

Software user guide ver. 2.0

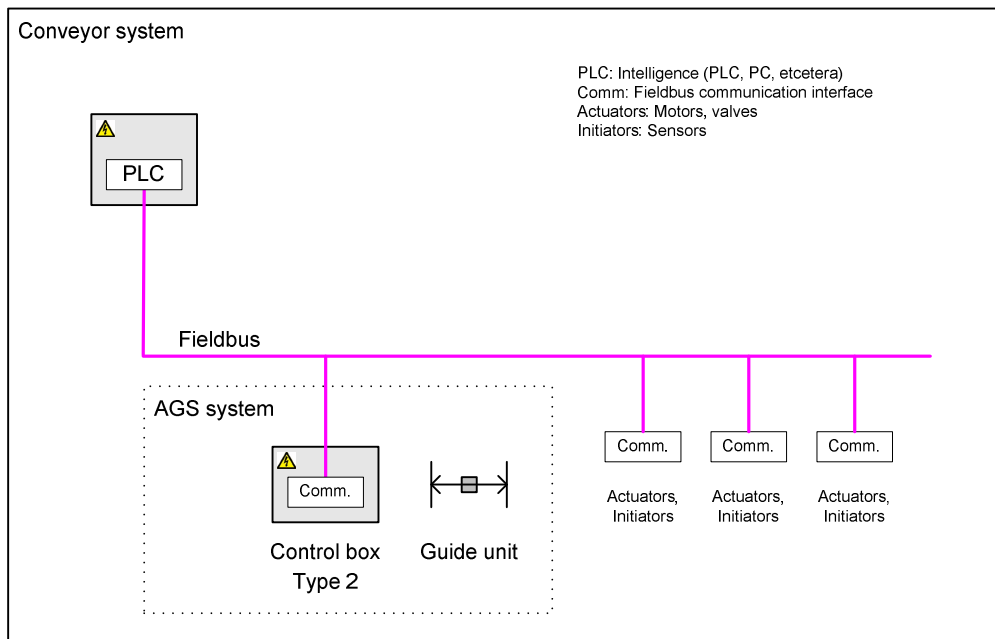
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1 General

The AGS is regarded as accessory to the conveyor system, consequently is the conveyor system's PLC used for controlling the AGS Control box in order to utilize existing investments.

PLC-code is beneficially created and supplied by FlexLink, which decrease the hours spent on programming. The code is open, thus enabling customization.

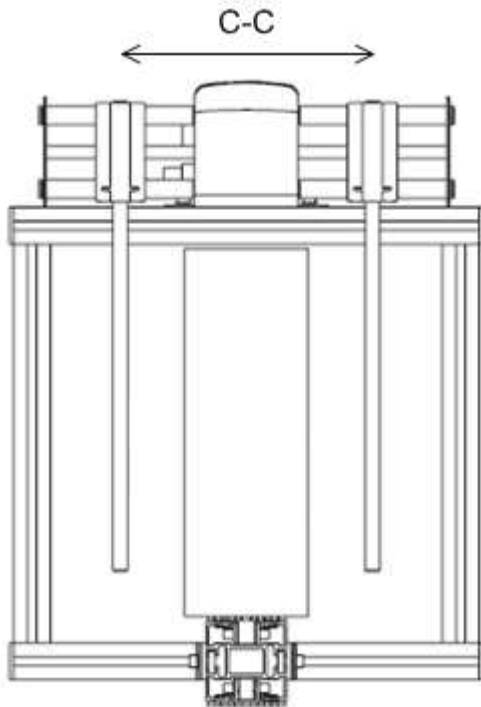


This document and other information is found at www.flexlink.com Technical library/Functions/Automatic guiding system.

2 Track width setting

Guide units with *Track width setting* allow to perform positioning of the guide rails.

As the Guide units can be equipped with numerous types of guide rail brackets and guide rails, the term *Track width setting* is equivalent to the CC-distance between the sliding supports of the Guide unit.



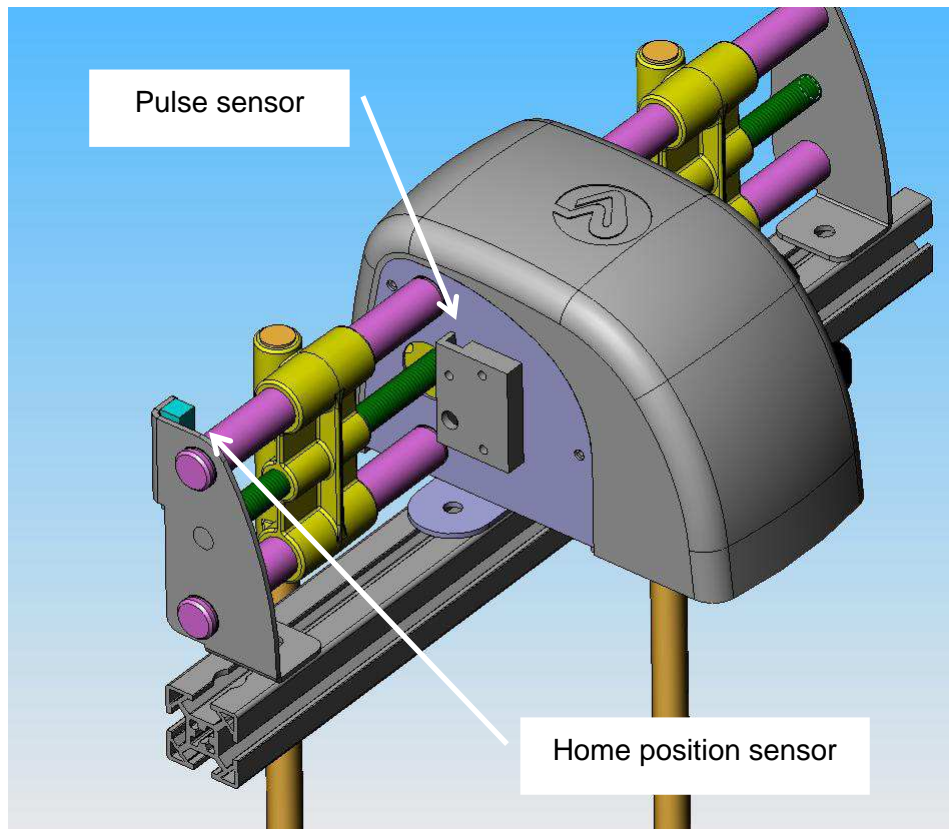
3 Electrical installation

3.1 Guide unit

Each Guide unit with the *Track Width Setting feature* has two sensors:

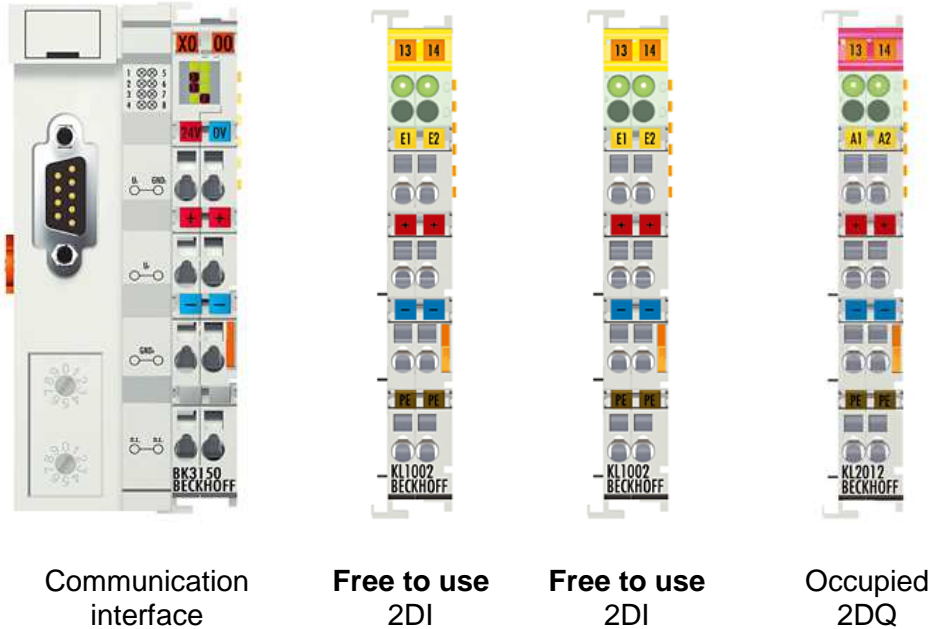
- Home position sensor
- Pulse sensor.

Pitch = 1.5 mm.



3.2 Control box, Type 2

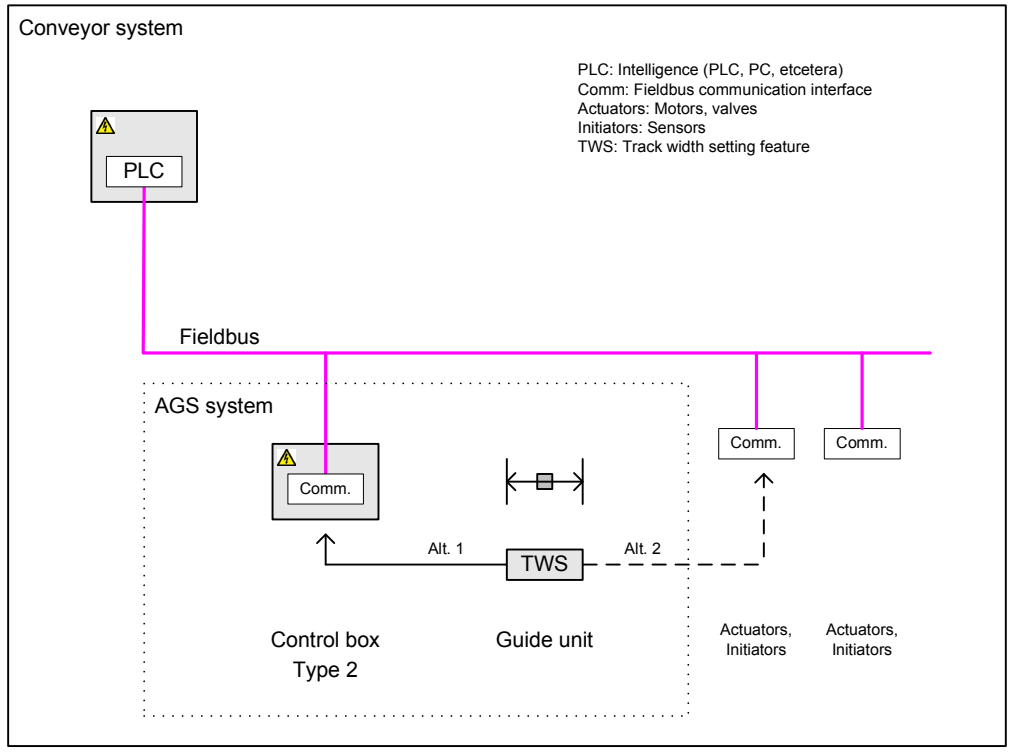
Each Control box, Type 2 has free 4 inputs that can be used for connecting the Guide unit's sensors.



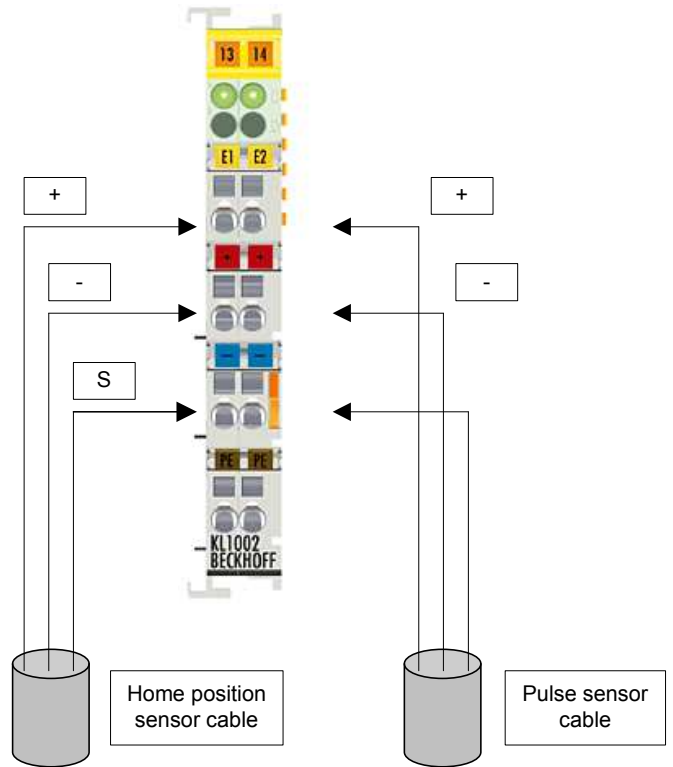
3.3 Connecting sensors to PLC

The sensors can be connected to the PLC in different ways:

- Via AGS Control box, Type 2
- Via another fieldbus interface
- Directly to input on PLC



If connecting the sensors of the Guide unit to the Control box, the sensor cables can be connected straight to the fieldbus interface.



4 Function block

The AGS-software shall be integrated in the Conveyor system's PLC.

4.1 Inputs and outputs of function block

Inputs:

iRun	Run-signal
iB1_home	Reference sensor in outer position
iB2_pulse	Pulse sensor
iReset	Reset for alarms
iManIn	Manual force inwards
iManOut	Manual force outwards
iSync	Synchronization of Guide units
iC_CMax	Maximum C-C distance.
iC_C	Desired C-C distance

Outputs:

qInPosition	Track width setting executed
qC_C	Actual C-C distance
qInwards	Motion inwards
qOutwards	Motion outwards
qSyncFinished	Guide unit synchronization finished (=20s.)
qAlarm	Alarm signal
qAlarmCode	Alarm value

Inputs/outputs

iqPulseValue	Pulse value (Comment: Battery backed-up)
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4.2 Remanent memory

Signal *iqPulseValue* shall be connected to a remanent variable that do not loose content at power down.

4.3 Functionality

The function block handles:

- Synchronization
- Automatic setting
- Manual setting
- Alarm report

4.4 C-C max setting

The Guide units come in different sizes with different maximum CC-distance between sliding supports. The signal *iC_CMax* is used for setting the correct size. Setting the signal to a value differing available sizes will cause an alarm.

Used for setting the correct size.

Fill in max distance (Possible values: 255, 455, 485, 653, 716)

Example: XLRQ 455 x 296

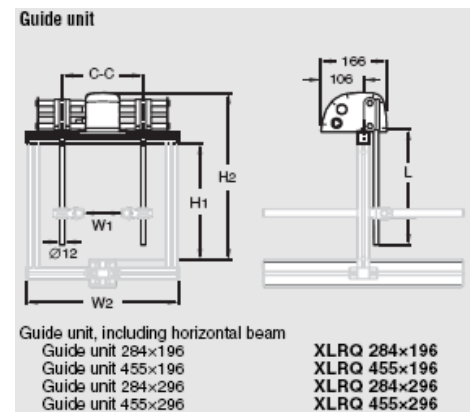
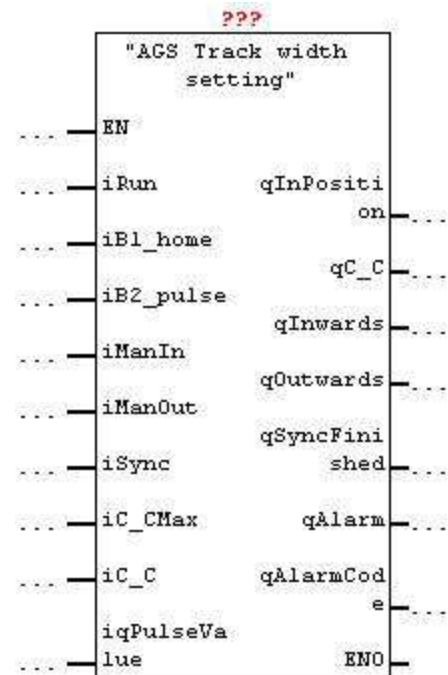


4.5 C-C parameter

Signal *iC_C* is used for setting the C-C distance between sliding supports.

Size	Interval
284	126-284
455	126-455
485	166-485
653	166-653
716	166-716

A value outside range will cause an alarm.



As the Guide units can be equipped with numerous types of guide rail brackets and guide rails, the *Track width setting* W1 will differ to the C-C distance between the sliding supports.

It is up to the implementing programmer to translate the *distance between guide rails* into *distance between sliding supports*.

4.6 Synchronization

Synchronization:

- **Start: Set iSync.**
- Guide rails move apart continuously.
- Guide rails reach Home sensor.
- Moving apart for another 20 seconds.
- Synchronized: Pulse value is set to 0.
- Output qSyncFinished goes high.
- **Reset input iSync.**

Input iSync must have a continuous signal or synchronization will stop.

Synchronization can not be done manually.

It is possible to run Guide rail to outer position manually, but the system will not set Pulse value to 0.

4.7 Automatic setting

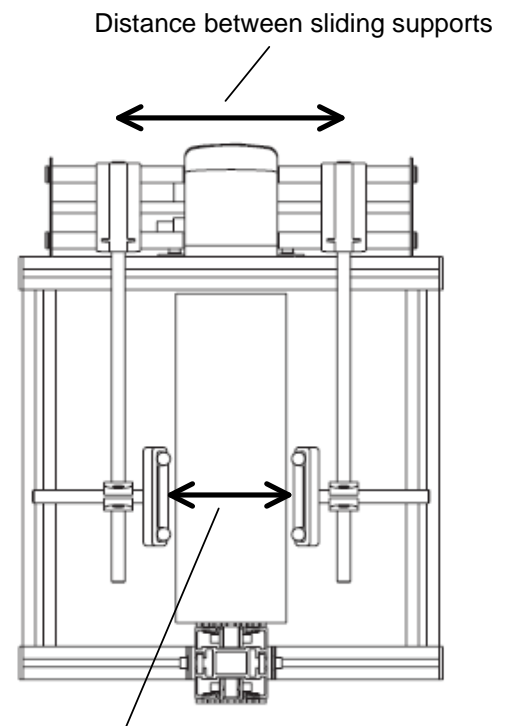
Conditions:

- Synchronization OFF.
- No alarm. (qAlarm = 0)

Automatic setting:

- **Fill in value for input iC_C.**
- **Set input iRun.**
- Guide rails move towards desired position, counting pulses.
- Position reached.
- Output qInPosition is set.

Input iRun must have continuous signal or automatic setting will stop. The input can be reset when position is reached.



Distance between guide rails

4.8 Manual setting

Conditions:

- Synchronization OFF.

Manual setting:

- Set input iManIn
- Guide rails move inwards. Pulses are counted.
- Reset input iManIn
- Guide rails stop

Set input iManOut

- Guide rails move outwards. Pulses are counted.
- Reset input iManOut
- Guide rails stop

Manual setting can not be used for synchronization, see Synchronization.

4.9 Motion

The Guide unit will move if (listed in priority order):

1. Guide unit synchronization is enabled,
2. Manual force signal is enabled,
3. The distance between sliding supports do not correspond with the set Track width setting* and *iRun* is HIGH.

The outwards motion has higher priority than inwards motion.

4.10 Alarms

The output *qAlarm* contains a value. Any value greater than zero will stop automatic setting. Manual run and Synchronization are not affected by alarm.

Alarm code:

0. No alarm
1. Pulse value < 0
2. Pulse value > max value
3. C-C value out of range
4. Unvalid C-CMax setting

To restore AGS during Alarm = 1 or 2, perform a synchronization.

4.11 Advanced

x = Pulse value
y = C-C distance

Equation
 $y(x) = -1.5x + \text{SizeSetting}$

Example 1:
SizeSetting = 485

Find C-C at outer position.

Solution:
Pulse value is set to 0 at outer position.
 $y(0) = -1.5 \cdot 0 + 485$
C-C = $y(0) = 485$

Example 2:
SizeSetting = 485

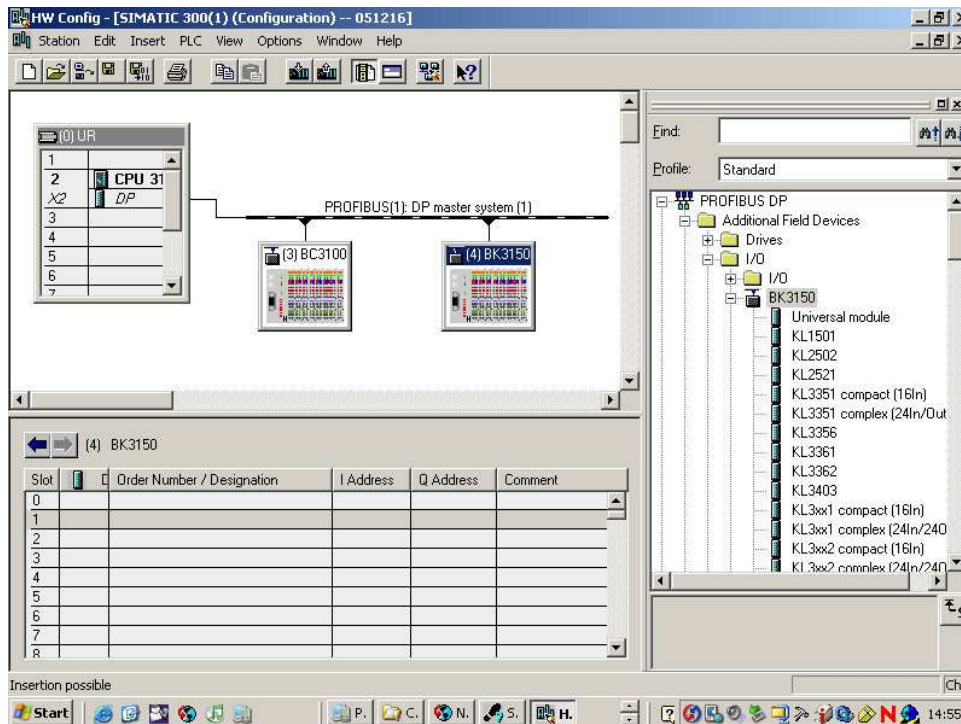
Find pulse value at most inward position:

Solution:
 $y_{\min} = 166$ (see chapter "C-C parameter")
 $166 = -1.5 \cdot x + 485$
 $x = (166 - 485) / -1.5 = \text{approx. } 212.67$
(Pulse value 213 should never appear. If so – then alarm.)

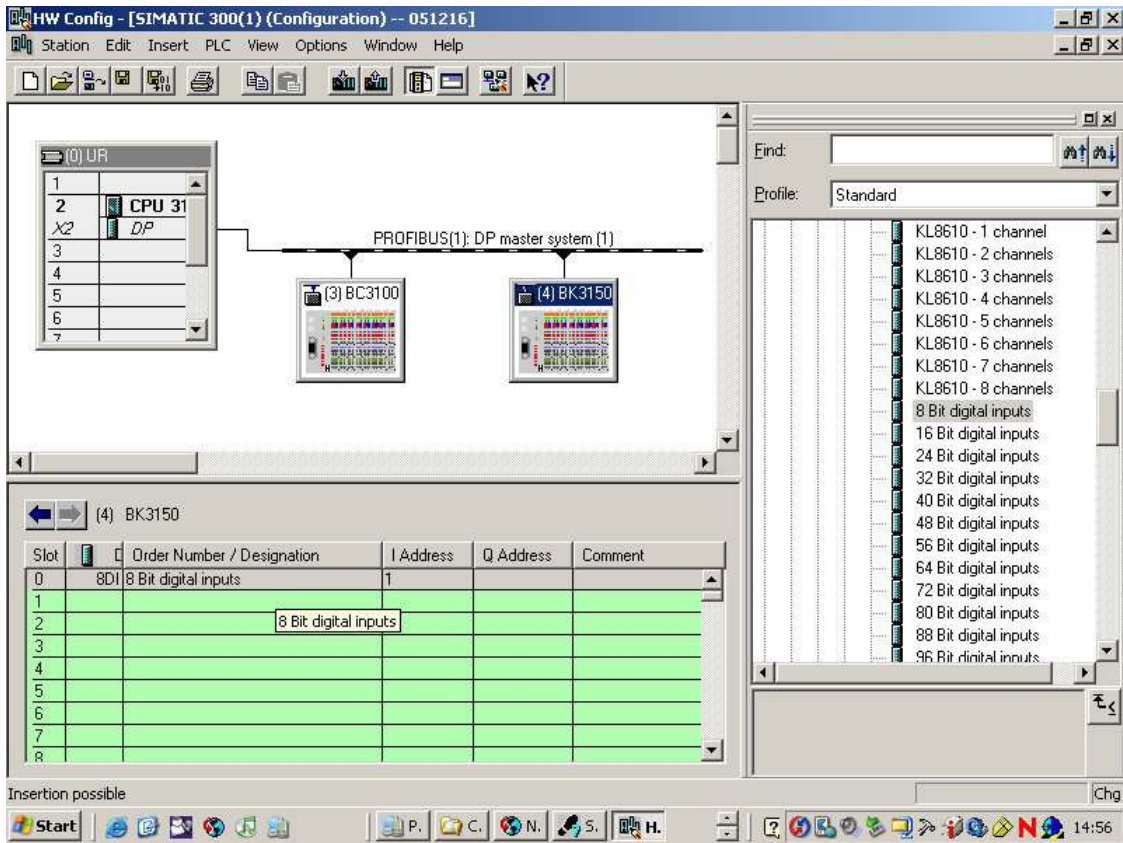
5 Control box 5057246 Siemens S7 hardware configuration

Use the following instruction to configure the hardware for Control box 5057246.

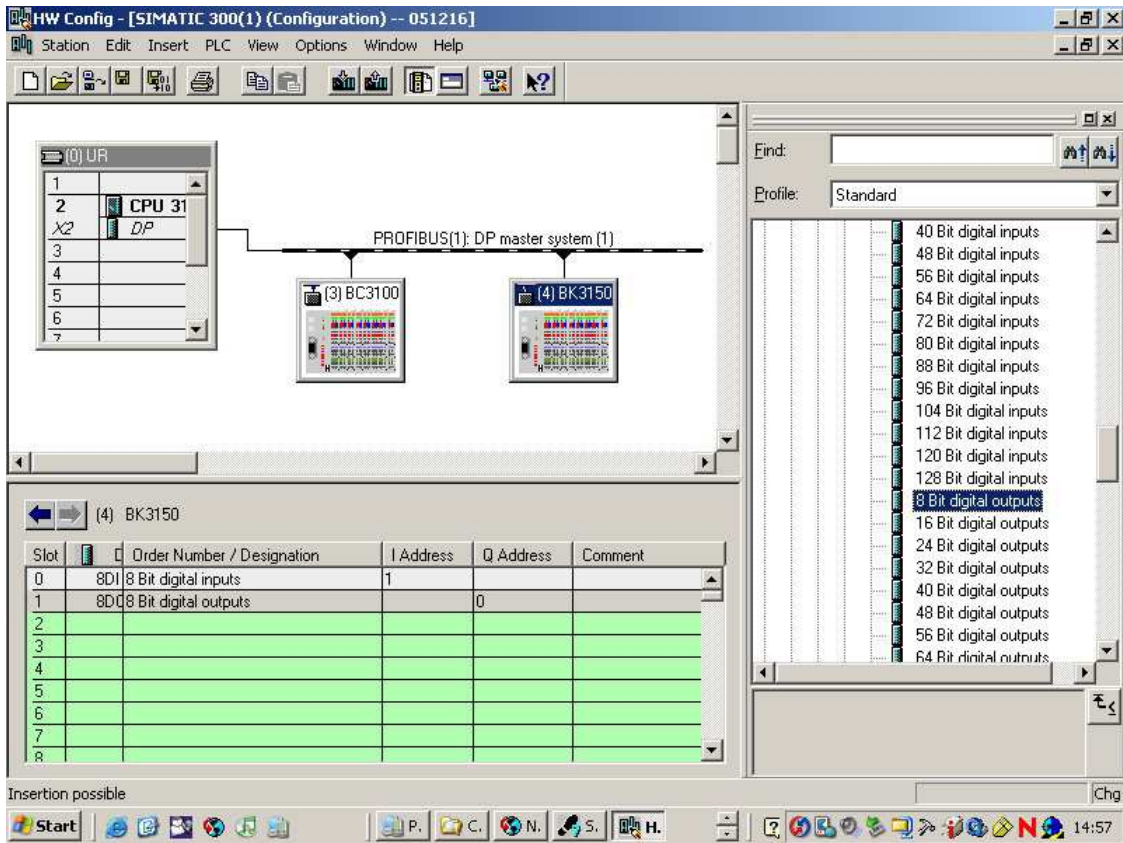
1. Download the GSD/GSE/GSG-file for BK3150 from www.beckhoff.com and install in S7 HW configurator.
2. Drag and drop BK3150 to Profibus.



3. Scroll down in the structure of BK3150 and drag and drop one block of "8 bit digital inputs" into the BK3150. The Control box 5057246 has 4 digital inputs, but the smallest block of digital inputs contains 8 bits.



4. Scroll down in the structure of BK3150 and drag and drop one block of "8 bit digital outputs" into the BK3150. The Control box 5057246 has 2 digital outputs, but the smallest block of digital outputs contains 8 bits.



5. Change the addresses of inputs and outputs of the BK3150 to the desired addresses.
6. Finished.