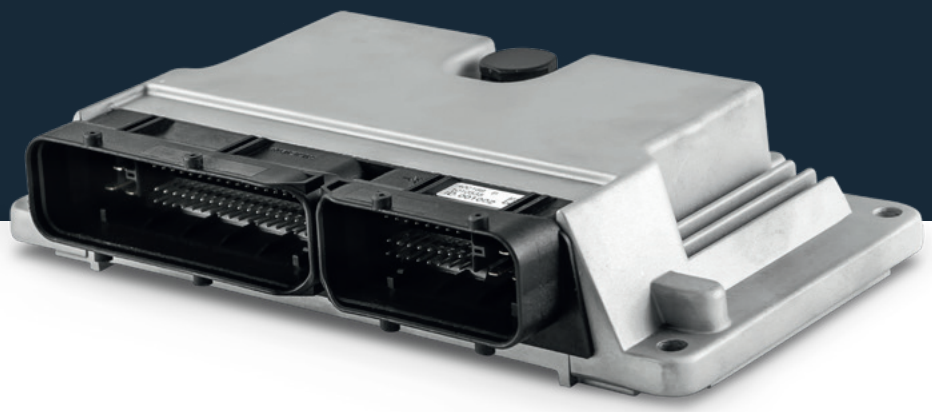
ICCS CAN CONTROLLER 121P

Controllers



The **ICCS CAN Controller 121P** is part of the Intelligent Control and Command Systems (ICCS) product range. It can be easily integrated into your CAN network or used as a standalone module.
The 16-bit NXP HCS12XEQ processor with integrated co-processor has sufficient computing power to handle complex tasks. The two CAN and an optional LIN master interface allow data exchange between independent bus systems or enable gateway / filter functions.

Applications

- Transmission of sensor values to the CAN bus
- CAN to CAN gateway function
- LIN to CAN gateway function
- Direct supply of loads up to 2 A
- Interface between switches and CAN bus
- Handling of lighting systems
- Protected power splices with built-in poly fuses

Technical data

General information	
Housing	Metal housing
Connector	1 x 81 pins, 1 x 40 pins
Dimensions	95.1 x 179 x 39.3 mm
Weight	~530 g
Operating temperature	-30 °C to 70 °C
Storage temperature	-30 °C to 70 °C
Ingress protection	IP65
Operating voltage	9–30 V (with limitation on 12 V LIN bus)
Pre-fusing	10 A / Power entry
Current consumption	50 mA
Processor type	NXP HCS12XEQ
Clock frequency	100 MHz
Flash memory	384 kB
RAM	24 kB
EEPROM	1 kB available for graphical programming
E1 certification	ECE10 Rev.05 : 058257

CAN Bus	
acc. ISO 11898-2	High speed
acc. CAN 2.0 B	29 Bits extended address identifier
acc. CAN 2.0 A	11 Bits address identifier
Baud rate	20 kBit/s to 1000 kBit/s (125 kBit/s default value)

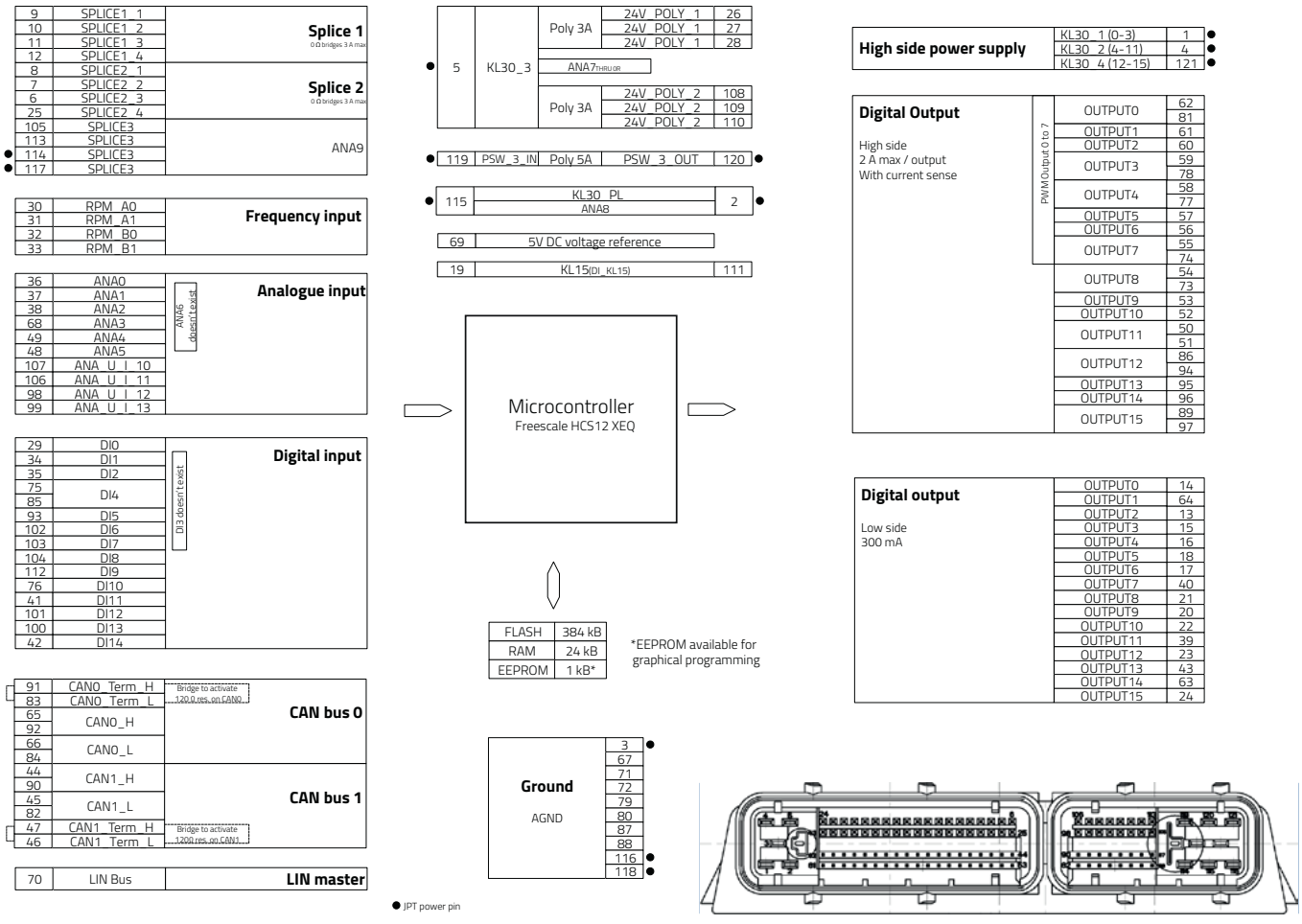
LIN Bus	
LIN 2.1 master	Pull-up to Vsupply, 1 kΩ & diode
Baud rate	4800 to 115200 bps
Vsupply	Recommended max 12 V (1 kΩ-12 V LIN)

Inputs / outputs overview		
4	Analogue inputs	0–10 V DC / 0–20mA
3	Analogue inputs	0–10 V DC
3	Analogue inputs	0–30 V DC
3	Analogue inputs	0–5 V DC
4	Frequency inputs	Switch-on / switch-off level: see inputs / outputs details
16	Digital inputs	Switch-on / switch-off level: see inputs / outputs details
16	Digital outputs	Low side outputs max 300 mA / channel
16	Digital outputs	High side outputs max 2 A / channel

Inputs / outputs details	
Analogue inputs	**4 x 0–10 V DC / 0–20 mA**
Voltage / current	0–11.4 V DC / 0–23 mA
Resolution	12 bits
Input resistance	22.6 kΩ
Pull-down resistance	Switchable 0.5 kΩ in 0–20 mA mode (4x)
Analogue inputs	**3 x 0–10 V DC**
Input voltage	0–11.4 V DC
Resolution	12 bits
Input resistance	22.6 kΩ
Analogue inputs	**3 x 0–5 V DC**
Input voltage	0–5 V DC
Resolution	12 bits
Input resistance	61.6 kΩ
Analogue inputs	**3 x 0–30 V DC**
Input voltage	0–33.6 V DC
Resolution	12 bits
Input resistance	66.6 kΩ

Inputs / outputs details	
Frequency inputs	**4**
Input resistance	100 kΩ
Input frequency	5 kHz (max)
Switch-on level	3 V DC
Switch-off level	2 V DC
Digital inputs	**16**
Input voltage	0 V DC to Vsupply
Switch-on level	7 V DC
Switch-off level	5 V DC
Input resistance	22.6 kΩ
Digital outputs	**16 x Low Side**
Load current	300 mA
Digital outputs	**16 x High Side**
Load current	max 2 A Diagnostic current sense, freewheel diode
PWM outputs	**8 of 16 digital outputs**
PWM frequency	max 1 kHz
Duty cycle	0 to 100 %
Resolution	0.10 %
Load current	max 1 A

Hardware map



Pin assignment

Pin assignment for 81 pins connector		
Pin	**Description**	**Function**
1	KL30_1	Power supply for outputs 0–3
2	KL30_PL	Internal link between two pins (115-2) measured from ANA_8 0–30 V
3	GND	Ground, all ground pins are interconnected
4	KL30_2	Power supply for outputs 4–11
5	KL30_3	Power supply input for polyfuse / ANA in 7 0–30 V
6	splice 2	Signal distribution 0 Ω all splice 2
7	splice 2	Signal distribution 0 Ω all splice 2
8	splice 2	Signal distribution 0 Ω all splice 2
9	splice 1	Signal distribution 0 Ω all splice 1
10	splice 1	Signal distribution 0 Ω all splice 1
11	splice 1	Signal distribution 0 Ω all splice 1
12	splice 1	Signal distribution 0 Ω all splice 1
13	LSD output 2	LSD output 300 mA
14	LSD output 0	LSD output 300 mA
15	LSD output 3	LSD output 300 mA
16	LSD output 4	LSD output 300 mA
17	LSD output 6	LSD output 300 mA
18	LSD output 5	LSD output 300 mA
19	KL15	Wake up / ignition - internally bridged to 111
20	LSD output 9	LSD output 300 mA
21	LSD output 8	LSD output 300 mA
22	LSD output 10	LSD output 300 mA
23	LSD output 12	LSD output 300 mA
24	LSD output 15	LSD output 300 mA
25 26 27	splice 2	Signal distribution 0 Ω all splice 2
28	Power supply poly	3 A polyfuse output (shared between pin 26, 27, 28) supplied by KL30_3
29	DI_0	Digital input
30	Freq_A0	Frequency input / digital encoder
31	Freq_A1	Frequency input / digital encoder
32	Freq_B0	Frequency input / digital encoder
33	Freq_B1	Frequency input / digital encoder
34	DI_1	Digital input
35	DI_2	Digital input
36	ANA_0	Analogue input 0–10 V
37	ANA_1	Analogue input 0–10 V
38	ANA_2	Analogue input 0–10 V
39	DI_16 / LSD output 11	Digital input shared with a low side output
40	DI_15 / LSD output 7	Digital input shared with a low side output
41	DI_14	Digital input
42	DI_11	Digital input
43	LSD output 13	LSD output 300 mA
44	CAN1 H	CAN 1 H also available on pin 90
45	CAN1 L	CAN 1 L also available on pin 82
46	CAN1 term L	Wire bridge to CAN1 term H to link a 120 Ω resistor

Pin assignment for 81 pins connector		
Pin	**Description**	**Function**
47	CAN1 term H	Wire bridge to CAN1 term L to link a 120 Ω resistor
48	ANA_5	Analogue input 0–5 V
49	ANA_4	Analogue input 0–5 V
50	HSD output 11	Digital output 2 A HSD shared with pin 51
51	HSD output 11	Digital output 2 A HSD shared with pin 50
52	HSD output 10	Digital output 2 A HSD
53	HSD output 9	Digital output 2 A HSD
54	HSD output 8	Digital output 2 A HSD shared with pin 73
55	HSD output 7	Digital output 2 A HSD shared with pin 74 (PWM)
56	HSD output 6	Digital output 2 A HSD (PWM)
57	HSD output 5	Digital output 2 A HSD (PWM)
58	HSD output 4	Digital output 2 A HSD shared with pin 77 (PWM)
59	HSD output 3	Digital output 2 A HSD shared with pin 78 (PWM)
60	HSD output 2	Digital output 2 A HSD (PWM)
61	HSD output 1	Digital output 2 A HSD (PWM)
62	HSD output 0	Digital output 2 A HSD shared with pin 81 (PWM)
63	LSD output 14	LSD output 300 mA
64	LSD output 1	LSD output 300 mA
65	CAN0 H	CAN 0 H also available on pin 92
66	CAN0 L	CAN 0 L also available on pin 84
67	GND	Ground, all ground pins are interconnected
68	ANA_3	Analogue input 0–5 V
69	5V Vref	Switchable 5 V reference approx. 400 mA
70	LIN bus	LIN master type
71	GND	Ground, all ground pins are interconnected
72	GND	Ground, all ground pins are interconnected
73	HSD output 8	Digital output 2 A HSD shared with pin 54
74	HSD output 7	Digital output 2 A HSD shared with pin 55 (PWM)
75	DI_4	Digital input distribution to pin 85
76	DI_10	Digital input
77	HSD output 4	Digital output 2 A HSD shared with pin 58 (PWM)
78	HSD output 3	Digital output 2 A HSD shared with pin 59 (PWM)
79	GND	Ground, all ground pins are interconnected
80	GND	Ground, all ground pins are interconnected
81	HSD output 0	Digital output 2 A HSD shared with pin 62 (PWM)

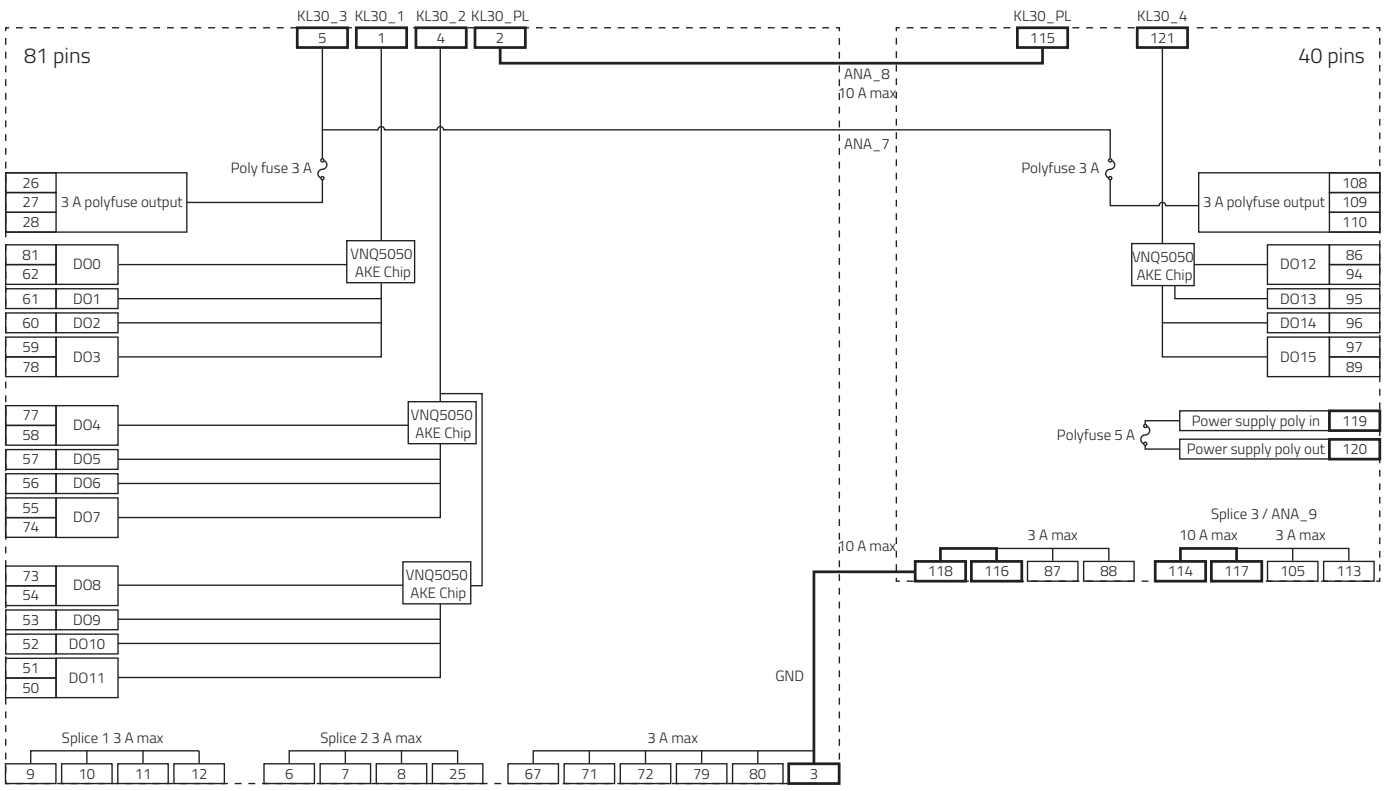
- DI_3 and ANA6 do not exist in the design.
- Each analogue input is also usable as a digital input in the programming software.
- All digital outputs HSD are equipped with freewheel diodes.

Pin assignment

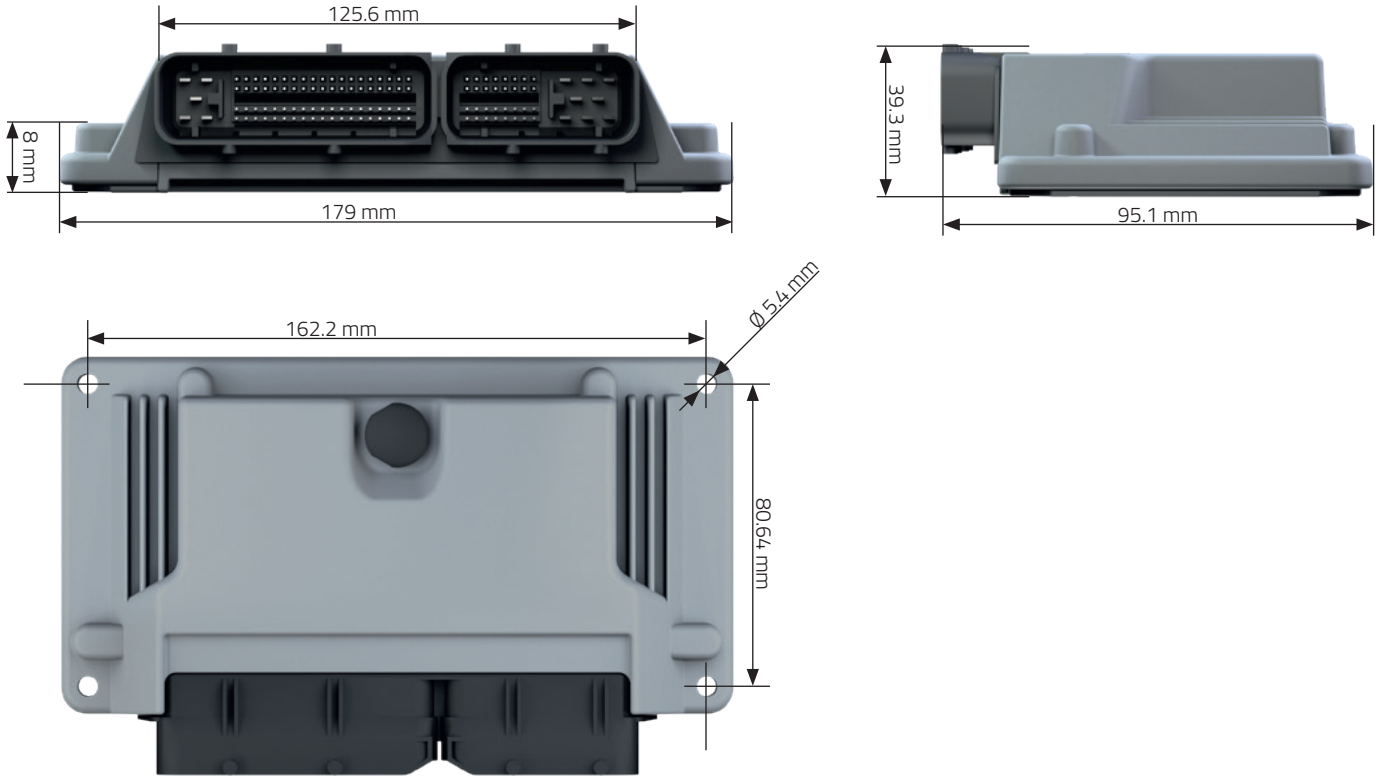
Pin assignment for 40 pins connector		
Pin	**Description**	**Function**
82	CAN1 L	CAN 1 L also available on pin 44
83	CAN0 term L	Wire bridge to CAN0 term H to link a 120 Ω resistor
84	CAN0 L	CAN 0 L also available on pin 66
85	DI_4	Digital input distribution to pin 75
86	HSD output 12	Digital output 2 A HSD shared with pin 94
87	GND	Ground, all ground pins are interconnected
88	GND	Ground, all ground pins are interconnected
89	HSD output 15	Digital output 2 A HSD shared with pin 97
90	CAN1 H	CAN 1 H also available on pin 44
91	CAN0 term H	Wire bridge to CAN 0 term L to link a 120 Ω resistor
92	CAN0 H	CAN 0 H also available on pin 65
93	DI_5	Digital input
94	HSD output 12	Digital output 2A HSD shared with pin 86
95	HSD output 13	Digital output 2 A HSD
96	HSD output 14	Digital output 2 A HSD
97	HSD output 15	Digital output 2 A HSD shared with pin 89
98	ANA_U_I_12	ANA in 0–10 V / 0–20 mA
99	ANA_U_I_13	ANA in 0–10 V / 0–20 mA
100	DI_13	Digital input
101	DI_12	Digital input

Pin assignment for 40 pins connector		
Pin	**Description**	**Function**
102	DI_6	Digital input
103	DI_7	Digital input
104	DI_8	Digital input
105	splice 3	Hardwired signal distribution connected to ANA in 9 0–30 V
106	ANA_U_I_11	ANA in 0–10 V / 0–20 mA
107	ANA_U_I_10	ANA in 0–10 V / 0–20 mA
108 109 110	Power supply poly	3 A polyfuse output (shared between pin 108,109,110) supplied by KL30_3
111	KL15	Wake up / ignition - internally bridged to 19
112	DI_9	Digital input
113	splice 3	Hardwired signal distribution connected to ANA in 9 0–30 V
114	splice 3	Hardwired signal distribution connected to ANA in 9 0–30 V
115	KL30_PL	Internal link between two pins (115–2) measured from ANA_8 0–30 V
116	GND	Ground, all ground pins are interconnected
117	splice 3	Hardwired signal distribution connected to ANA in 9 0–30 V
118	GND	Ground, all ground pins are interconnected
119	Power supply poly in	5 A polyfuse protected line 119–120
120	Power supply poly out	5 A polyfuse protected line 119–120
121	KL30_4	Power supply for output 12–15

Power supply distribution - Schematic



Dimensions



Available references	Part number WE ICS
ICCS CAN Controller 121P XEQ	ICS-105460

Mating connector 40 pins	Part number Tyco
Crimp contact MQS 0.50–0.75 mm²	968221-1
Single wire seal JPT 1.5 mm²	828905-1
Crimp contact JPT 1.5–2.5 mm²	927768-3
Locking for 40 pins connector	368388-1
Locking lever for 40 pins connector (type A)	1473255-1
Housing for 40 pins connector	1473252-1

Mating connector 81 pins	Part number Tyco
Crimp contact MQS 0.50–0.75 mm²	968221-1
Single wire seal JPT 1.5 mm²	828905-1
Crimp contact JPT 1.5–2.5 mm²	927768-3
Locking for 81 pins connector	368382-1
Locking lever for 81 pins connector (type A)	1473247-1
Housing for 81 pins connector	1473244-1

This item is a standard product, please consider the relevant datasheet notes. The user is responsible for the product's functionality in its purposed system environment. Technical content may be modified and changed by Würth Elektronik ICS GmbH & Co. KG without any notice.

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