



Quick Guide

Article number::	AP3062
Article name:	App AC14 Tool changeover
Version:	1.0.0
AC14 firmware version:	>= V3.1.2
URL (main page):	<a href="http://<IP-Adresse*>:8080/tch.htm">http://<IP-Adresse*>:8080/tch.htm
URL (additional pages):	-
Languages:	German, English
Restrictions in demo mode:	Only two tool files are supported: 001.csv and 002.csv
Hardware requirements	AS-i Slaves nach Spec 3.0

* IP address of the AC14 configuration interface

Short description

Key functions of the ifm System Solutions App *Tool changeover* (AP3062):

- Read tool description files from SD-card.
- Transmission of the tool file number and trigger of the tool changeover process by the PLC via fieldbus.
- Processing the Tool changeover and messaging OK or Failure to the PLC.
- WEB visualization of AS-i slave profiles and addresses of the selected tool.

Groundworks for using the ifm System Solutions App

Nothing to do

The user interface

Main page: http://<IP-Adresse*>:8080/tch.htm

Visualization: Table with AS-i slave profiles connected to AS-i master 1 and / or master 2 according the selected Tool number.

Display of last processed Tool after system power-on..

After system power-on the AC14 the App is ready to receive a trigger signal to start the changeover.



192.168.10.101:8080/index.htm

System solution for AS-i Tool Change

AP3062 / V1.0.0

Tool No.: 10 31 A Slaves Master 1

Master 1			Master 2		
	A-Slave	B-Slave		A-Slave	B-Slave
0			0		
1			1		
2			2		
3			3		
4	7ae7		4		
5	7ae7		5		
6	7ae7		6		
7	7ae7		7		
8	7ae7		8		
9	7ae7		9		
10	7ae7		10		
11	7ae7		11		
12	7ae7		12		
13	7ae7		13		
14	7ae7		14		
15	7ae7		15		
16	7ae7		16		
17	7ae7		17		
18	7ae7		18		
19	7ae7		19		
20	7ae7		20		
21	7ae7		21		
22	7ae7		22		
23	7ae7		23		
24	7ae7		24		
25	7ae7		25		

Config Error

M1 M2

PLC view:

PLC System

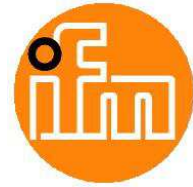
OK

fail

Tool Change

OK

fail



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Each Tool needs to have a description file. Some sample files are added to the delivery (001.csv etc.).

Please edit your Tool description files according the following specification.

A standard SD- card is used to store the Tool description files.

Please save the files only to the root directory of the SD-card.

The files are containing the AS-i profiles of the slaves. Please use a standard Windows editor like notepad.exe or MS Excel.

The following file 004.csv is opened in a notepad editor:

```
4;Frässwerkzeug 4711;;;;  
Master number; Slave number; IO-Code; ID; ID2; ID1  
1;1;7;5;5;f  
1;10 ;7;b;e;f  
1;17;7;4;c;f  
2;16b;7;a;e;7  
2;22b;7;a;e;7
```

Line 1:

The number 4 is the number of the Tool. It is followed by an optional description of the Tool.

Line 2:

Contains the description of following lines and rows.

Line 3:

1 = Master 1, 1 = Slave- Address 1, 7 = IO- Code, 5 = ID- Code, 5 = ID2- Code; f = ID1- Code

Line 4:

1 = Master 1, 10 = Slave- Address 10, 7 = IO- Code, B = ID- Code, e = ID2- Code; f = ID1- Code

Lines 5, 6 ... with corresponding Slave profiles.

A -addresses will have a following „a“ or „A“ behind the Slave- Address.

B -addresses will have a following „b“ or „B“ behind the Slave- Address.

ID1 can be changed by customers contrary to the other ones which cannot be changed.

Rule of Thumb:

Is ID = A, than ID1 = 7

Is ID unequal A, than ID1 = f

[3]



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IO-, ID-, ID2-, ID1-codes are the parts building the slave profile of a slave module.

The profile is printed on the label and can also be read by the Web interface of AC14.

Please prefer to read the entire profile by the web interface since someone could have changed the ID1 code.

Please connect the SD card to the slot after editing and saving the file.

Please check the AC14 settings: For the output access please choose „Gateway with PLC”.

A successful reading of the Tool description file will look like this:

The screenshot displays the 'visToolEn' web interface for 'System solution for AS-i Tool Change'. The browser address bar shows '192.168.10.101:8080/index.htm'. The page title is 'System solution for AS-i Tool Change' with version 'AP3062 / V1.0.0'. A German flag is visible in the top right.

At the top, there are two input fields: 'Tool No.: 10' (circled in green) and '31 A Slaves Master 1'. Below these are two tables for 'Master 1' and 'Master 2'. Each table has columns for 'A-Slave' and 'B-Slave' and rows numbered 0 to 25. In the 'Master 1' table, the 'A-Slave' column contains the value '7ae7' for all rows from 4 to 25, which is highlighted by a green box. A green arrow points from the 'Tool No.: 10' field to the 'A-Slave' column of the 'Master 1' table.

On the right side, there are status indicators:

- Config Error:** M1 and M2, both with green squares indicating 'OK'.
- PLC view:** 'PLC System' with a green square for 'OK' and an empty square for 'fail'.
- Tool Change:** 'OK' and 'fail' with empty squares.



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The communication protocol between the PLC and the Tool changeover APP will be described now.

A more detailed description you'll find in „SignalProtocol.xls“.

For a Siemens S7 PLC you'll find a sample project in the delivery.

The Step7 project „tch.zip“ contains a function FC1 for managing and processing the tool changeover process (designed by Simatic Manager 5.5).

You can assign your own input and output addresses to the function parameter.

Two words are send by the PLC or read by the PLC.

The lower word EW0/AW0 is described in the following table.

The lower part Byte of the word EB0 and AB0 contains system specific messages.

In the following description the PLC point of view is made. The APP is sending (EB0.0) a TRUE signal to message it's stand by to the PLC.

The PLC is doing the same. A Tool changeover is triggered by Bit AB1.0. Before sending the trigger signal the PLC has to send the tool description file number in AW2.

The APP messages EB1.0 „new tool will be processed“. The APP is processing the tool changeover. That means the new slaves are projected in the AS-i master and messages a successful configuration of the tool by setting the Bit EB1.1. If the configuration failed it sets the Bit EB1.2.

In case of failure the Bit EB0.1 is set to message a common failure to he PLC.

In case of successful configuration the APP messages with a rising edge of the signal EB1.1.

In every case the RESET-Bit AB1.3 has to be set to reset the APP again to stand- by.



Signals

PLC point of view	
Bus-Address	
APP	PLC
Adr.	
EB0: 0	System stand by
EB0: 1	Failure of module
EB0: 2	
EB0: 3	
EB0: 4	
EB0: 5	
EB0: 6	
EB0: 7	
EB1: 0	New Tool changeover process is started
EB1: 1	New tool is successfully processed
EB1: 2	New tool could not be processed
EB1: 3	
EB1: 4	Configuration Error Master 1
EB1: 5	Configuration Error Master 2
EB1: 6	
EB1: 7	
EW2	Tool description file number
EW4	
EW6	
PLC	APP
AB0: 0	System stand by
AB0: 1	Failure of module
AB0: 2	
AB0: 3	
AB0: 4	
AB0: 5	
AB0: 6	
AB0: 7	
AB1: 0	Request for a new Tool changeover
AB1: 1	New tool was detected
AB1: 2	New tool could not be detected
AB1: 3	RESET of APP
AB1: 4	
AB1: 5	
AB1: 6	
AB1: 7	
AW 2	Tool description file number
AW 4	

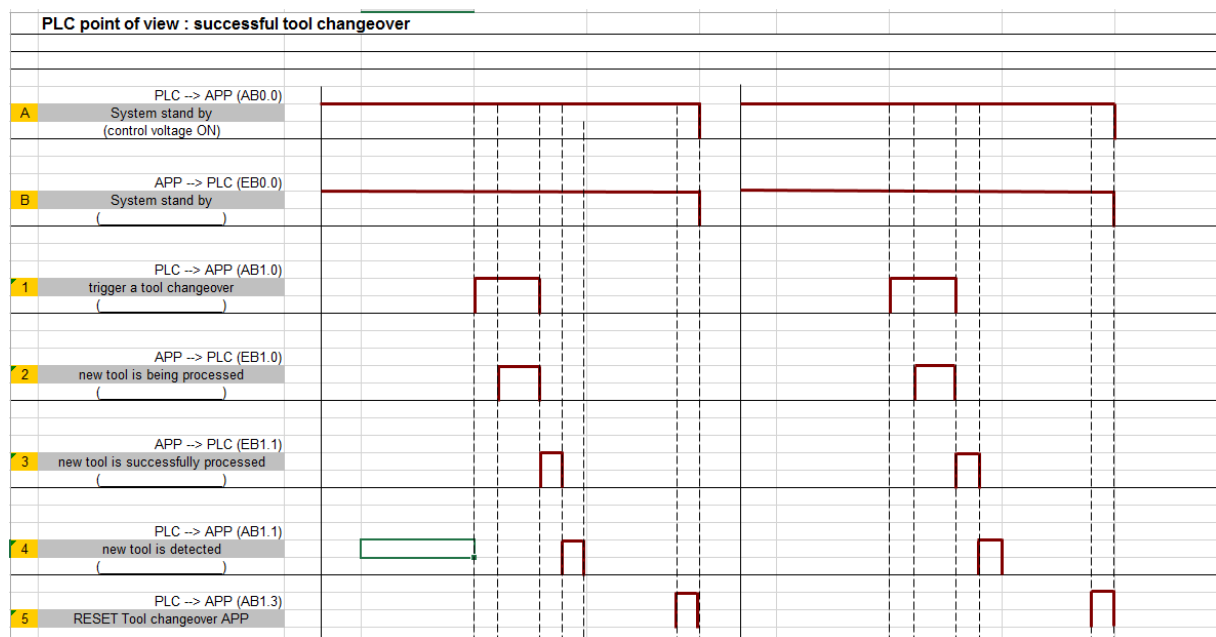


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Interface

PLC -> APP			APP -> PLC		
System stand by	A	AB0.0	System stand by	B	EB0.0
Failure of Module	C	AB0.1	Failure of Module	D	EB0.1
		AB0.2			EB0.2
		AB0.3			EB0.3
		AB0.4			EB0.4
		AB0.5			EB0.5
		AB0.6			EB0.6
		AB0.7			EB0.7
Request for new tool changeover	1	AB1.0	New tool changeover process is started	2	EB1.0
New tool is detected	4	AB1.1	New tool is configured	3	EB1.1
New tool could not be detected	4	AB1.2	New tool could not be configured	3	EB1.2
RESET of APP	5	AB1.3			EB1.3
		AB1.4			EB1.4
		AB1.5			EB1.5
		AB1.6			EB1.6
		AB1.7			EB1.7

Signal Protocol



Please select AC14 Slot 9 and 11 with at least 4 words in your hardware configuration.

This enables the data transfer between the PLC and the APP.

The APP is designed for maximum amount of slaves (62 each master).

That's the reason why it takes some seconds until the Bit EB1.1 is set even a few slaves are involved.



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If a non-existent file is selected the file is marked red in the Visualization.

Additionally Bit AB0.1 is flashing between True and False.

192.168.10.101:8080/index.htm

System Lösung für AS-i Werkzeugwechsel AP3062 / V1.0.0

Werkzeugnummer: 15 31 A Slaves Master 1

Master 1			Master 2		
	A-Slave	B-Slave		A-Slave	B-Slave
0			0		
1			1		
2			2		
3			3		
4	7ae7		4		
5	7ae7		5		
6	7ae7		6		
7	7ae7		7		
8	7ae7		8		
9	7ae7		9		
10	7ae7		10		
11	7ae7		11		
12	7ae7		12		
13	7ae7		13		
14	7ae7		14		
15	7ae7		15		
16	7ae7		16		
17	7ae7		17		
18	7ae7		18		
19	7ae7		19		
20	7ae7		20		
21	7ae7		21		
22	7ae7		22		
23	7ae7		23		
24	7ae7		24		
25	7ae7		25		

Konfigurations Fehler
M1 M2
OK OK

SPS Sicht
Anlage
OK
gestört

Werkzeugwechsel
 OK
 Fehler



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If a wrong file number is selected which does not correspond to the tool it is reported by the protocol Bits.

	Address	Symbol	Display format	Status value	Modify value
1		//Anlage ok			
2	M 1.0		BOOL	false	
3		//Störung			
4	M 1.1		BOOL	false	
5		//Taste_einlesen			
6	M 1.2		BOOL	false	
7		//MKZ_einlesen			
8	M 1.3		BOOL	true	
9					
10	EW 60		DEC	532	
11	EW 62		DEC	0	
12	AW 62		DEC	2	
13		//MKZ_NNR			
14	MW 2		DEC	2	2
15	E 60.0		BOOL	false	
16	E 60.1		BOOL	true	
17	E 61.0		BOOL	false	
18	E 61.1		BOOL	false	
19	E 61.2		BOOL	true	
20	E 61.4		BOOL	true	
21	E 61.5		BOOL	false	
22					



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This is also displayed in the Web visualization.

Especially the Configuration Errors of Master 1 and Master 2 are shown.

In the AC14 local HMI more detailed information about the reason of the configuration error can be investigated.

System solution for AS-i Tool Change AP3062 / V1.0.0

Tool No.: 2 Presswerkzeug a3

Master 1		
	A-Slave	B-Slave
0		
1	755f	
2		
3		
4		
5		
6		
7		
8		
9		
10	7bef	
11		
12		
13		
14		
15		
16		
17	74cf	
18		
19		
20		
21		
22		
23		
24		
25		

Master 2		
	A-Slave	B-Slave
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		

Config Error
M1 M2
[Red] [Green]

PLC view:
PLC System
[White] OK
[Red] fail
Tool Change
[White] OK
[Red] fail



The language can be changed by pressing on the flags.

192.168.10.101:8080/index.htm

System solution for AS-i Tool Change AP3062 / V1.0.0

Tool No.: 10 31 A Slaves Master 1

Master 1			Master 2		
	A-Slave	B-Slave		A-Slave	B-Slave
0			0		
1			1		
2			2		
3			3		
4	7ae7		4		
5	7ae7		5		
6	7ae7		6		
7	7ae7		7		
8	7ae7		8		
9	7ae7		9		
10	7ae7		10		
11	7ae7		11		
12	7ae7		12		
13	7ae7		13		
14	7ae7		14		
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18	7ae7		18		
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21	7ae7		21		
22	7ae7		22		
23	7ae7		23		
24	7ae7		24		
25	7ae7		25		

Config Error
M1 M2

PLC view:
PLC System
 OK
 fail
Tool Change
 OK
 fail