

PCD3.C90



<u>Revision History</u>			
Date	Modification	Author	Version
14.09.09	E/A – Bus Connector PCD2.K106 change to PCD3.K106	Müller.R	1.1
22.09.09	Added E/A – Bus Connector PCD3.K116	Müller.R	1.2
06.01.10	Added note page 13	--	Rev. IX
2014-01-22	Change of logo	HaMa	EN04
2019-08-09	Changed the phone number	HaMa	ENG05

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1 Introduction

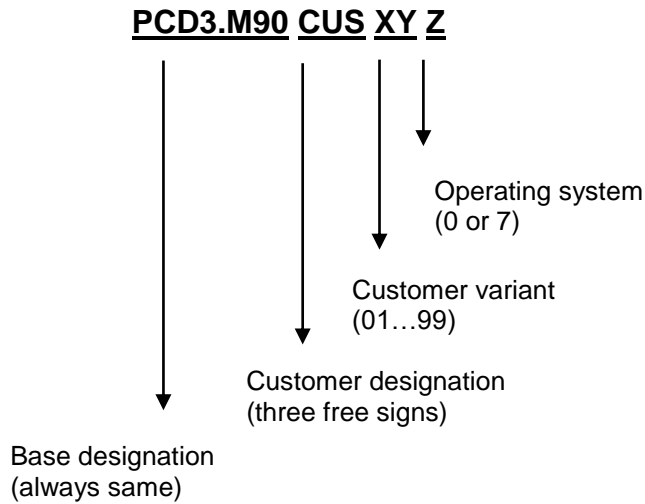
The OEM Controller is previewed for OEM customers in infrastructure applications. It is based on a PCD3 CPU with a dedicated I/O Board. A metal housing protects the electronic.

The system can be extended with a dedicated extension unit.

1.1 ASN Name

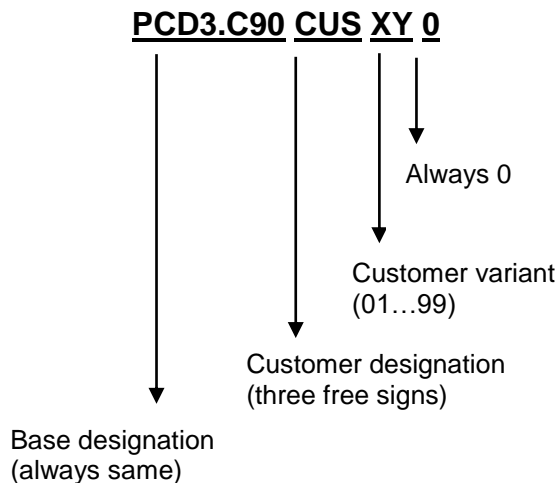
OEM Controller PCD3.M90

Base unit:



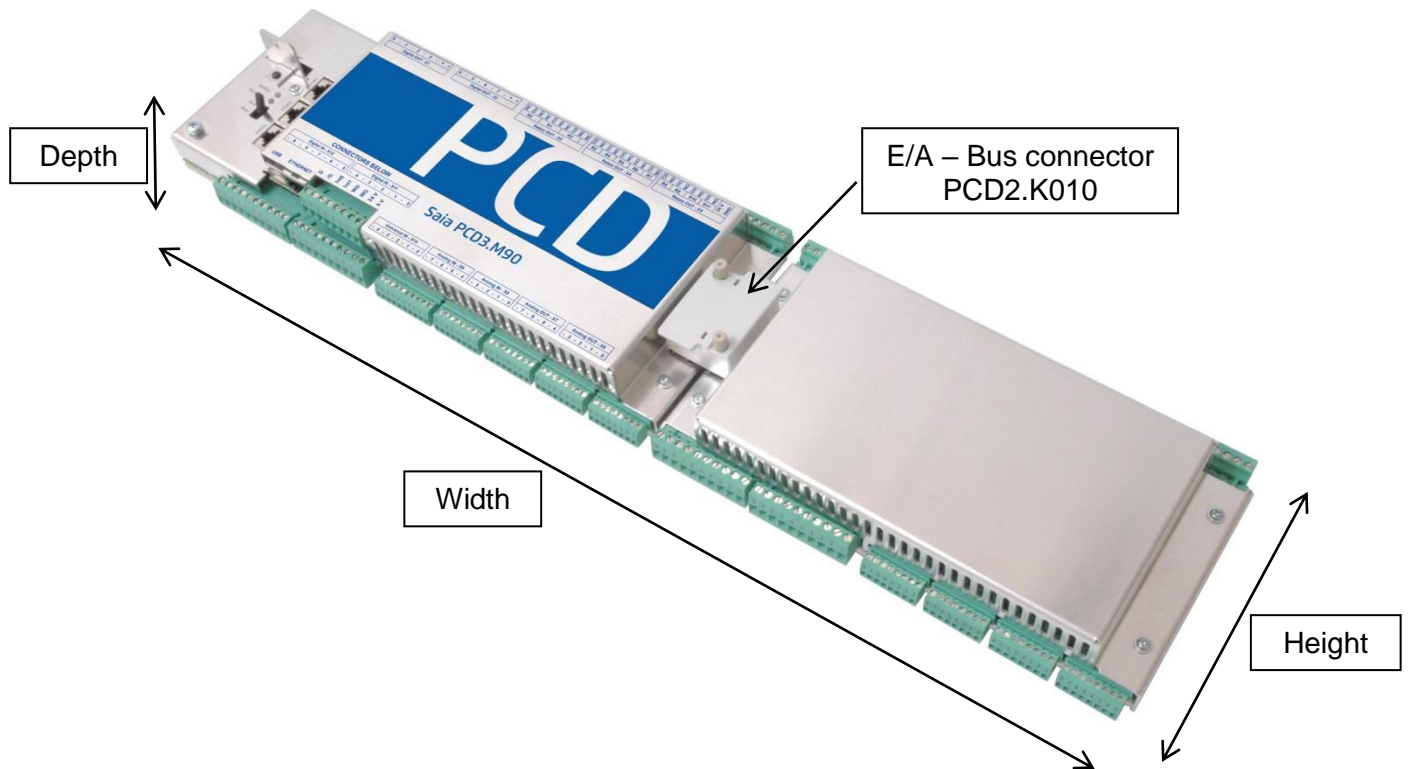
OEM Extension PCD3.C90

Extension unit:



2 Mechanical data Extension Unit

2.1 Main Unit & Extension Unit



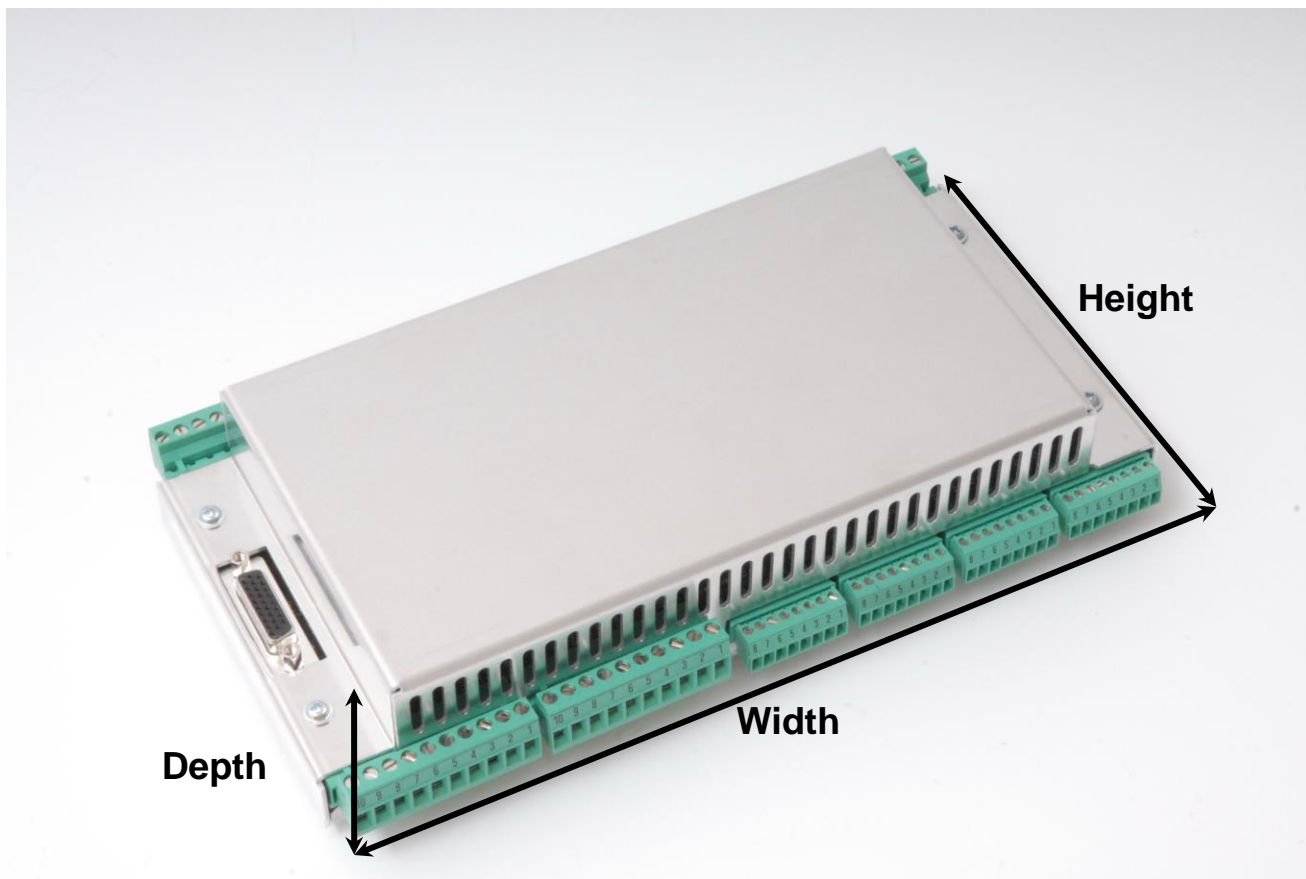
Width: 560 mm
Height: 132 mm (with the connectors)
Depth: 44 mm (from DIN rail)

2.2 Connector to the Main Unit

E/A – Bus Connector PCD2.K010 (Connector)
E/A – Bus Connector PCD3.K106 (Cable 0,7 m)
E/A – Bus Connector PCD3.K116 (Cable 1,2 m)

2.3 Extension Unit

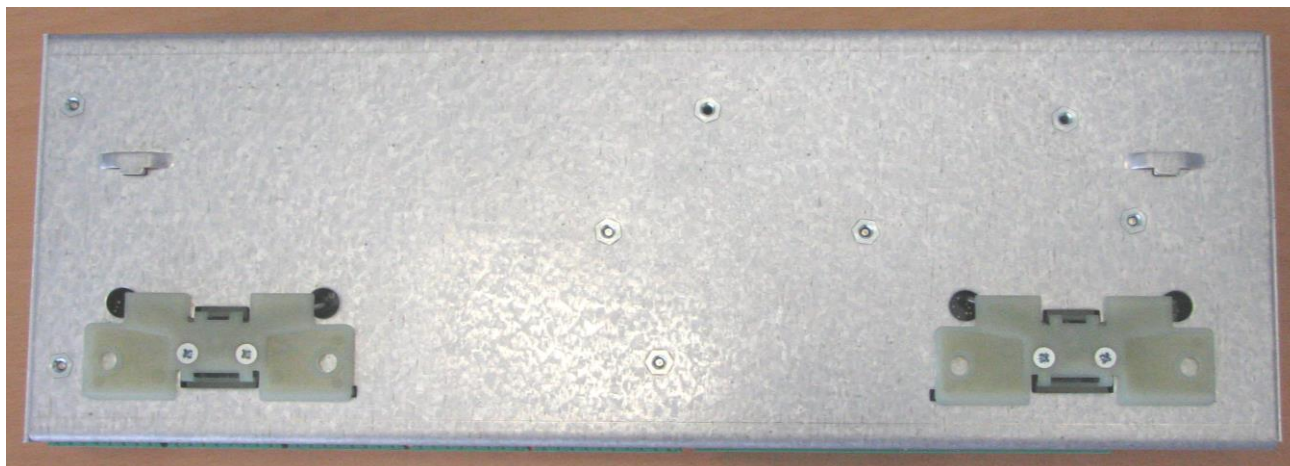
2.3.1 Dimensions Extension Unit



Width: 240 mm
Height: 132 mm (with the connectors)
Depth: 44 mm (from DIN rail)

2.3.2 Fixation Extension Unit

The back plate is equipped with two DIN rail fixations that the system can be mounted on a single DIN rail, the backplane is on PGND potential.



3 Functions

3.1 Extension Unit

On the Extension I/O board:

- 10 digital inputs
- 16 digital outputs
- 14 analogue inputs, 12 Bit, 0...10 V / 0...20 mA / PT/NI1000 / NTC10, selectable per channel with jumpers.
- 2 analogue outputs, 12 Bit, 0... 10 V

3.2 Main Unit & Extension Unit

On the Main Unit & Extension Unit I/O board

- 20 digital inputs
- 24 digital outputs
- 12 digital outputs relays
- 22 analogue inputs, 12 Bit, 0...10 V / 0...20 mA / PT/NI1000 / NTC10, selectable per channel with jumpers.
- 10 analogue outputs, 12 Bit, 0... 10 V
- 5 universal inputs which are digital or analogue inputs 0... 10V / >10V = high

Note: For the position of the different elements, please refer to page 11.

4 Technical specifications

4.1 General technical data

Supply voltage	base unit X30
Power consumption	max. 12 W (no load current included)
Storage temperature:	-25...+70° C
Ambient temperature operating:	0...+55° C
Relative air humidity:	10...95% r.h. non condensing
Protection level:	IP20
Standards	CE: EMC (industrial level), UL: certificated Rohs compliant (2002/95/CE)

4.2 Technical data of Main I/O-Board

4.2.1 Digital inputs: X28, X29

Number of inputs:	10, electrically connected, source operation
Input voltage:	Type. 24 VDC smoothed or pulsed H level: 15...30V L level: -30...+5V
Input current:	typ. 4 mA at 24 VDC (IEC 61131-2, Typ 1)
Input delay:	typ. 8 ms
Over voltage protection:	no
Terminals	2 plug-in screw terminal blocks, 10-pole, 5mm, for wiring up to 2.5 mm ²

4.2.2 Digital outputs: X20,X21,X22, X23

Number of outputs:	16, electrically connected, source operation
Voltage range:	10...32 VDC, smoothed, max. 10% residual ripple
Output current:	5...500 mA (leakage current max. 0,1 mA) min. load resistance: 48Ω
Short circuit protection	yes
Voltage drop:	Max. 0.3 V at 0.5 A
Output delay:	Typically 50 μs, max. 100 μs for resistive load
Terminals	4 plug-in screw terminal block 10-pole, 5 mm, for wiring up to 2.5 mm ²



Please note that the state of the: Digital output and the Relays outputs are writable only.

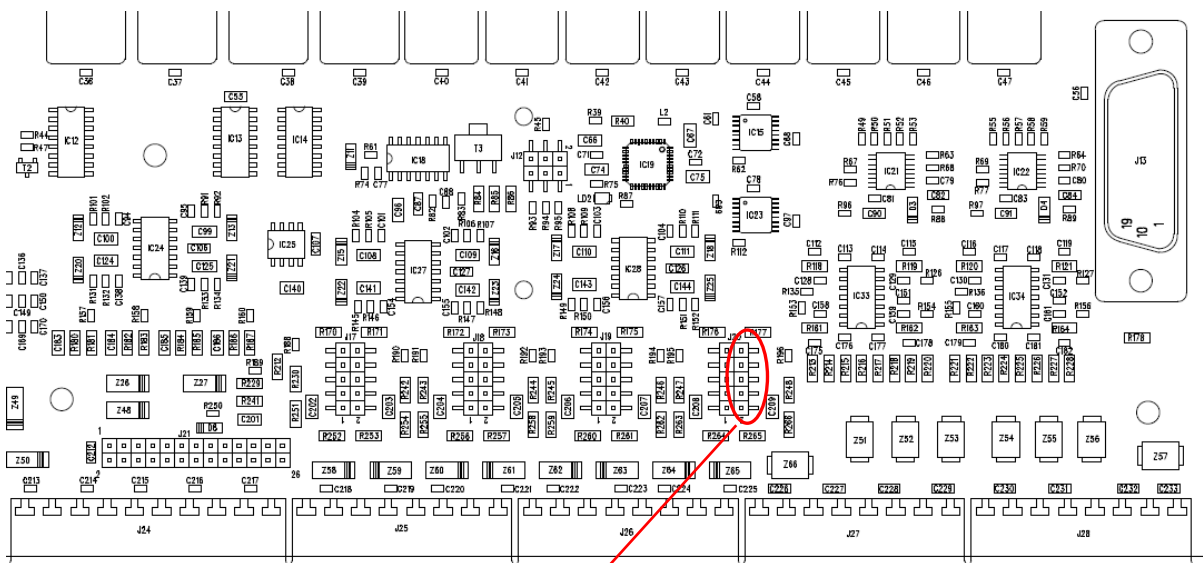
It is not possible reading the state of the digital output or relays outputs.

Due to this fact, some instructions (like e.g. COM) do not work.

4.2.3 Analogue inputs: X24, X25, X26, X27

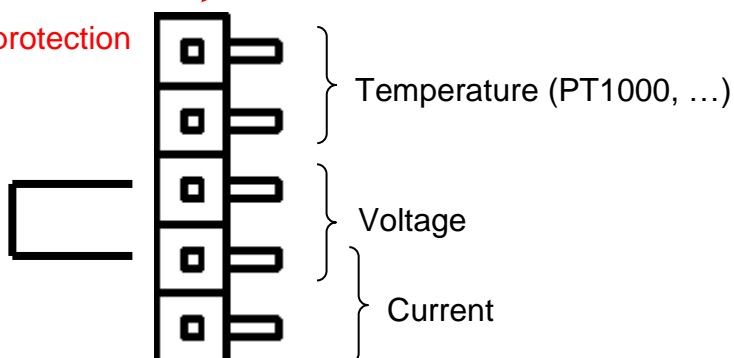
Number of inputs:	14 AI → Note X24 Pin 0&2 = 2AO please refer to you on chapter 4.2.4
Galvanic separation:	no
Signal ranges (jumper selectable):	0...10 V Resolution*) 2.44 mV 0...20 mA, Resolution*) 4.88 µA
	*) Resolution = value of least significant bit (LSB)
Resolution (digital representation):	12 bits (0...4095) resp. directly in 1/10° C
Connection technique for sensors	2 wires (passive input)
Measuring principle:	Single ended
Input resistance:	10 V range: 40 kΩ 20 mA range: 125 Ω
Input filter:	typ. 10 ms (0...10V; RTC10) typ. 20 ms (0...20mA; PT/NI1000)
Input ranges for temperature sensors	PT1000: -100...+200° C NI1000: -50...+200° C NTC10: -50...+100° C
Accuracy at 25°C:	± 0.5%
Temperature error (0...+55°C):	± 0.25%
Over range protection:	10 V range: + 35 V (39V TVS Diode) 20 mA range: +40 mA
Terminals	4 plug-in screw terminal blocks 8-pole, 3.5 mm, for wiring up to 1.5 mm ²

For the Analogue Inputs, don't forget to put the jumper in right position (Voltage, Current or Temperature)



There is no input protection in current mode (20 mA MAX!)

DEFAULT SETTING



4.2.4 Analogue outputs: X24

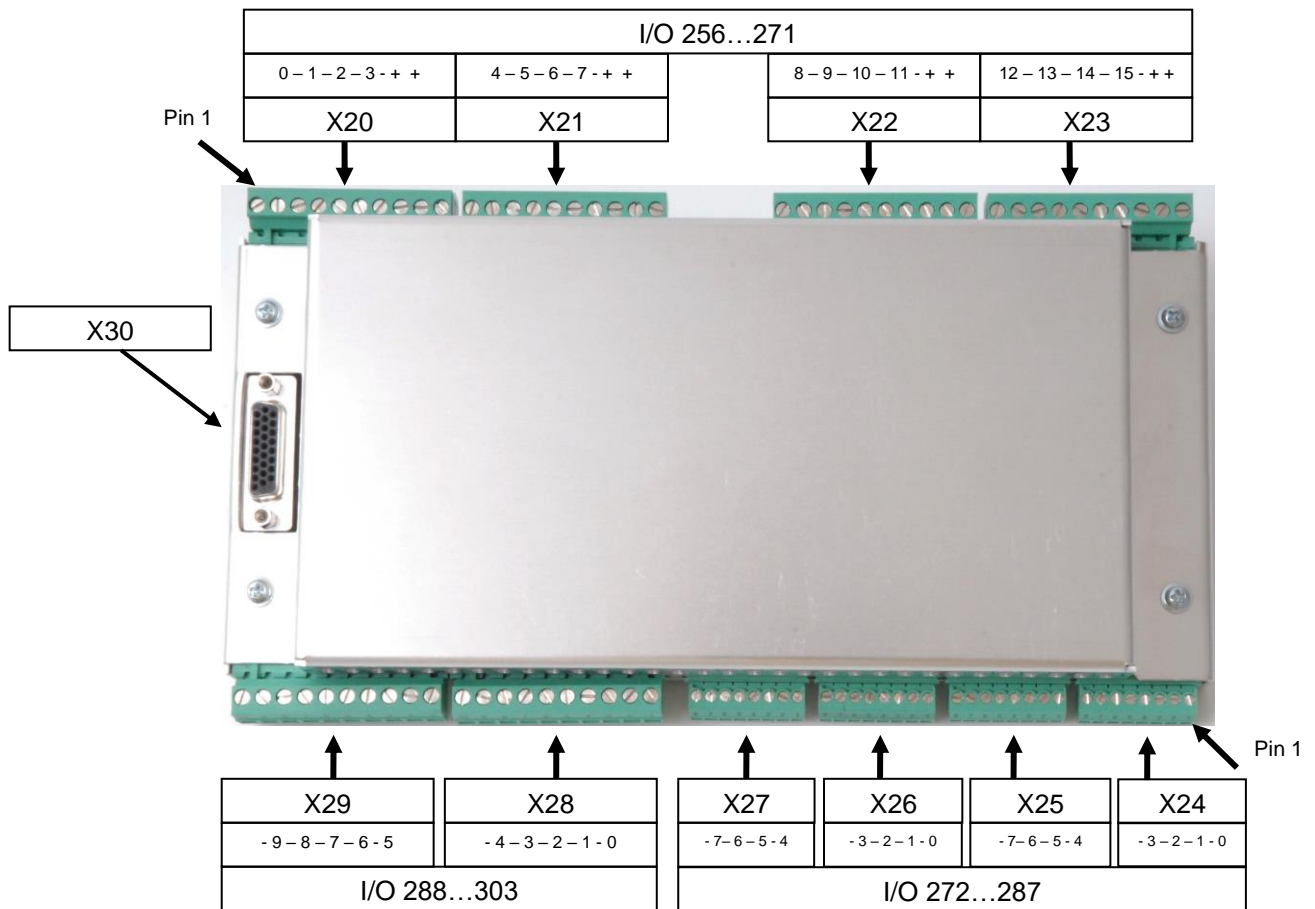
Number of outputs:	2
Galvanic separation:	no
Signal ranges:	0...10 V Resolution*) 2.44 mV
	*) Resolution = value of least significant bit (LSB)
Resolution (digital representation):	12 bits (0...4095)
Accuracy at 25°C:	± 1% ± 50mV
Temperature error (0...+55°C):	± 0.25%
Load resistance	Voltage output 0...10V: min. 3kΩ
Short-circuit protection:	yes, permanent
Time constant of the output filter:	100 ms
Terminals	1 plug-in screw terminal blocks 8-pole, 3.5 mm, for wiring up to 1.5 mm ²

4.2.5 E/A Bus connector: X30

I/O Extension (X14):	HD 26-pole female
Connector type:	E/A – Bus Connector PCD2.K010 E/A – Bus Connector PCD2.K106

5 Connection technology

5.1 Numbering of connectors



5.2 Connector types

On I/O Board	
Digital outputs (X20;X21;X22;X23):	4x plug-in screw terminal block, 10-pole, 5 mm ¹⁾
Analogue outputs (X24):	Pin 1 - 4
Analogue inputs (X24;X25;X26;X27):	4x plug-in screw terminal block, 8-pole, 3.5 mm ²⁾
Digital inputs (X28;X29):	2x plug-in screw terminal block, 10-pole, 5 mm ¹⁾
	¹⁾ SAURO CIF green ²⁾ SAURO CTF green

5.3 Pin out Extension unit

I/O-Board

Connector	Pin number	Signal name	Description	Comment
X20 Digital Outputs	1	D00	Digital Output 0	
	2	GND	System ground	
	3	DO1	Digital Output 1	
	4	GND	System ground	
	5	DO2	Digital Output 2	
	6	GND	System ground	
	7	DO3	Digital Output 3	
	8	GND	System ground	
	9	+24V	System Power	
	10	+24V	System Power	
X21 Digital Outputs	1	D04	Digital Output 4	
	2	GND	System ground	
	3	DO5	Digital Output 5	
	4	GND	System ground	
	5	DO6	Digital Output 6	
	6	GND	System ground	
	7	DO7	Digital Output 7	
	8	GND	System ground	
	9	+24V	System Power	
	10	+24V	System Power	
X22 Digital Outputs	1	D08	Digital Output 4	
	2	GND	System ground	
	3	DO9	Digital Output 5	
	4	GND	System ground	
	5	D10	Digital Output 6	
	6	GND	System ground	
	7	D11	Digital Output 7	
	8	GND	System ground	
	9	+24V	System Power	
	10	+24V	System Power	
X23 Digital Outputs	1	D12	Digital Output 4	
	2	GND	System ground	
	3	D13	Digital Output 5	
	4	GND	System ground	
	5	D14	Digital Output 6	
	6	GND	System ground	
	7	D15	Digital Output 7	
	8	GND	System ground	
	9	+24V	System Power	
	10	+24V	System Power	
X24 Analog Outputs	1	AO0	Analog Output 0	
	2	GND	System ground	
	3	AO1	Analog Output 1	
	4	GND	System ground	
X24 Analogue Inputs	5	AI0	Analog Input 0	
	6	GND	System ground	
	7	AI1	Analog Input 1	
	8	GND	System ground	
X25 Analogue Inputs	1	AI2	Analog Input 2	
	2	GND	System ground	
	3	AI3	Analog Input 3	
	4	GND	System ground	
	5	AI4	Analog Input 4	
	6	GND	System ground	
	7	AI5	Analog Input 5	
	8	GND	System ground	

Connector	Pin number	Signal name	Description	Comment
X26 Analogue Inputs	1	AI6	Analog Input 6	
	2	GND	System ground	
	3	AI7	Analog Input 7	
	4	GND	System ground	
	5	AI8	Analog Input 8	
	6	GND	System ground	
	7	AI9	Analog Input 9	
	8	GND	System ground	
X27 Analogue Inputs	1	AI10	Analog Input 10	
	2	GND	System ground	
	3	AI11	Analog Input 11	
	4	GND	System ground	
	5	AI12	Analog Input 12	
	6	GND	System ground	
	7	AI13	Analog Input 13	
	8	GND	System ground	
X28 Digital Inputs	1	DI0	Digital Input 0	
	2	GND	System ground	
	3	DI1	Digital Input 1	
	4	GND	System ground	
	5	DI2	Digital Input 2	
	6	GND	System ground	
	7	DI3	Digital Input 3	
	8	GND	System ground	
	9	DI4	Digital Input 4	
	10	GND	System ground	
X29 Digital Inputs	1	DI5	Digital Input 5	
	2	GND	System ground	
	3	DI6	Digital Input 6	
	4	GND	System ground	
	5	DI7	Digital Input 7	
	6	GND	System ground	
	7	DI8	Digital Input 8	
	8	GND	System ground	
	9	DI9	Digital Input 9	
	10	GND	System ground	



Do never plug in the extension if the main module has power source.
To connect an extension the main module must be disconnected from the power supply.

6 I/O Mapping

6.1 Basic Unit

Function	Address	Configuration
Slot 0...3	0 ...63	not usable (on CPU slot 0...3)
8 DO	64...79	like A460 configured
12 Relays O	80...95	like A200 configured but 12 relays
8 AO / 8AI / 5UI	96...111	new to implement
10 DI	112...127	like E160 configured

6.2 Extension Unit

Function	Address	Configuration
16 DO	256...271	like A460 configured
2AO + 14 AI	272...287	new to implement
10 DI	288...303	like E160 configured

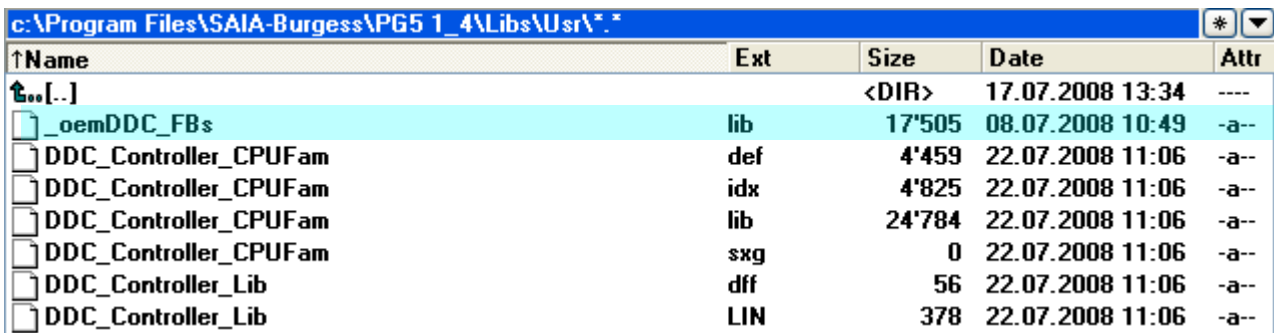
7 Configuration

7.1 Software

All of us customer will receive per E-mail, one file (the name is OEM DDC Controller library_V1_0_001_ml.exe) to install in his own PC to be able to configure some Inputs and Outputs (see a picture in the next side).

To use the new Fbox in PG5, **double-click on the EXE.file:**

All files will be installed automatically in the right dossier (see image here below).

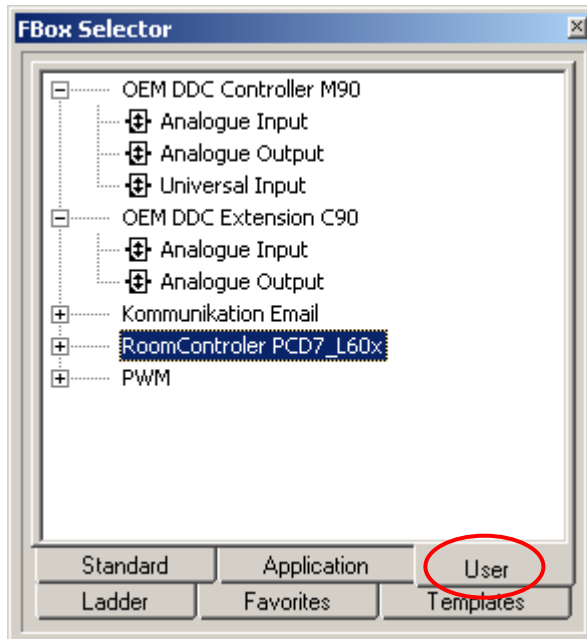


Name	Ext	Size	Date	Attr
↑Name				
↑..[...]		<DIR>	17.07.2008 13:34	----
<input type="checkbox"/> _oemDDC_FBs	lib	17'505	08.07.2008 10:49	-a-
<input type="checkbox"/> DDC_Controller_CPUFam	def	4'459	22.07.2008 11:06	-a-
<input type="checkbox"/> DDC_Controller_CPUFam	idx	4'825	22.07.2008 11:06	-a-
<input type="checkbox"/> DDC_Controller_CPUFam	lib	24'784	22.07.2008 11:06	-a-
<input type="checkbox"/> DDC_Controller_CPUFam	sxg	0	22.07.2008 11:06	-a-
<input type="checkbox"/> DDC_Controller_Lib	dff	56	22.07.2008 11:06	-a-
<input type="checkbox"/> DDC_Controller_Lib	LIN	378	22.07.2008 11:06	-a-

Note: Just the file ***_oemDDC_FBs*** is used with the IL program.

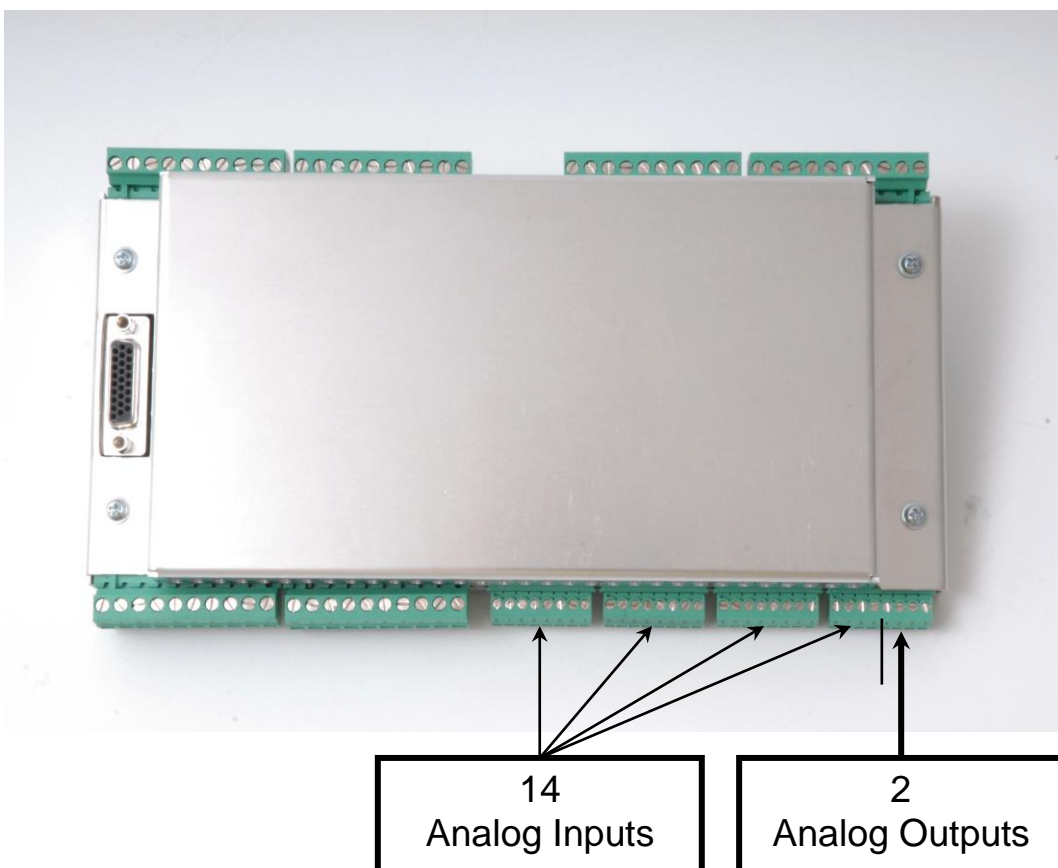
8 FBox

You can find the special FBox for the DDC_Controller in *FBox Selector* "User"

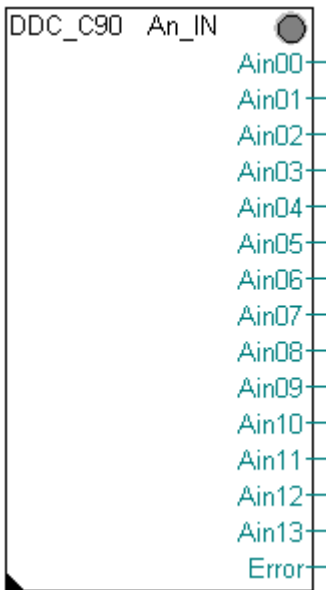


Remark: All of these 5 FBox can be stretched up to their own maximal inputs/outputs.

Below a picture of the DDC Controller with the 2 different Input/Output, which are used in the new FBox.



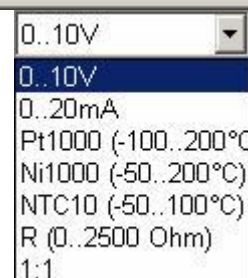
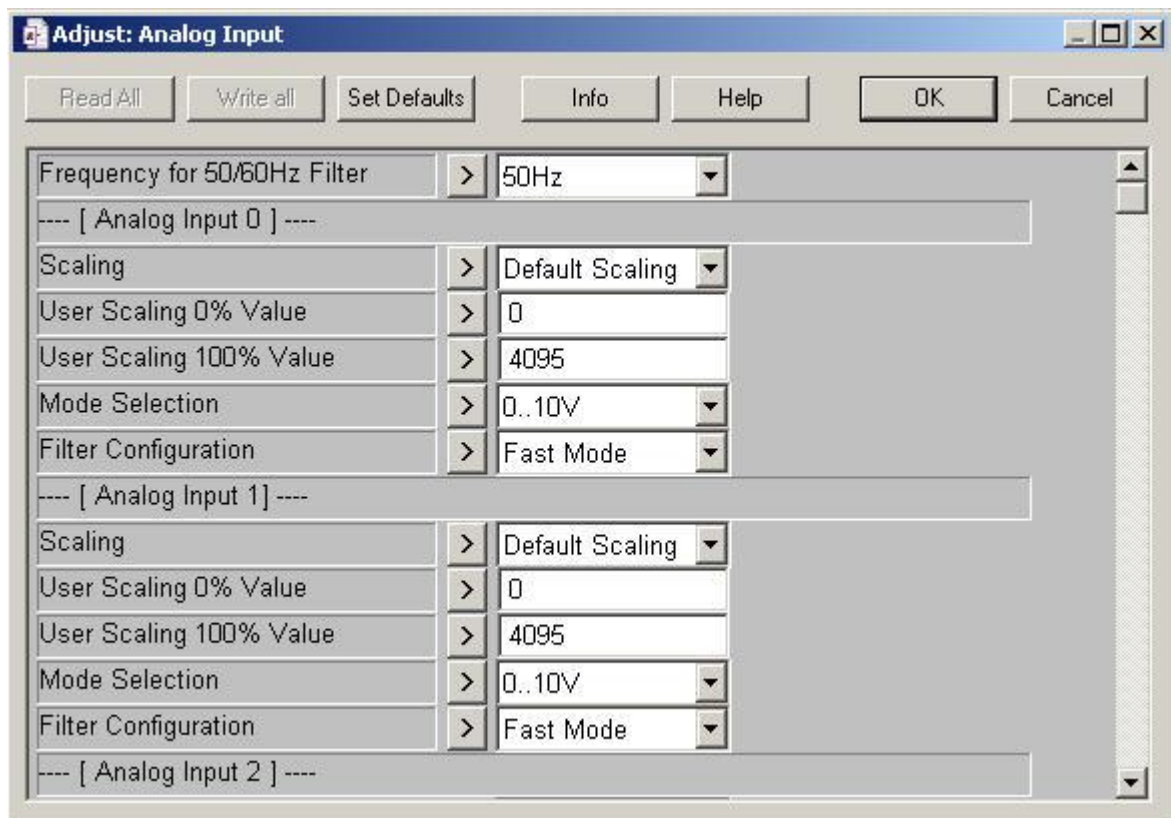
8.1 Analog Input



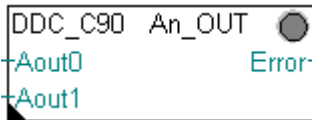
There are 14 maximal inputs, which can have independently 7 different **Mode Selection**. There is no filter of 50/60Hz in **Fast Mode**.

An **error** appears when we swapped the User Scaling Min and Max or if the value is not inside the range in Temperature mode. If there is no communication with the ADuC, it will give an error too.

To have more information about this FBox, you can take the Fbox of a **W.525** and read his help (is almost the same configuration)

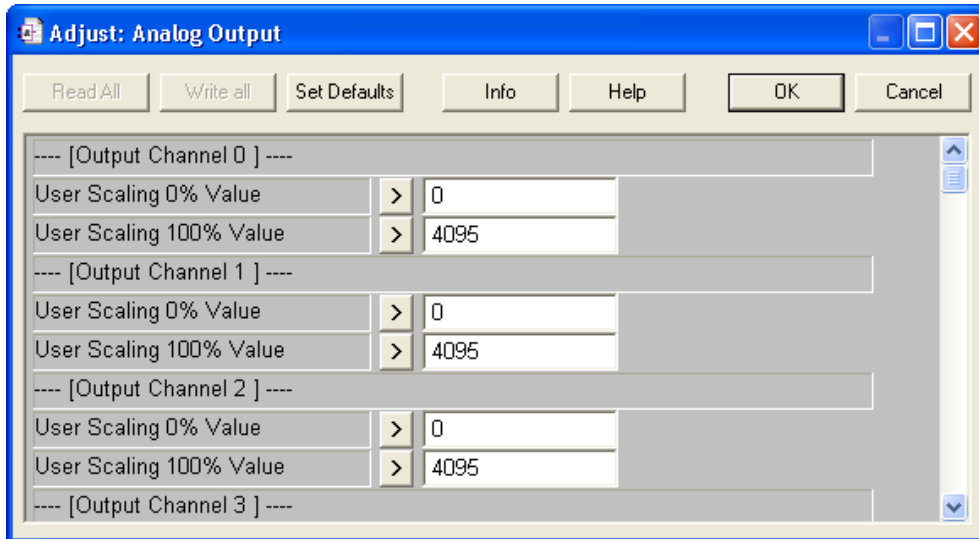


8.2 Analog Output



There are 2 maximal outputs, which can have just 1 mode (0 to 4095 in **Default Scaling**)

An **error** appears when we swapped the User Scaling Min and Max or if the output value is not inside the User Scaling. If there is no communication with the ADuC, it will give an error too.



8.3 General Information

The register error, which is put at each FBox, has the same value.

The Led is red separately at each FBox failure, except of the General Error, which activates in red all FBox.

Register Error

31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
General Error			Not Used								Analog Outputs Error							Analog Inputs Error							Universal Inputs Error						
											7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	4	3	2	1	0

- Bit:
- 29 = Not Calibrated
 - 30 = Communication Error
 - 31 = No Response

9 EMC standards

Referenced on IEC61131-2:2003 needs including EN61000-6-4:2001 industrial level

9.1 Immunity Testing

9.1.1 Immunity to Electrostatic Discharge (ESD) → IEC 61000-4-2

Air discharge: +/- 8 kV
Contact discharge: (HVR) +/- 6 kV

9.1.2 Immunity to Fast Transient (Burst) → IEC 61000-4-4

Refer to IEC61131-2:2003 Table 31

Test description	Asked	Remarks & References
<i>Direct coupled: Power Supply 24 VDC</i> <ul style="list-style-type: none"> ➤ On + terminal ➤ On - terminal 	± 2 kV ± 2 kV	
<i>Capacitive coupled: inputs/outputs</i> <ul style="list-style-type: none"> ➤ Onboard ➤ Modular inserted 	± 1 kV	
<i>Capacitive coupled: communication ports</i>	± 0.5 kV	

9.1.3 Immunity to High Energy Surge (1,2/50 μs) → IEC 61000-4-5

Refer to IEC61131-2:2003 Table 31 & 40

Test description	Asked	Remarks & References
<i>Power supply DC : Common Mode</i> <ul style="list-style-type: none"> ➤ Coupling : 12 Ω / 9 μF direct, 5 pos, 5 neg, 1/min ➤ UUT powered on ➤ Surge on +Terminal vs. PGND ➤ Surge on -Terminal vs. PGND 	± 1 kV ± 1 kV	
<i>I/O & Comm lines shielded: Common Mode</i> <ul style="list-style-type: none"> ➤ Coupling: 42 Ω / 0,5 μF direct, 5 pos, 5 neg, 1/min ➤ UUT powered on 	± 1 kV	
<i>I/O & Comm lines unshielded: Differential Mode</i> <ul style="list-style-type: none"> ➤ Coupling: 42 Ω / 0,5 μF direct, 5 pos, 5 neg, 1/min ➤ UUT powered on 	± 0.5 kV	

9.1.4 Immunity to Conducted Radio Frequency (RF) Interferences → IEC 61000-4-6

Test description	Asked	Remarks & References
<ul style="list-style-type: none"> ➤ 0,15...80 MHz; AM 1 kHz, 80% ➤ Tested ports: <ul style="list-style-type: none"> - Supply 24 VDC - I/O & Comm lines - Functional earth 	3 Vrms	covering IEC61131-2:2003 Table 31 & 41

9.1.5 Immunity to Radiated Electromagnetic Fields → IEC 61000-4-3

Test description	Asked	Remarks & References
<ul style="list-style-type: none"> ➤ 80...1000 MHz ➤ 1 kHz, AM 80% ➤ Vertical and horizontal polarization 	10 V/m	covering and exceeds IEC61131-2:2003 Table 30 & 37

9.2 Emission Testing

9.2.1 Radiated Emission 30...1000 MHz

Test description	Remarks & References
<ul style="list-style-type: none"> ➤ 30...230 MHz; 40 dB quasi-peak ➤ 230...1000 MHz; 47 dB quasi-peak ➤ basic standard CISPR 11 ➤ 10m 	industrial level

10 Mechanical robustness

10.1 Vibrations

Reference Test	IEC 68-2-6, Test Fc
Motion	Sinusoidal
Amplitude/Acceleration	
5...9 Hz	3.5 mm
9...150 Hz	1.0 g
Vibration type	Sweeping, at a rate of 1 oct./min (+/-10%)
Vibration duration	10 sweep cycles per axis on each of three mutually perpendicular axes

10.2 Shocks

Reference Test	IEC 68-2-27, Test Ea
Type of Shock	Half-Sine
Shock severity	15 g peak
Shock duration	11 ms
Application	2 Shocks per axis on each of three mutually perpendicular axes

Notes:

- Electromechanical relays may temporarily respond to 15 g shocks. Temporarily malfunction is allowed during the test, but equipment must be fully functional after the test.

11 Saia Burgess Controls address

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