Compact controllers

E-Series
E105

Contents

User manuals

Versions：Av2

User manual
Contents

Historical records

Version	Date	Release	Editor	Description
Av2	2021/11/8	N	ChenMo	First Edition
Av3	2021/11/9	N	ChenMo	Uniform Rules for Port Descriptions
Av4	2022/3/10	N	ChenMo	Update material number

1. Security instructions

1.1. Copyright

The copyright of this manual belongs to Xuzhou Mook Electro-Hydraulic Control Co.,Ltd In accordance with copyright law, this manual may not be reproduced in any way without the prior written permission of Xuzhou Mook Electro-Hydraulic Control Co.,Ltd. We will not be liable for the consequences of patent infringement arising from the use of the information contained in this manual.

Please observe the copyright law when making any copies of this manual.

1.2. Preface

This manual has been verified and reviewed for accuracy. The instructions and descriptions contained in this manual are accurate for the E105 controller at the time of publication. However, future issues of the E105 controller and its manual are subject to change without notice. Xuzhou Mook Electro-Hydraulic Co., Ltd. assumes no liability for damages arising directly or indirectly from errors, omissions or discrepancies between the product and the manual.

1.3. Marking of notices

Icon	Meaning	Detailed instructions
	DANGEROUS	It can be predicted to cause unavoidable serious injury, death or property damage
	WARNING	May result in unavoidable serious injury, death or property damage
	NOTE	This may result in minor injuries and losses
	INSTRUCTION	Non-safety-related usage guidance and information
	ANNOTATION	Additional instructions or usage recommendations

2. Product introduction

2.1. Product Description

2.2. Port Description

Input ports	Number of ports	Parameters
DIH/DIL	4	Defaults to a high valid switching input; Can be multiplexed to low valid switching inputs
DIH	4	High valid switching input
PI/DIH	2	Defaults to a frequency input; Can be multiplexed to high effective switching input
RI/DIL	2	Default is 0~15KΩ resistance type analog input; Can be multiplexed to low valid switching input;
AI/DIH	4	Default is 0~5V voltage type analog input; Multiplexable to 4~20mA current type analog input; It can be multiplexed as high valid switch input;
Output ports	**Number of ports**	**Parameters**
PWM(CC)/DOH	2	Default is PWM output with current feedback; Can be multiplexed to 2A high-side output;
PWM/DOH	6	Defaults to 2A high-side output; Multiplexable to PWM output
DOH		Defaults to 2A high-side output;
AO	1	0-5V voltage output
+5VOUT	1	5V power output

2.3. Technical parameters

Technical parameters	
Operating Voltage	8~36V DC
Operating Temperature	-40℃~+75℃
Storage Temperature	-40℃~+85℃
Relative Humidity	45%~90%
Current consumption	No load, in 12V vehicle electrical system: 200mA No load, in 24V vehicle electrical system: 100mA
Maximum Load Current	30A
Processor Unit	32Bit 180MHz
Storage	512K SDRAM，32MB FLASH
Parameter space	2KB FRAM
Protection class	IP66/67
Dimension	158.6mm × 111mm × 40.4mm
Communication Interface	CAN2.0B
Programming mode	Codesys、simulink

Testing standards	
Low temperature test	**Execution standard: GB/T2423.01/IEC60068-2-1** -40℃ low temperature start test, 10 times, start normal -40℃ low temperature working test 16h -40℃ low temperature storage test 72h
High temperature test	**Execution standard: GB/T2423.02/IEC60068-2-2** +75℃ high temperature full load working test 16h +85℃ high temperature storage test 72h
Temperature shock test	**Execution standard: GB/T2423.22/IEC60068-2-14** Low temperature -40℃, high temperature 85℃, high and low temperature conversion time 3min, cycle times 10 times
Temperature and humidity cycle test	**Execution standard: GB/T2423.34/IEC60068-2-38** High temperature 65±2℃, 93±3%; room temperature 25±2℃, 93±3%; low temperature -10℃, 24h for a cycle, for ten cycles
Vibration test	**Execution standard: GB/T2423.10/IEC60068-2-6 sinusoidal vibration** Vibration (sinusoidal) 30Hz, 4g, 4h vertically, 2h horizontally left and right, front and back, total 8h **Executive standard: GB/T2423.56/IEC60068-2-64 Random vibration** 10Hz~20Hz Amplitude 3mm 20Hz~2000Hz, peak acceleration 50m/s2. Sweep frequency 1oct/min, according to the up and down direction, front and back direction, left and right direction of the number of times in order to sweep the frequency 2 times, for 24h
Shock test	**Execution standard: GB/T2423.5/IEC60068-2-27** 30g/11ms, half-sine wave, 100 times in each of the three axes
Drop test	**Execution standard: GB/T2423.8/IEC60068-2-32** Transportation status (with bubble bag packaging), drop height 1000mm, 2 times
Salt spray test	**Execution standard: GB/T2423.17/IEC60068-2-11** Under 35℃, 5% sodium chloride salt spray environment, 96h test in uncharged state, no rust and corrosion of shell, connector and other parts after the test, and work normally after connecting to the test voltage.
EMC	**EN 61000-6-2:2005; EN 61000-6-4: 2011;** ISO 7637 immunity; ISO 11452 immunity; ISO 16750 immunity

2.4. Order Number

Serial No.	Material No.	Material Description
1	236259	Controller，E105

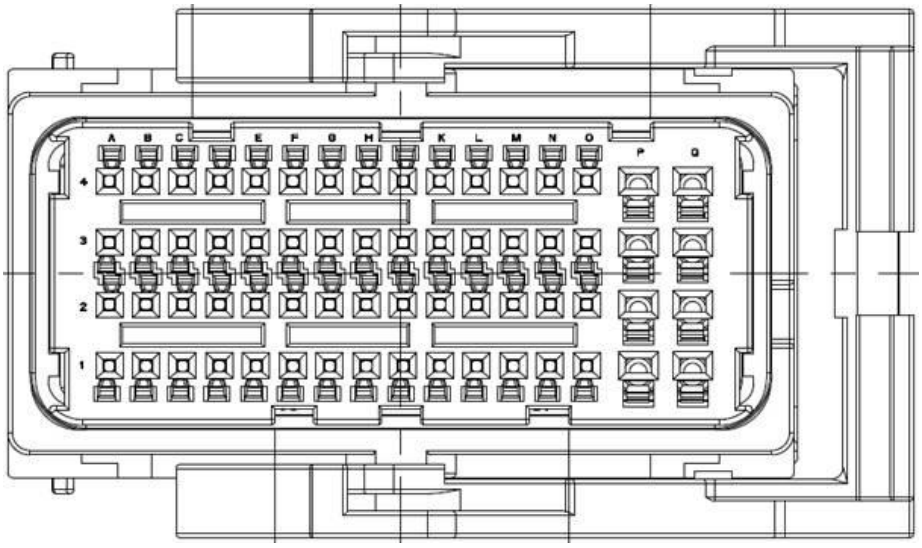
2.5. Product Code Description

3. Port Description

3.1. Connectors

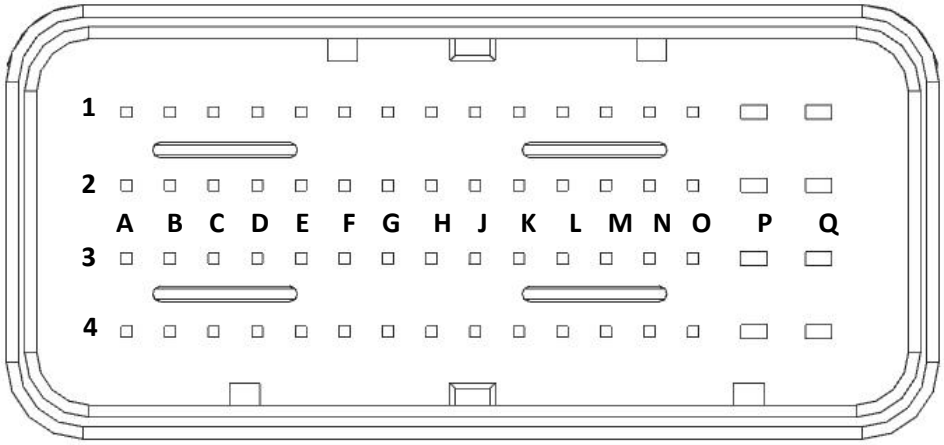
The connector for the E105 controller is an AMP 2209129 64-pole pin socket.

3.2. To the list of plug-ins



No.	Description	Model	Order No.	Manufacturer
1	64 pole hole plug	2050036-1	508982	TE
2	Large Terminal	638652-1	508983	TE
3	Small Terminal	968221-1	508984	TE
4	Large Blind	1670108-1	508985	TE
5	Small blind plug	1394871-1	508981	TE

3.3. Pin Definition



Pin	Port Definition	Function Description
A1		
B1	PWM1	High side output 2A, or PWM (50~1000HZ) output 2A
C1	PWM2	High side output 2A, or PWM (50~1000HZ) output 2A
D1		
E1	PWM3	High side output 2A, or PWM (50~1000HZ) output 2A
F1	PWM4	High side output 2A, or PWM (50~1000HZ) output 2A
G1	PWM5	High side output 2A,or PWM (50~1000HZ) output 2A, or DOCC output, 2A
H1	PWM6	High side output 2A,or PWM (50~1000HZ) output 2A, or DOCC output, 2A
J1	PWM7	High side output 2A, or PWM (50~1000HZ) output 2A
K1	PWM8	High side output 2A, or PWM (50~1000HZ) output 2A
L1		
M1		
N1		
O1		
P1	UBP	Power Supply
Q1	UBP	Power Supply
A2		High Side Output 2A
B2		High Side Output 2A
C2		
D2		
E2	DI1	Switching Input, High Valid
F2	DI2	Switching Input, High Valid
G2	DI3	Switching Input, High Valid
H2	DI4	Switching Input, High Valid
J2	DIH5	Switching input, high/low valid software programmable
K2	DIH6	Switching input, high/low valid software programmable
L2	+5VOUT	
M2	AGND	analog ground
N2		
O2		
P2	UBP	Power Supply

（Continued from previous page）

Pin	Port Definition	Function Description
Q2	BSL	Debug/Burn serial port mode selection
A3		
B3		
C3	AO1	
D3		
E3	AI1	
F3	AI2	
G3	AI3	
H3	AI4	
J3	CAN1_H	CAN1_H
K3	CAN1_L	CAN1_L
L3	CAN2_H	CAN2_H
M3	CAN2_L	CAN2_L
N3	DI7	
O3	DI8	
P3		
Q3		
A4	TXDOUT	TXDOUT
B4	RXDIN	RXDIN
C4		
D4		
E4		
F4		
G4	AI9	
H4	AI10	
J4	PI1	Frequency Input, 10HZ~15KHZ / Highly Effective Switching Inputs
K4	PI2	Frequency Input, 10HZ~15KHZ / Highly Effective Switching Inputs
L4		
M4		
N4	PGND	Power Ground
O4	PGND	Power Ground
P4	PGND	Power Ground
Q4	UBS	System power supply

3.4. Wiring schematic

- Cautions:

（1）Shorted or low resistance connection between case screw and vehicle ground.

（2）The system power supply UBS powers the internal electronics and the power supply UBP powers the PWM outputs and switching outputs.

（3）The CAN bus requires 120Ω termination resistors.

（4）The fuse size of the power output power supply matches the maximum current consumption of the PWM outputs and switching outputs and does not exceed 30A.

（5）The PWM output comes with current feedback, the duty cycle of each channel can be adjusted separately, and the frequency can be adjusted uniformly.

3.5. Port Detailed Parameters

3.5.1. Power supply

（1）Functional description: System power supply UBS, power supply for internal electronic components; power supply UBP, power supply for PWM output and switching output.

（2）Pin number: UBS pin is Q4; UBP pins include P1, Q1, P2 .

The above power supply pins all use 1.5mm2 wire diameter, single pin maximum support 10A current.

3.5.2. GND

（1）Function Description: M2 is the analog ground, the rest of the ground signals are power ground GND.

（2）Pin No.: M2, N4, O4, P4

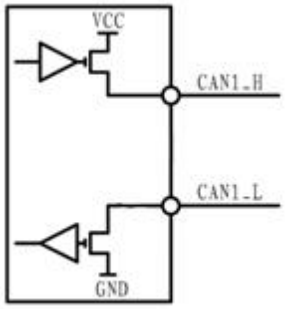
Among the above ground pins, N4, O4, P4 use 1.5mm2 wire diameter, single pin maximum support 10A current; M2 use 0.75mm2 wire diameter, single pin maximum support 5A current.

3.6. Communications port

3.6.1. CAN1

（1）Pin number: J3, K3

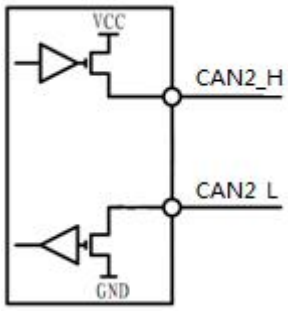
（2）Port Parameters:

CAN1	
Schematic	
Communication Type	CAN2.0B
Port Protection	CAN1_H and CAN1_L have short-circuit protection for UB and GND respectively.
Termination Resistor	No built-in termination resistor

3.6.2. CAN2

（1）Pin number: L3, M3

（2）Port Parameters:

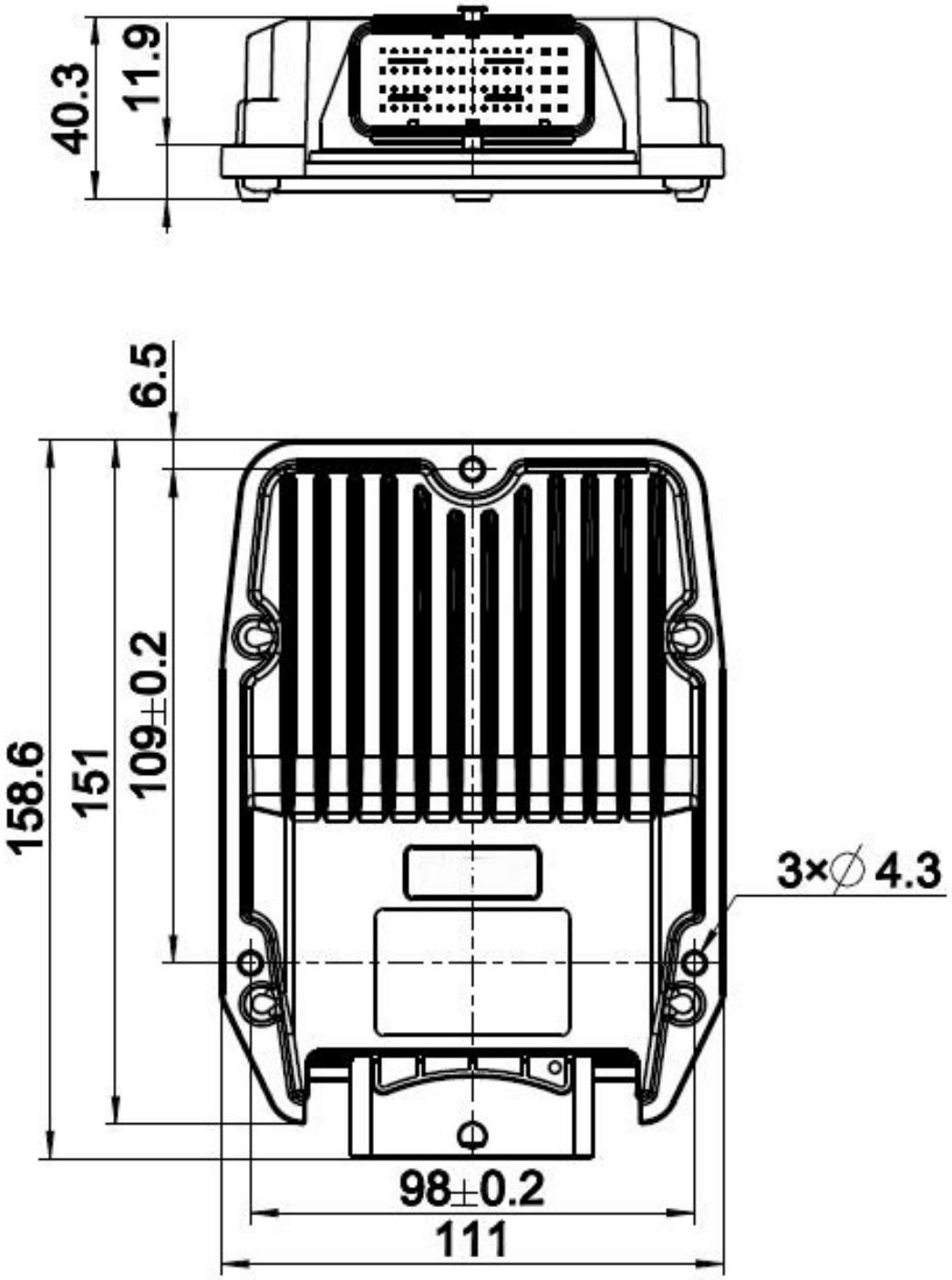
CAN2	
Schematic	
Communication Type	CAN2.0B
Port Protection	CAN2_H and CAN2_L have short-circuit protection for UB and GND respectively.
Termination Resistor	No built-in termination resistor

4. Installation Instructions

4.1. Pre-installation inspection

	Tip.
	Before installation, please check whether the power supply and wiring are complete and correspond to each other, and whether the product is in good condition and free of bumps.

4.2. Outline and Installation Dimension Drawing



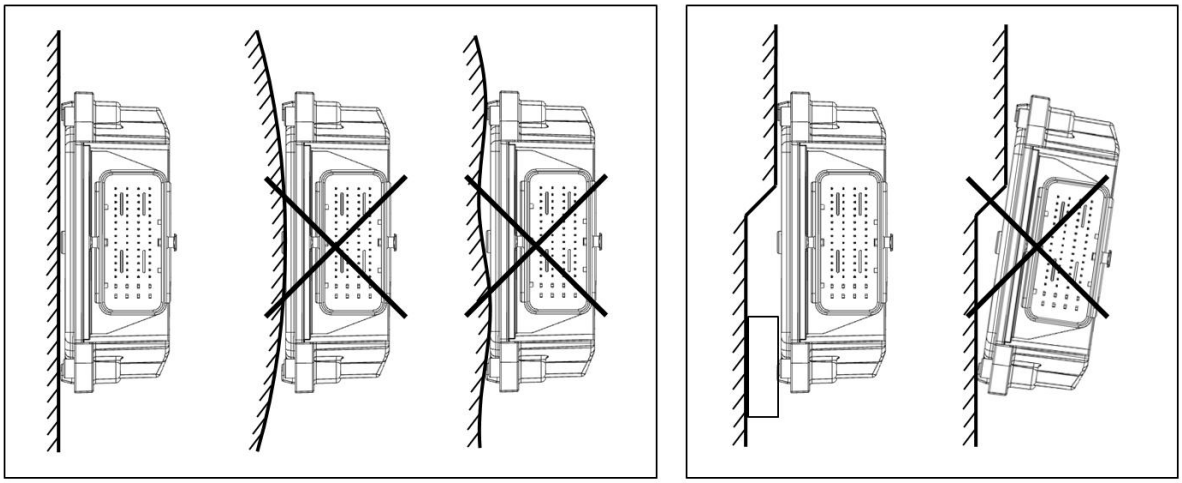
4.3. Installation

The product selection of 3 × M4 screws for fixed installation, installation, please ensure that the installation surface is flat, no foreign objects. Installation position in the direction of the connector should be reserved at least 100mm of installation space, to facilitate the connector plug pulling.

	Caution.
⚠	Please use appropriate screws for installation to prevent the product from being damaged during placement and fastening.

4.4. Mounting Surface

If the mounting surface at the site cannot be leveled during installation, use pads to assist installation.



5. Common Troubleshooting

5.1. Common Hardware Failures and Solutions

No.	FAQs	Solutions
1	No output from port after power on	First check whether the power supply is normal, if normal, please contact our service personnel to solve the problem.
2	No signal acquisition from port after power on	First check whether the signal voltage is normal, if normal, please contact our service personnel to solve the problem.

3	CAN communication failure after power on	First check whether the external CAN cable is correctly connected, if the connection is normal, please contact our service personnel to solve the problem.