouch system and used to uniquely identify a Job.
Name	String	
MachineID	String	
ToolCode	String	
EarliestStart	DateTime	
LatestFinish	DateTime	
PlannedStart	DateTime	
PlannedFinish	DateTime	
StandardCycleTime	Double	Standard cycle time for the job in seconds. This field is required and must be greater than zero.
SlowCycle	Double	Cycle time at which the Intouch system will show the machine as running slowly.
FastCycle	Double	Cycle time at which the Intouch system will show the machine as running fast.
StoppedCycle	Double	Elapsed time since the last cycle for which the Intouch system will show the machine as stopped.
VeryFastCycle	Double	Cycle time at which the Intouch system will show the machine as running very fast.
SetupTime	Integer	Planned setup time for the job, in seconds.
Status		
StartTime	DateTime	
EndTime	DateTime	
WorksOrders	List<WorksOrder>	A job can have more than one works order. For example, in a family tool in injection moulding. The tool may produce a right-hand part and a left hand part for each cycle. In these circumstances an MRP/ERP system may produce two distinct works order, one for left hand parts and the other for right hand parts.
ProcessParameters	List<ProcessParameter>	

2.2.2 WorksOrder

Field Name	Type	Comments
WorskOrderID	String	GUID, automatically allocated by the Intouch system and used to uniquely identify each works order.
JobID	String	This links the works order to the job and will be automatically allocated by Intouch.
OrderNumber	String	
PartCode	String	
OrderQuantity	Double	This field is required and must be greater than zero.
AlreadyMade	Double	
Description	String	
ShortDescription	String	
LongDescription	String	
DueDate	DateTime	
Impressions	Double	The number of parts made for each cycle of the machine. This field is required and must be greater than zero.
PartWeight	Double	
WasteWeight	Double	
SellingPrice	Double	
MaterialCost	Double	
Material	String	
Text[0-5)	String Array	Text[0] is not used but is included for backward compatibility purposes.
Number[0-9]	Integer Array	Number [0] is not used but is included for backward compatibility purposes.
AdditionalText[0-40]	String Array	AdditionalText[0] is not used but is included for backward compatibility purposes.
AdditionalNumber[0-15]	Double Array	AdditionalNumber [0] is not used but is included for backward compatibility purposes.

2.2.3 ProcessParameter

Field Name	Type	Comments
ParameterName	String	
NominalValue	Double	
USL	Double	
LSL	Double	
UAL	Double	
LAL	Double	

2.2.4 RunningJob

Field Name	Type	Comments
MachineID	String	
JobID	String	

2.2.5 RunningJobList

Field Name	Type	Comments
RunningJobs	List< RunningJob>	

2.3 Job Change Entities

2.3.1 JobChange

Field Name	Type	Comments
MachineID	String	
StartTime	DateTime	
JobID	String	

2.4 JobChangeList

Field Name	Type	Comments
JobChanges	List<JobChange>	

2.5 Job Import Entities

2.5.1 i4JobImport

Field Name	Type	Comments
Jobs	List<i4Job>	
Settings	List<ImportSetting>	Please note: The Settings list is in place for future functionality. Currently these setting must be configured in the system database by Intouch.

2.5.2 ImportSetting

Field Name	Type	Comments
Name	String	
Value	String	Set to '0' to deactivate the setting. Set to '1' to activate the setting.

Settings:

Setting Name	If Active
UpdateExistingJobs	If the job is already on the schedule, then update it with new values from the import.
AddEndedJobs	If the job has previously been imported and subsequently ended on Intouch, then add the job back into the schedule.
AddDeletedJobs	If the job has previously been imported and subsequently deleted from the schedule, then add the job back into the schedule.
MoveFixedJobs	Allow the import to move jobs that have been marked as fixed on the schedule.
AddToUnscheduled	Adds any new jobs in the file to the unscheduled machine.
MoveOldJobs	Allows existing jobs to be re-sequenced by the import
MoveMachines	Allows existing jobs to be move to a different machine if specified in the import.
DeleteOldJobs	The import will delete jobs that are on the schedule but not in the import.

2.5.3 ScheduleImportReport

Field Name	Type	Comments
TimeStamp	String	
NumberOfLinesInTheImport	Integer	
SuccessfullyImported	List<JobImportReport>	
Warnings	List<JobImportReport>	
Errors	List<JobImportReport>	

2.5.4 JobImportReport

Field Name	Type	Comments
ImportLineNumber	Integer	
Items	List<JobImportReportLine>	

2.5.5 JobImportReportLine

Field Name	Type	Comments
StatusType	String	Success Warning Error
StatusCode	Integer	Success Codes 1001 Job added. 1002 Job updated. Warning Codes 2001 Not imported – Job previously ended. 2002 Not imported – Job previously deleted. 2003 Not imported – Job previously imported. 2004 Job deleted. Error Codes 3001 Not imported – Invalid machine. 3002 Not imported – Invalid data.
StatusMessage	String	
Description	String	For successfully added jobs this will contain the Job ID GUID for the new job.
AdditionalDetails	List< String >	This field will give additional details where available such as why the job failed data validation. There may be more than one reason a job is rejected.

2.6 Production Entities

2.6.1 ProductionProfilePeriod

Field Name	Type	Comments
MachineID	String	
StartTime	DateTime	
EndTime	DateTime	
Status	Integer	No Job = 1 Waiting To Start Job = 2 Setup = 3 Running OK = 4 Running Fast = 5 Running Slow = 6 Stopped = 7 Running Very Fast = 8
StopCodeID	String	
JobID	String	
OperatorsLoggedIn	List<string>	One entry in the list for each operator logged into the given machine during the period. Each entry in the list points to the User GUID.
PartsMade	List< WorksOrderProduction >	

2.6.2 ProductionProfileList

Field Name	Type	Comments
ProductionProfilePeriods	List<ProductionProfilePeriod>	

2.6.3 WorksOrderProduction

Field Name	Type	Comments
WorksOrderID	String	
GoodParts	Double	
Rejects	List<RejectProduction>	

2.6.4 RejectProduction

Field Name	Type	Comments
RejectCodeID	String	
Quantity	Double	

2.7 Status Entities

2.7.1 MachineStatus

Field Name	Type	Comments
Status	Integer	No Job = 1 Waiting To Start Job = 2 Setup = 3 Running OK = 4 Running Fast = 5 Running Slow = 6 Stopped = 7 Running Very Fast = 8
StopCodeID	String	

2.8 MESi Entities

2.8.1 FieldIdent

Field Name	Type	Comments
ItemID	string	
WorksOrderID	strng	
FieldID	int	
CodeID	int	

2.8.2 JobDataRequest

Field Name	Type	Comments
JobID	string	
Items	List<FieldIdent>	

2.8.3 JobDataRequestResult

Field Name	Type	Comments
RequestID	string	
Result	string	

2.9 Trigger Entities

2.9.1 Trigger

Field Name	Type	Comments
TriggerID	String	GUID, automatically allocated by the Intouch system and used to uniquely identify each instance of a trigger.
TimeStamp	DateTime	
EventType	String	JobStart JobEnd PalletComplete MachineStopped MachineStarted
MachineID	String	
Parameter1	String	
Parameter2	String	
Parameter3	String	
Parameter4	String	
Parameter5	String	

3. Endpoints

3.1 Machines

GET	/API/Machine
Returns all list of all Machine entities. Return Type: List<Machine>	
PARAMETERS:	

GET	/API/GetMachineList
Returns all list of all Machine entities within an encapsulating object. Return Type: MachineList	
PARAMETERS:	

GET	/API/GetMachine/{ID}	
Returns the Machine entity specified by ID. Return Type: Machine		
PARAMETERS:		
ID	String	A valid Machine GUID

3.2 Reject Codes

GET	/API/GetRejectCode
Returns all list of all Reject Code entities. Return Type: List<EventCode>	
PARAMETERS:	

GET	/API/GetRejectsList
Returns all list of all Reject Code entities within an encapsulating object. Return Type: EventCodeList	
PARAMETERS:	

3.3 Downtime Codes

GET	/API/GetDowntimeCode
Returns all list of all Downtime Code entities. Return Type: EventCode	
PARAMETERS:	

GET	/API/GetDowntimeList
Returns all list of all Downtime Code entities within an encapsulating object. Return Type: EventCodeList	
PARAMETERS:	

3.4 Users

GET	/API/GetUsers
Returns all list of all User entities. Return Type: List<User>	
PARAMETERS:	

GET	/API/GetUserList
Returns all list of all User entities within an encapsulating object. Return Type: UserList	
PARAMETERS:	

GET	/API/GetUser/{ID}	
Returns the User entity specified by ID. Return Type: User		
PARAMETERS:		
ID	String	A valid User GUID

3.5 i4Jobs

GET	/API/i4Job/{ID}

Returns the Job specified by ID.

Return Type: i4Job

PARAMETERS:

ID	String	A valid Job GUID

GET	/API/GetRunningJobs

Returns a list of all the currently running jobs.

Return Type: RunningJobList

PARAMETERS:

POST	/API/GetJobs

Returns a list of Jobs specified by the list of Job IDs (GUIDs).

Return Type: List<i4Job>

PARAMETERS (From Body):

ID List	List<String>	A List of valid Job GUIDs

POST	/API/JobImport

Updates job schedule on Intouch.
Returns exception report detailing any jobs which could not be added to schedule and why.

Return Type: ScheduleImportReport

PARAMETERS (From Body):

JobsAndSettings	i4JobImport	A List of i4Job objects & a list of ImportSetting objects

3.6 Job Changes

POST	/API/JobChange

Returns all jobs changes for the specified machines and date range.

Return Type: JobChangeList

PARAMETERS:

MachineGUIDs	List<String>	A List of Machine GUIDs
StartTime	DateTime	Start of period
EndTime	DateTime	End of period

POST	/API/GetJobsRan

Returns a list of Jobs ran on the specified machines during the specified period.

Return Type: i4JobList

PARAMETERS:

MachineGUIDs	List<String>	A List of Machine GUIDs
StartTime	DateTime	Start of period
EndTime	DateTime	End of period

3.7 Production Profile Data

GET	/API/ProductionProfile

Returns list of contiguous production profile periods describing the production between the start and end times for the specified machine (see Appendix IV).

Return Type: List<ProductionProfilePeriod>

PARAMETERS (Query):

MachineGUID	String	A valid Machine GUID
StartTime	DateTime	Start of period
EndTime	DateTime	End of period

GET	/API/GetProductionProfilePeriodList

Returns list of contiguous production profile periods describing the production between the start and end times for the specified machines, all encapsulated in an object.

Return Type: ProductionProfilePeriodList

PARAMETERS (Query):

StartTime	DateTime	Start of period
EndTime	DateTime	End of period

3.8 Production Data

GET	/API/MESiData

Returns the MESi calculation specified by the FieldID and CodeID for the specified time range for the specified machine.

Return Type: String

PARAMETERS (Query):

MachineID	String	A valid Machine GUID
StartTime	DateTime	Start of period
EndTime	DateTime	End of period
FieldID	Integer	See appendix III
CodeID	Integer	(for future expansion)

GET	/API/GetCurrentJobMESiData

Returns the MESi calculation specified by the FieldID and CodeID for the current job of the specified machine.

Return Type: String

PARAMETERS (Query):

MachineID	String	A valid Machine GUID
FieldID	Integer	See appendix III
CodeID	Integer	(for future expansion)

GET	/API/GetJobMESiData

Returns the MESi calculation specified by the FieldID and CodeID for the job with the specified Job ID and works order ID.

If no works order id is specified, then the value for all works order in the job is returned (e.g. good parts for all works orders added together).

Return Type: String

PARAMETERS (Query):

JobID	String	A valid Job GUID
WorksOrderID	String	A valid works order GUID (or left blank)
FieldID	Integer	See appendix III
CodeID	Integer	(for future expansion)

PUT	/API/GetJobMESiDataItems

Returns the MESi calculations for the specified list of FieldID and CodeID pairs for the job with the specified Job ID and works order ID.

If no works order id is specified, then the value for all works order in the job is returned (e.g. good parts for all works orders added together).

Return Type: List<JobDataRequestResult>

PARAMETERS (From Body):

RequestItems	JobDataRequest	Contains Job ID and list of fields to be returned. Each requested item can be provided with an id. That id is then attached to the result. The results are retuned I the same order as specified in the request list.

3.9 Actions

PUT	/API/StartThisJob
Immediately starts the job specified in the body on the machine specified within the job. If a job is already running on that machine, then the currently running job is ended before starting the new job. Return Type: JobImportReport	
PARAMETERS (From Body): Job — i4Job — The job to be started. - Must be a valid i4Job - Must include a valid Machine GUID	

3.10 Status

PUT	/API/GetMachineStatus
Gets the current status for the specified machine. Return Type: MachineStatus	
PARAMETERS: MachineID — string — A valid Machine GUID	

4. Triggers

4.1 Subscribing & Receiving Triggers

Trigger subscription will initially be configured by Intouch. Ultimately this will be configurable by the customer through a web page.

Each trigger occurrence will include a unique Trigger ID. Any triggers posted will require a response. If a response is not received the trigger will be repeated (with the same Trigger ID) until a response is received or until the max number of tries (TBD) is reached. The Trigger ID will enable the endpoint to verify that the trigger has not be seen before.

The triggers we send are HTTP POST requests made to the URL you provide, with a JSON body.

The JSON body will be in the following format:

```
{
        "Id":"9C7EFB0A-CF9C-4534-AC86-BEC7AFE2ED47", // Trigger Id
        "TimeStamp":"2020-01-01T00:00:00.000Z",
        "EventType":"JobStart",
        "MachineId":"123-123-123-123",
        "Parameter1":"8B7AFB0A-EF9A-8346-AC86-EBD7AAF2ED21",
        "Parameter2":"",
        "Parameter3":"",
        "Parameter4":"",
        "Parameter5":""
}
```

You should return a http response code 200 (Ok).

4.2 Available Triggers

Initially it will be possible to subscribe to the following triggers.

Start of Job	
EventType	“JobStart”
Parameter1	JobID (GUID) of job being started
Parameter2	
Parameter3	
Parameter4	
Parameter5	

End of Job	
EventType	“JobEnd”
Parameter1	JobID (GUID) of job being ended
Parameter2	Job Start Time
Parameter3	Pallet Start Time
Parameter4	
Parameter5	

Suspend Job	
EventType	“JobSuspend”
Parameter1	JobID (GUID) of job being started
Parameter2	Job Start Time
Parameter3	Pallet Start Time
Parameter4	
Parameter5	

End of Pallet	
EventType	“PalletComplete”
Parameter1	JobID (GUID) of job being started
Parameter2	WorksOrderID (GUID)
Parameter3	Pallet Start Time
Parameter4	Pallet Quantity
Parameter5	Pallet Number

Machine Stopped	
EventType	“MachineStopped”
Parameter1	Stop code (GUID)
Parameter2	
Parameter3	
Parameter4	
Parameter5	

Machine Started	
EventType	“Machine Started”
Parameter1	
Parameter2	
Parameter3	
Parameter4	
Parameter5	

Stop Code Entered	
EventType	“Stop code entered”
Parameter1	Event Code GUID
Parameter2	Event Code Name
Parameter3	Event Code Details field
Parameter4	
Parameter5	

Announcement Code Entered	
EventType	Announcement Group Name + “ set” e.g. Priority Set
Parameter1	Event Code GUID
Parameter2	Event Code Name
Parameter3	Event Code Details field
Parameter4	
Parameter5	

5. Throttling

To prevent undue stress on the Intouch API and Intouch servers, a throttling algorithm is employed to limit the use of the API.

The limits are as follows:

- Maximum calls per minute: 100
- Maximum daily Kbyte egress (per machine monitored) 100000

These limits can be changed, as a costed option, by arrangement with Intouch support.

6. Operation

The following is a brief description of how the API might be used to send works orders to Intouch and subsequently retrieve production data when those works orders are run and monitored by Intouch.

1. Use the Machine end point to get a list of the machines defined within Intouch. Each machine will include an ID which is unique and is the ID Intouch will use to identify the machine in any API data exchanges. It will also include other data such as machine name, description, and text fields. One of these fields would need to have been configured in the Intouch system to match a reference to the correct machine in the customers system.

2. Use the Users end point to get a list of the users defined within Intouch. Each user will include an ID which is unique and is the ID Intouch will use to identify the user in any API data exchanges. It will also include other data such as username, and text fields. One of these fields would need to have been configured in the Intouch system to match a reference to the correct user in the customers system.

3. Use the Jobs endpoint to send a list of jobs/worksorders to the Intouch schedule.

4. Intouch will then be used to monitor production against those jobs.

5. As production against a job progresses Intouch will send triggers at the start of a job and at the end of each pallet.

6. When a pallet trigger is received, use the Production Data end point to retrieve the production data for the machine for the period during which the pallet was made.

7. At the end of a job Intouch will send an End Job trigger.

Appendix I - Superseded Entities

The following entities have been superseded but remain part of the API for the purposes of backward compatibility.

When creating new integrations with the Intouch API, you avoid using superseded entities.

Job (superseded)

Field Name	Type	Comments
JobID	String	GUID, automatically allocated by the Intouch system and used to uniquely identify a Job.
MachineID	String	
ToolCode	String	
EarliestStart	DateTime	
LatestFinish	DateTime	
StandardCycleTime	Double	Standard cycle time for the job in seconds.
SlowCycle	Double	Cycle time at which the Intouch system will show the machine as running slowly.
FastCycle	Double	Cycle time at which the Intouch system will show the machine as running fast.
VeryFastCycle	Double	Cycle time at which the Intouch system will show the machine as running very fast.
StoppedCycle	Double	Elapsed time since the last cycle for which the Intouch system will show the machine as stopped.
SetupTime	Integer	Planned setup time for the job, in seconds.
WorksOrders	List<WorksOrder>	

JobImport (superseded)

Field Name	Type	Comments
Jobs	List<Job>	
Settings	List<ImportSetting>	

JobImportWithProcessParameters (superseded)

Field Name	Type	Comments
Jobs	List<JobWithProcessParameter>	
Settings	List<ImportSetting>	

JobWithProcessParameters (superseded)

Field Name	Type	Comments
JobID	String	GUID, automatically allocated by the Intouch system and used to uniquely identify a Job.
MachineID	String	
ToolCode	String	
EarliestStart	DateTime	
LatestFinish	DateTime	
StandardCycleTime	Double	Standard cycle time for the job in seconds.
SlowCycle	Double	Cycle time at which the Intouch system will show the machine as running slowly.
FastCycle	Double	Cycle time at which the Intouch system will show the machine as running fast.
VeryFastCycle	Double	Cycle time at which the Intouch system will show the machine as running very fast.
StoppedCycle	Double	Elapsed time since the last cycle for which the Intouch system will show the machine as stopped.
SetupTime	Integer	Planned setup time for the job, in seconds.
WorksOrders	List<WorksOrder>	
ProcessParameters	List<ProcessParameter>	

Appendix II - Superseded Endpoints

The following endpoints have been superseded but remain part of the API for the purposes of backward compatibility.

When creating new integrations with the Intouch API, you avoid using superseded endpoints.

Jobs

GET	/API/Job/{ID}

Returns the Job specified by ID.

Return Type: Job

PARAMETERS:

ID	String	A valid Job GUID

POST	/API/Job

Updates job schedule on Intouch.
Returns exception report detailing any jobs which could not be added to schedule and why.

Return Type: ScheduleImportReport

PARAMETERS (From Body):

JobsAndSetting	JobImport	A List of Job objects & a list of ImportSetting objects

POST	/API/JobImportWithProcessParameters

Updates job schedule on Intouch.
Returns exception report detailing any jobs which could not be added to schedule and why.

Return Type: ScheduleImportReport

PARAMETERS (From Body):

JobsAndSetting	JobImportWithProcessParameters	A List of i4Job objects & A list of ImportSetting objects

Appendix III – Supported MESi Codes

Field Name	Field ID
- Good Parts	1000
- Number of cycles	1007
- Run Time	3
- Average Cycle Time	1008

Appendix IV – Illustration of Profile Period List