



PC - PLC control software

Possible uses for ATS clamping program technology

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1 ASI and tool change

1.1 Advantage of ASI3 / ASI5

- Problem-free operation with slip rings.
- Robust against EMC.
- No conflicts with addresses, as there is always a fixed assignment.
- The same subscriber numbers (slaves) can always be assigned (with gaps) for tools or devices of the same construction. This does not apply to Profibus (subscriber number / slave) or Profinet (device name).
- Only those modules have to be installed that are actually required.
- ASI3 + ASI5 modules can be connected to one line.
- A quick set-up process is thus possible.
- Devices of the same construction only need to be programmed once.

2 ASI3

2.1 Use

ASI3-A modules with full expansion occupy 4 x 4 bytes (16Btyes) per input / output for one line. Physically, 31 slaves can be used (1..31). Slave 0 maps a so-called status nibble.

0A	1A	2A	3A	4A	5A	6A	7A
8A	9A	10A	11A	12A	13A	14A	15A
16A	17A	18A	19A	20A	21A	22A	23A
24A	25A	26A	27A	28A	29A	30A	31A

ASI3-B modules with full expansion occupy 4 x 4 bytes (16Btyes) per input / output for one line. Physically, 31 slaves can be used (1..31). Slave 0 maps a so-called status nibble.

0B	1B	2B	3B	4B	5B	6B	7B
8B	9B	10B	11B	12B	13B	14B	15B
16B	17B	18B	19B	20B	21B	22B	23B
24B	25B	26B	27B	28B	29B	30B	31B

Each ASI3 module (slave) can be assigned an ID code in the ATS web editor. When a device is registered, the ID codes (target / actual) are checked. The device can only be activated if they agree.	<p>Slave Input ASI3 1A</p> <p>Slavename: 1A <small>ID-Code wählen</small></p> <p>ID-Code: 167 (A7): Mischmodul 4xE, 4xA</p>
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- In summary, this results in an I / O quantity for an ASI line with 248 inputs and 248 outputs.

Device configuration ASI master (ASI3) line 1
Line 1 would be equivalent to station 1, for example

Possible uses for ATS clamping program technology

Modul	...	Baugr...	Steck...	E-Adresse	A-Adresse	Typ
pn1-asi-3	0	0	16377*		DAP V2.0	
▶ PN-IO	0	0 X1	16376*		ASI-GW	
K1: 32 Byte DEA (0-31B)	0	1	48...79	48...79	K1: 32 Byte DEA (0-31B)	

3 ASI5

3.1 Use

Full ASI5 modules would be up to 96 modules (slaves) per line. ATS allows up to 31 modules (slaves). A minimum of 1 byte and a maximum of X bytes can be assigned for 1 module. The use of the possible number of modules (slaves) is monitored in the ATS editor. When using the ASI IO-Link master, the byte amount is automatically specified.

Physically 31 slaves can be used (1..31), slave 0 maps a status byte (1 byte).

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	26	27	28	29	30	31

Status bits in the first input byte (slave 0)

- ASI5 K1 Konfiguration nicht OK
- ASI5 K1 Konfigurationsmodus, FALSE=PROTECT, TRUE=PROJEKTIERUNG
- ASI5 K1 Execution Control Normal Operating nicht aktiv
- ASI5 K1 Systemspannung zu niedrig
- ASI5 K1 mindestens 1 ASI5 Slave Zustand Warnung od Kritisch od Defekt
- ASI5 K1 Paramet.Image eines ASI5 Slaves und Backup ASI5 Master n.konsist
- ASI5 K1 Parameter Image Server nicht aktiv

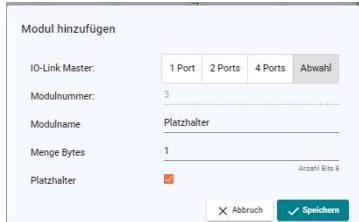
<p>A profile ID can be assigned to each ASI5 module (slave) in the ATS web editor. When registering a device, the profile IDs (target / actual) are checked. The device can only be activated if they agree.</p>	<div style="background-color: #f0f0f0; border: 1px solid #ccc; padding: 5px;"> <p>Slave Input ASI5 1</p> <p>Input + Output</p> <p>Module</p> <p>Slavename: +VR-ASI5-A1</p> <p>ProfileID: 8388612 (800004): IP67_M12_8L_BW3802</p> <p><button>Module entfernen</button></p> </div>
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- In summary, this results in an I / O quantity for an ASI line with 248 inputs and 248 outputs.

Device configuration ASI master (ASI5) line 1						
Line 1 would be equivalent to station 1, for example						
Modul	...	Baugr...	Steck...	E-Adresse	A-Adresse	Typ
pn1-asi-3	0	0	16377*		DAP V2.0	
▶ PN-IO	0	0 X1	16376*		ASI-GW	
K1: 32 Byte DEA (0-31B)	0	1	48...79	48...79	K1: 32 Byte DEA (0-31B)	
K1: 32 Byte ASI-5 DEA	0	2	80...111	80...111	K1: 32 Byte ASI-5 DEA	

3.2 Place holder

For example, if you use a standard assignment in which not all modules (slaves) are required, you can use the placeholder function in the ATS-WebStudio i4.0 Editor.



Assume you are using 5 field modules with 8 I / O each. Modules 2 and 4 are not installed as there is no need.

Modul 1	installed	
Modul 2	-	Place holder
Modul 3	installed	
Modul 4	-	Place holder
Modul 5	installed	

Modules with placeholders are ignored in the Profile ID check.

4 ASI3 + ASI5

4.1 Use of mixed operation

Device configuration ASI master (ASI3 / ASI5) line 1 Line 1 would be equivalent to station 1, for example							
	Modul	...	Baugr...	Steck...	E-Adresse	A-Adresse	Typ
	▼ pn1-asi-3		0	0	16377*		DAP V2.0
	► PN-IO		0	0 X1	16376*		ASi-GW
	K1: 32 Byte DEA (0-31B)		0	1	48...79	48...79	K1: 32 Byte DEA (0-31B)
	K1: 32 Byte ASI-5 DEA		0	2	80...111	80...111	K1: 32 Byte ASI-5 DEA

- In summary, this results in an I / O quantity for an ASI line with 496 inputs and 496 outputs.

4.2 Special feature of mixed operation

In mixed operation, the system can be operated with only ASI3 modules or with only ASI5 modules or with ASI3 modules and ASI5 modules.

5 UNIVERSAL I/O (UNIVIO)

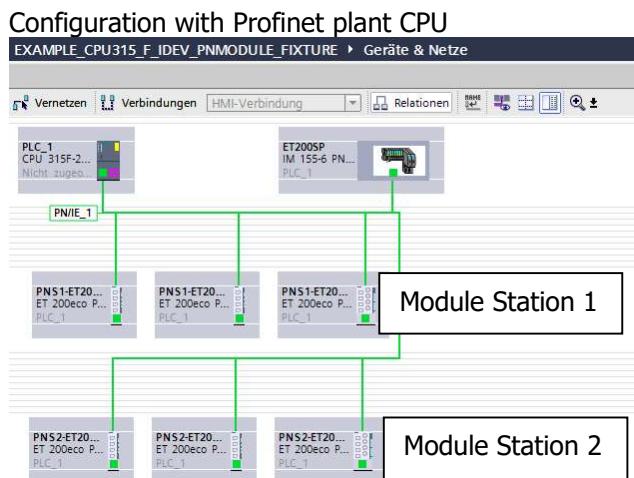
5.1 Use

With UNIVIO, up to 512 inputs and 512 outputs can be used in a station.

5.2 Example with CPU315X und CPU416-3

The ET200 modules on the devices are integrated in the system PLC. Example with 2 stations.

5.3 Configuration of the CPU315X system PLC



I-device transfer area

The transfer area _1 / 2 maps the interface between the CPUs. This can be adapted to the needs according to agreement.

Transferbereiche						
...	Transferbereich	Typ	Adresse im IO-Cont...	↔	Adresse im I-Device	Länge
1	Transferbereich_1	CD	→ E 512...543		32 Byte	
2	Transferbereich_2	CD	← A 512...543		32 Byte	
3	PAA_VR_ST1	CD	→ E 1024...1087		64 Byte	
4	PAE_VR_ST1	CD	← A 1024...1087		64 Byte	
5	PAA_VR_ST2	CD	→ E 1088...1151		64 Byte	
6	PAE_VR_ST2	CD	← A 1088...1151		64 Byte	
7	VR_BASE_IO_ADDRESS_ST1	CD	→ A 332...333		2 Byte	
8	VR_BASE_IO_ADDRESS_ST2	CD	← A 334...335		2 Byte	
9	<Neu hinzufügen>					

A maximum structure of the modules on the stations can also be created. Participants that are not used must then be deactivated by the system PLC due to the detection of non-existent participants (Profinet fault). The same applies to Profibus.

The ATS control system can tell the system PLC which participants are to be deactivated.

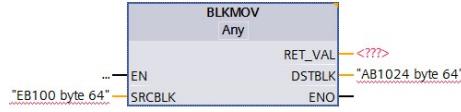
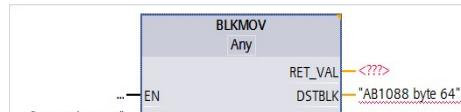
5.4 Module assignment of the stations

Module assignment of the stations

Module Station 1			Module Station 2		
Name (Device)	Geräte-nummer	E/A Adresse	Name (Device)	Geräte-nummer	E/A Adresse
Profinet			Profinet		
PNS1-ET200-11	11	EB100	PNS2-ET200-101	101	EB200
PNS1-ET200-12	12	EB101	PNS2-ET200-102	102	EB201
PNS1-ET200-13	13	EB102 AB102	PNS2-ET200-103	103	EB202 AB202

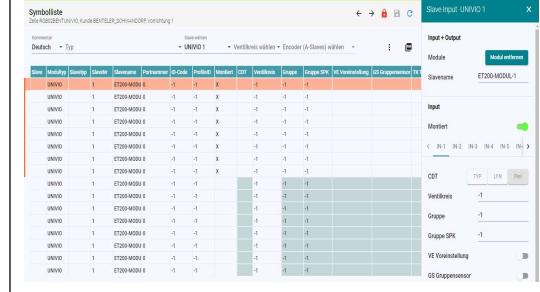
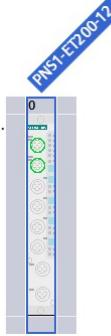
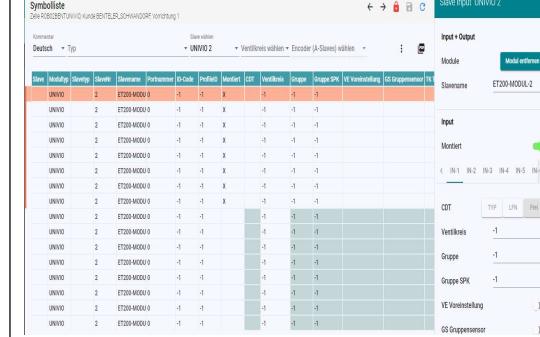
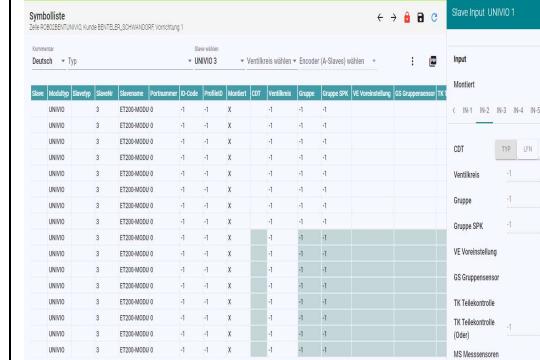
5.5 Transfer inputs from devices via I-Device

Peripheral states are routed from the point of view of the system PLC.

Station 1	<p>Transfer via Block Move</p> <p>The same applies to the opposite side.</p> 
Station 2	<p>Transfer via Block Move</p> <p>The same applies to the opposite side</p> 

5.6 Comparison of the assignment of the symbol list and the modules on the device

Beispiel Module Station 1

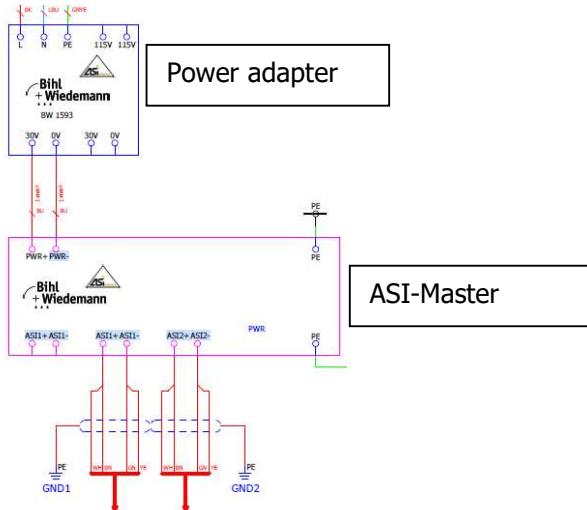
Modul	Symbol list ATS WebStudio i4.0
Modul device name PNS1-ET200-11 	 <p>Use of inputs as per Mounted Periphery byte EB100</p>
Modul device name PNS1-ET200-12 	 <p>Use of inputs as per Mounted Periphery byte EB101</p>
Modul device name PNS1-ET200-13 	 <p>Use of inputs as per Mounted Periphery byte EB102 Periphery byte AB102</p>

6 Hardware ASI

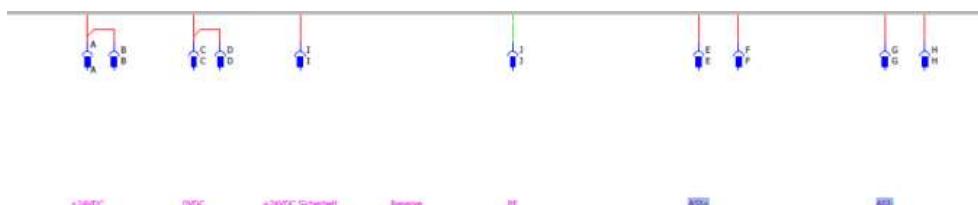
6.1 Komponenten

1 x Power adapter

1 x ASI gateway here as a double master



6.2 Example hardware interface



Description of pin assignment::

A/B + 24VDC

C/D 0VDC

I +24VDC, Shutdown via safety

J PE/earth

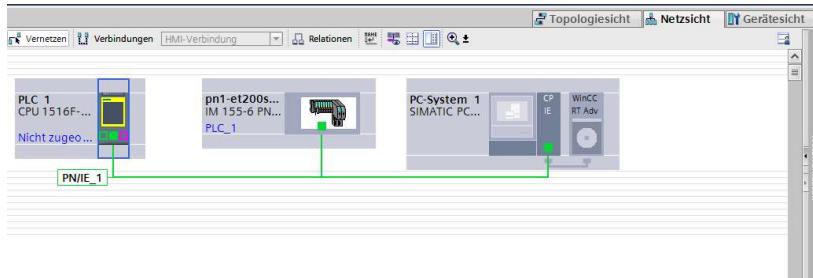
E/F Control voltage g ASI +30V

G/H Control voltage ASI 0V

7 Systems PLC CPU1500X and IBHSoftSPS (CPU416)

7.1 Device configuration systems PLC

Configuration from the ATS test setup



I-device transfer area

The transfer area_1 / 2 forms the interface between the CPUs. This can be adapted to the needs according to agreement.

The screenshot shows a table titled "Transferbereiche" under the heading "I-Device-Kommunikation". The table has columns for "Transferbereich", "Typ", "Adresse im IO-Cont...", "Adresse im I-Device", and "Länge". There are 9 entries in the table:

Transferbereich	Typ	Adresse im IO-Cont...	Adresse im I-Device	Länge
1 Transferbereich_1	CD	→ E 512...543	32 Byte	
2 Transferbereich_2	CD	← A 512...543	32 Byte	
3 PAA_VR_ST1	CD	→ E 1024...1087	64 Byte	
4 PAE_VR_ST1	CD	← A 1024...1087	64 Byte	
5 PAA_VR_ST2	CD	→ E 1088...1151	64 Byte	
6 PAE_VR_ST2	CD	← A 1088...1151	64 Byte	
7 VR_BASE_IO_ADDRESS_ST1	CD	← A 332...333	2 Byte	
8 VR_BASE_IO_ADDRESS_ST2	CD	← A 334...335	2 Byte	
9 <Neu hinzufügen>				

7.2 Configuration soft PLC

CPU416-3



When operating with ASI, the SOFT-PLC takes control of the ASI gateway

Transferbereich I-Device

	Modul	Baugr...	Steck...	E-Adresse	A-Adresse	Typ	Artikel-Nr.
1	plcxb1.idevice2d02	0	1	512...543		PLC_1_BENT_2020. 6E57 516-3FN00-0AB0	
2	Transferbereich_1	0	1	1.1000	512...543	Transferbereich_1	
3	Transferbereich_2	0	1	1.1001	512...543	Transferbereich_2	
4	PAA_VR_ST1	0	1	1.1002	1000...1063	PAA_VR_ST1	
5	PAE_VR_ST1	0	1	1.1003	1000.....	PAE_VR_ST1	
6	PAA_VR_ST2	0	1	1.1004	1064...1127	PAA_VR_ST2	
7	PAE_VR_ST2	0	1	1.1005	1064.....	PAE_VR_ST2	
8	VR_BASE_IO_ADDRESS_ST0	0	1	1.1006	332...333	VR_BASE_IO_ADRE...	
9	VR_BASE_IO_ADDRESS_ST0	0	1	1.1007	334...335	VR_BASE_IO_ADRE...	

7.3 Comparison of the interfaces

Anlagen CPU I-Device		Soft-SPS ATS Profinet-Teilnehmer (I-Device)
Standardtransferbereich:		
TransferArea_1 Out/In TransferArea_2 In/Out	Signal exchange like: Modes of operation safety Positions robot Etc.	
Operation with UNIVERSAL-IO (UNIVIO)		
PAA_VR_ST1 PAA_VR_ST2	IO signals begin with byte address X. A total of 64 bytes per station.	
VR_BASE_IO_ADDRESS_ST1 VR_BASE_IO_ADDRESS_ST2	Serves for the automatic calculation of the IO addresses (byte number) on the ATS side. Example: Station 1 peripheral allocation from EB / AB100 Station 2 peripheral allocation from EB / AB164	