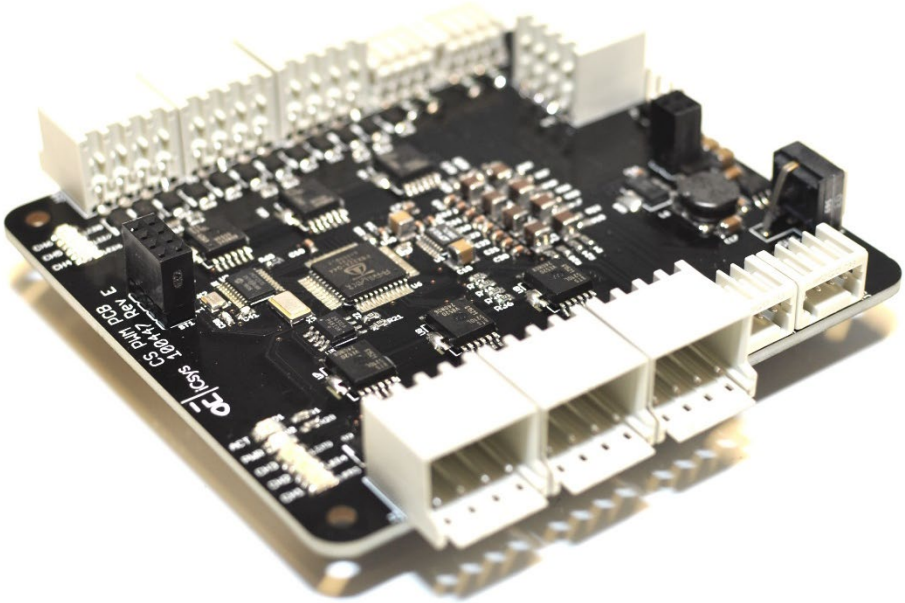
USER MANUAL



Equipment Description	PCB CS PWM
Ixys Part Number:	100447

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VHA		EAP	SHA

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1. INTRODUCTION

1.1. GENERAL NOTES

This document outlines and defines the installation, operation and maintenance procedures for the Ixys PCB CS PWM. The manual will contain all relevant data and methods to be able to use and maintain the device for its intended purpose.

It will be stated in the manual everything from technical specifications, installation and maintenance to troubleshooting.

1.2. PURPOSE AND SCOPE

The purpose of this manual is to give instructions to install, operate and maintain the PCB CS PWM supplied by Ixys AS.

The manual is to be used by trained and competent personnel only.

1.3. ABBREVIATIONS

Abbreviation	Description
PCB	Printed Circuit Boards
ESD	Electrostatic Discharge
EEPROM	Electric Erasable Read Only Memory
PWM	Pulse Width Modulation
CAN	Controller Area Network

1.4. SUPPLIER CONTACT INFORMATION

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2. HEALTH, SAFETY AND ENVIRONMENT

2.1. GENERAL

Safety Notes and General Precautions shall be presented to all personnel concerned prior to testing, operation, maintenance and repair. The operations shall be performed by the responsible engineer/supervisor. The personnel using this equipment must have knowledge of this type of equipment and have familiarized themselves with the applicable procedures and manuals for this product.

2.2. SAFETY MESSAGE LEVELS

Safety message level		Indication
	DANGER:	A hazardous situation which, if not avoided, will result in death or serious injury
	WARNING:	A hazardous situation which, if not avoided, could result in death or serious injury
	CAUTION:	A hazardous situation which, if not avoided, could result in minor or moderate injury or damage to equipment
	Electrical Hazard:	The possibility of electrical risks if instructions are not followed in a proper manner
NOTICE:		A potential situation which, if not avoided, could result in an undesirable result or state A practice not related to personal injury

3. SPECIFICATIONS

3.1. DESCRIPTION

The PCB CS PWM is a printed circuit board with multiple PWM outputs and analog inputs for connection of solenoids and analog sensors.

3.2. TECHNICAL DATA

General	
Manufacturer	Ixys AS
Description	PCB CS PWM
Weight	~150g
Dimensions	96 x 90 x 13mm (PC104 format)

Electrical Data	
Supply Voltage	24VDC (10-30)
Power Consumption	~5W

Communication	
CAN-Bus	250kbps

Performance	
PWM Output Frequency	40-2000Hz
PWM Output Resolution	16bit (65535)
PWM Output Current	5A (Max total for PCB = 15A)
Analog Input Resolution	16bit (65535)

Cable Connectors	
Output Ports	Wago 2092-1124
Input Ports	Wago 733-104

Other	
Recommended spacers under PCB	15mm

3.3. WARRANTY CONDITIONS AND GUARANTEE

- Improper use of equipment where use is not reflected in what it was intended to.
- Where general maintenance is not performed leading to defective parts or other type of defect.
- Incorrect handling or use of equipment.
- Packing not carried out in an ESD protective way

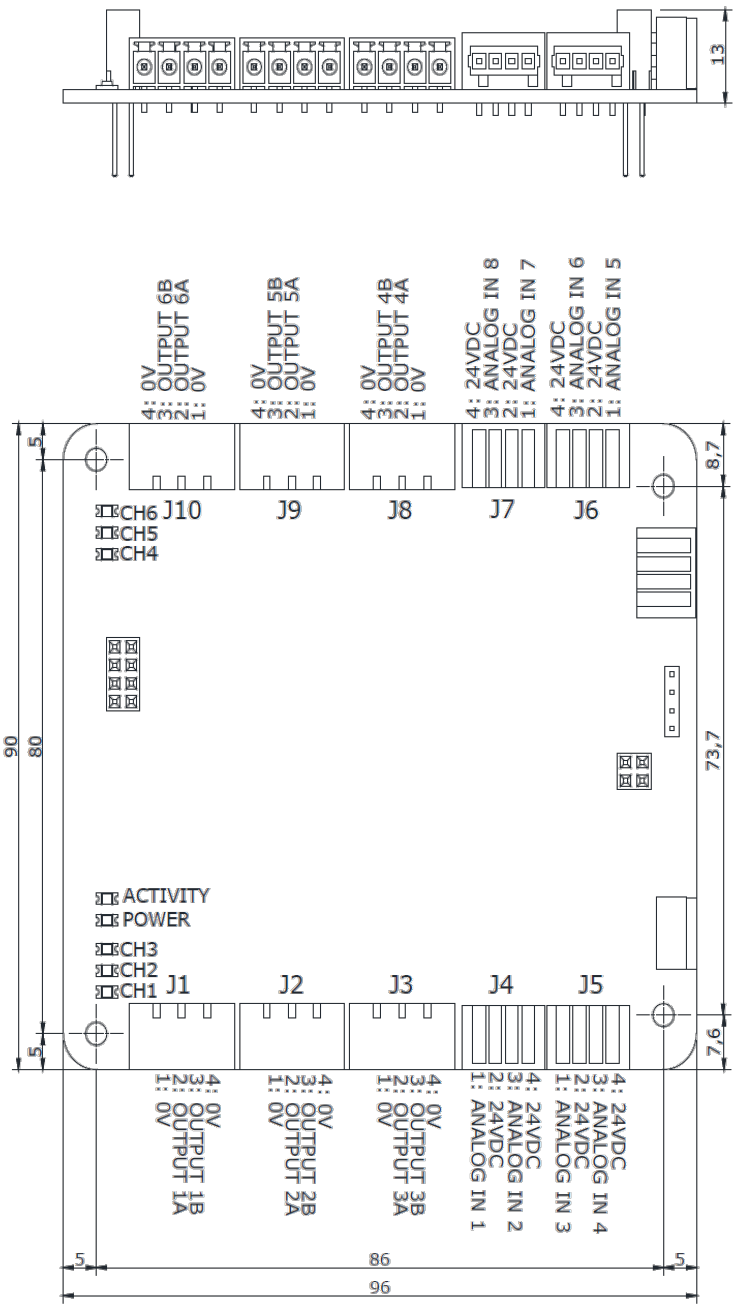
3.4. ORDERING

Ixys Part Number	Description
100447	PCB CS PWM

3.5. ACCESSORIES

Ixys Part Number	Description
112075	Connector – 4 Way Cable contact Wago 2092-1124
100086	Connector – 4 Way Cable contact Wago 733-104

4. DRAWING



4: COM
3: 24VDC
2: 5VDC
1: GND

Note: External supply voltage can be connected to the COM (Common Digital Output Supply Input) and GND pins. To use the internal stack power, add a wire link between pin 3 and 4 for 24Vdc or 2 and 4 for 5Vdc

5. OPERATION

5.1. NORMAL OPERATION

The board can be attached to another Ixys CS-range board configured as master. The board will then share power and communication with the master board and all outputs and inputs will be presented in the master board Modbus registers. Node selector switch must be set to the desired node ID from 1 to 15(F). Node ID is normally set according to stack order.

5.2. SETUP

The J11 connector must be wired according to the need. When the PWM outputs are used with low current load, then the internal voltages can be looped from pin 2 or 3 to pin 4. For higher demanding loads an external power supply should be connected to pin 1 and 4.

5.3. RC-SERVO OUTPUT MODE

Using the settings register index 4, the PWM outputs can be configured as RC-servo outputs. This is a mode for controlling servos or motor controllers needing an accurate variable pulse from 1 to 2ms duration and a typical period of 20ms. The 1-2ms represents the range or position from 0-100%.

5.4. TROUBLESHOOTING / FAULTFINDING

Preliminary fault isolation Check

- ✓ The electrical connections are correct as described in drawing in chapter 4.

Trouble shooting		
Symptom	**Possible Causes**	**Remedy**
No communication with PCB	• No power to board.	• Be sure power in a range from 10-30VDC is provided to the board.
	• Node ID not set above zero	• Verify rotary switch set to correct Node ID
	• No termination on CAN-Bus between the boards.	• Add 120-ohm resistor between CAN-High and CAN-Low in 8pin stack connector.
No power on PWM outputs	• Missing wiring on connector J11	• Verify connector J11 wired correctly

6. REGISTERS

For Ixys CS Slave PCBs the Register addresses are meant as offsets from the start register each board gets in the Modbus registers in the Master PCB of the stack of boards.

6.1. DATA TYPES

The following table describes the data types used on Ixys boards. For 32bit values two registers are used where the first is the most significant.

Name	Size	Value Range
INT16	2 byte	-32,768 to 32,767
UINT16	2 byte	0 to 65,535
INT32	4 byte	-2,147,483,648 to 2,147,483,647
UINT32	4 byte	0 to 4,294,967,295
REAL32	4 byte	1.2E-38 to 3.4E+38

6.2. INPUTS

Address	Description	Note	Data Type
0	Input 1	Raw 16bit ADC value where 12500 = ~4mA and 62700 = ~20mA	UINT16
1-7	Input 2 - 8		UINT16

6.3. OUTPUTS

Address	Description	Note	Data Type
0	Output 1A	The PWM Duty cycle from 0-100% (0-65535) If output mode is configured for RC-servo, then 1000-2000 represents pulse duration in microseconds	UINT16
1	Output 1B		UINT16
2-11	Output 2A – 6B		UINT16

6.4. SETTINGS

Refer to user manual for the applicable master to adjust any setting parameter.

Index	Description	Default	Note	Data Type
3	PWM Frequency	500	Common setting of frequency for all PWM outputs (40-2000Hz)	UINT16
4	RC-servo Mode	0	Enable RC-servo mode Bit 0 = Output 1A Bit 1 = Output 1B Bit 2 = Output 2A Bit 3 etc.	UINT16