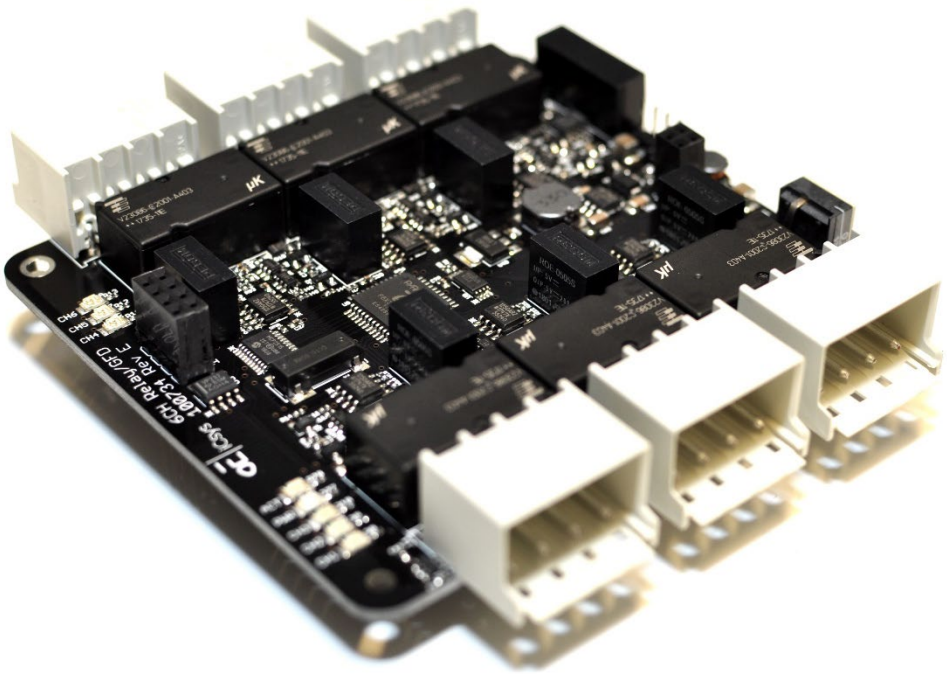
USER MANUAL



Equipment Description	PCB CS 6CH Relay/GFD
Ixys Part Number:	100734

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Prepared		**Checked**	**Approved**
FTO		EAP	VHA

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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 6CH Relay/GFD. 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 6CH Relay/GFD 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
CAN	Controller Area Network
GFD	Ground Fault Detection

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 6CH Relay/GFD PCB is a printed circuit board with multiple two pole relays with ground fault detection on each channel output.

3.2. TECHNICAL DATA

General	
Manufacturer	Ixys AS
Description	PCB CS 6CH Relay/GFD
Weight	~144g
Dimensions	96 x 90 x 16.4mm (PC104 format)

Electrical Data	
Supply Voltage	24VDC (20-30)
Power Consumption	~5W

Communication	
CAN-Bus	250kbps

Performance	
Relay Operating Voltage	0-48VDC / 0-250VAC
Relay Operating Current	15A @ 250VAC
Relay Operating Current	15A @ 24VDC
Relay Operating Current	3A @ 48VDC

Cable Connectors	
Output Ports	Wago 2092-1124

Other	
Recommended spacers under PCB	16mm

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

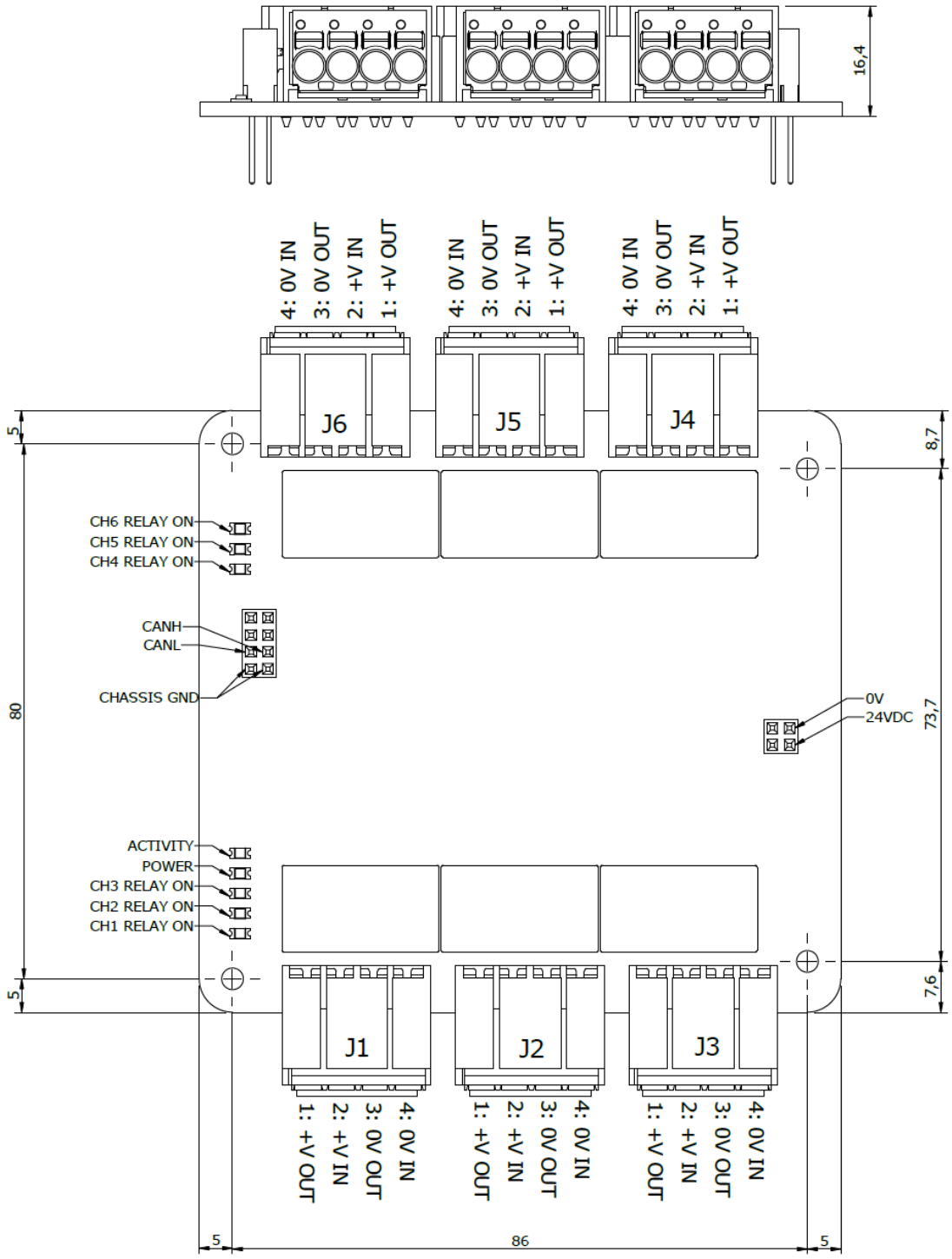
3.4. ORDERING

Ixys Part Number	Description
100734	PCB CS 6CH Relay/GFD

3.5. ACCESSORIES

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

4. DRAWING


16,4
4: 0V IN
3: 0V OUT
2: +V IN
1: +V OUT
J6
J5
J4
5
8,7
CH6 RELAY ON
CH5 RELAY ON
CH4 RELAY ON
CANH
CANL
CHASSIS GND
80
0V
24VDC
73,7
ACTIVITY
POWER
CH3 RELAY ON
CH2 RELAY ON
CH1 RELAY ON
7,6
J1
J2
J3
1: +V OUT
2: +V IN
3: 0V OUT
4: 0V IN
5
86

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.

CAUTION:

Each channel has a corresponding jumper on the circuit board. This must be open (removed) above 50 volts. Failing to remove the jumper will result in damage to the relay card circuit.
With the jumper closed, GFD is monitored on both outputs. Open jumper only monitors GFD on the 0V output.

5.2. 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 20-30VDC is provided to the board.
	• Node ID not set above zero	• Verify rotary switch set to correct Node ID
	• No termination on the CAN-Bus between the boards.	• Add 120-ohm resistor between CAN-High and CAN-Low by mounting a jumper on the dedicated termination jumper position on the stack master board.
No power on Relay Outputs	• Missing power on Relay Input	• Verify power on Relay Input

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	Relay 1 Current	Current in mA	UINT16
1	Relay 1 GFD	Ground fault measurement in Kohm Values above 1k are beyond range and are indicated with 2k	UINT16
2	Relay 2 Current		UINT16
3	Relay 2 GFD		UINT16
4	Relay 3 Current		UINT16
5	Relay 3 GFD		UINT16
6	Relay 4 Current		UINT16
7	Relay 4 GFD		UINT16
8	Relay 5 Current		UINT16
9	Relay 5 GFD		UINT16
10	Relay 6 Current		UINT16
11	Relay 6 GFD		UINT16
12	On/Off Status	Relay status feedback. Bit 0 = Relay 1, Bit 1 = Relay 2 …	UINT16
13	Trip Status	Over current Trip. Bit 0 = Relay 1, Bit 1 = Relay 2 …	UINT16
14	Spare		UINT16
15	Spare		UINT16

6.3. OUTPUTS

Address	Description	Note	Data Type
0	Relay On/Off and Trip Reset	Bit 0-5 = Relay On/Off, Bit 8-13 = Relay Trip Reset	UINT16
1	GFD Activation	Bit 0-5 = GFD Measurement On/Off *	UINT16
2-7	Trip Level	Trip Level in mA. Fuse trip function is deactivated when zero trip level	UINT16

* The Relay boards synchronize between each other and selects one channel at the time for GFD measurement to eliminate interreference when connected to the same power supply. The less activated GFD channels the faster the update rate (about 0.5sec per channel).

6.4. SETTINGS

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

Index	Description	Note	Data Type
100-105	Startup Trip Level	Trip Level in mA. Fuse trip function is deactivated when zero trip level	UINT16
106	Fuse Configuration CH1	Bit 0 = Short circuit Trip Disabled Bit 1 = Fast fuse active Bit 2 = Lock trip limit to startup trip level	UINT16
107-111	Fuse Configuration CH2-6		