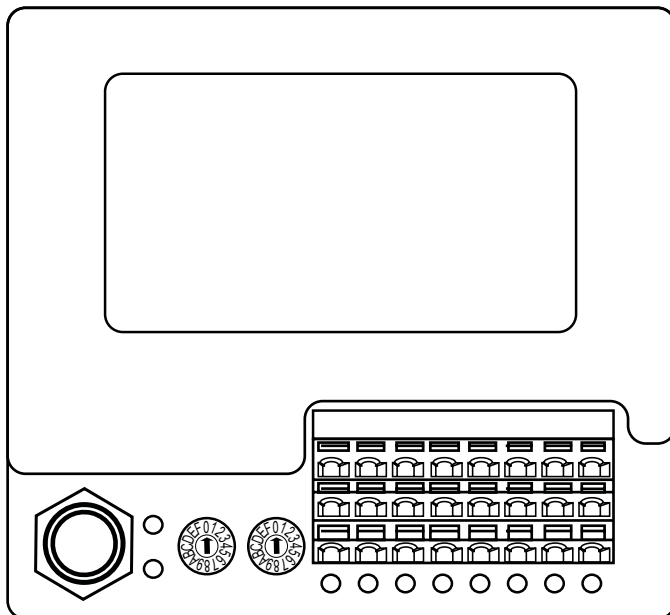


NMEA2000® RELAY OUTPUT MODULE 8
Part Numbers: 3478
USER MANUAL



Revision 1.20

Contents

1 Introduction	2
1.1 Firmware Revision	2
1.2 Product Features	2
2 Installation	3
2.1 Unpacking the box.....	3
2.2 Mounting the unit	3
2.3 Connecting the NMEA2000 Cable	3
2.4 Connecting the relay cables to the WAGO socket.....	3
3 Configuration.....	5
4 Operation	6
5 Maintenance	7
6 Technical Specification	8
7 Troubleshooting/FAQ	10
8 Warranty	11
9 Technical Support	12

The Offshore System's NMEA2000® 3478 Relay Output Unit 8 is designed to control up to 8 separate isolated DC or AC circuits from controllers on the NMEA2000® network. This unit is designed to operate in a protected marine environment such as an engine room. It is very important that it is installed and set up correctly according to this manual. Please read and follow the installation and setup instructions carefully to achieve the best results.

1.1 Firmware Revision

The information in this manual corresponds to firmware revision 2.0.1

1.2 Product Features

The NMEA2000® 3478 Relay Output Module 8 has the following features:

- **8 Fully Isolated 16A 250 VAC, 8A 35 VDC Relays with Changeover Contacts**
- **Each relay circuit has a green indicating LED**
- **User Settable Switch Bank Instance using rotary switches**
- **Heartbeat blue LED confirming NMEA transmission.**
- **NMEA2000 micro C interface plug**

2

INSTALLATION

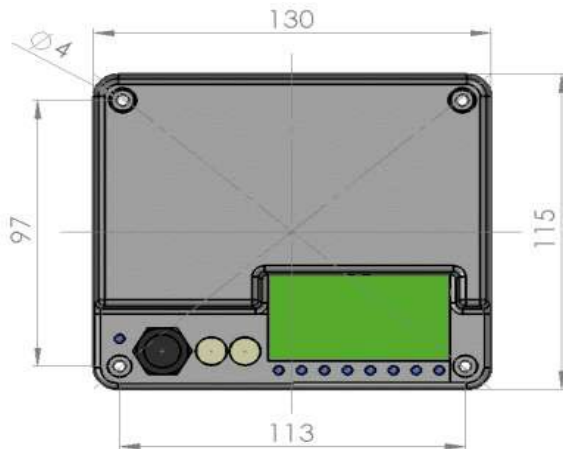
2.1 UNPACKING THE BOX

You will find the following items in the 3340 shipping box:

- 1 x 3478 NMEA2000® Relay Output Module 8
- 1 x 3478 User Manual (This document)

2.2 MOUNTING THE UNIT

The unit should be mounted to a flat surface using 4 x M4 mounting screws. The unit dimensions and mounting hole locations are shown on the following drawing.



2.3 CONNECTING THE NMEA2000 CABLE

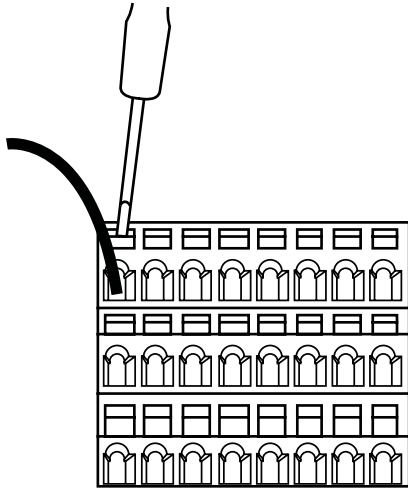
The unit is connected to the NMEA2000 network by the 5 way micro C socket on the front. Carefully attach the network drop cable to this plug and hand tighten until it is fully seated. Take care to match the orientation of the pip inside the socket to the recess inside the drop cable plug. The other end of the drop cable should be connected to a suitable Tee connector on the NMEA2000 network backbone cable.

2.4 CONNECTING THE SENSOR CABLES TO THE WAGO SOCKET

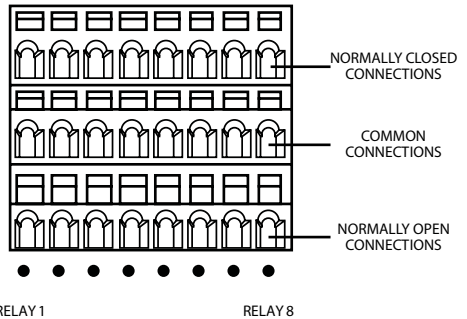
WARNING: Risk of Electric Shock

This device contains potentially hazardous voltages. Ensure that power is removed from all AC circuit that will be connected to the AC monitor. Do not attempt to disassemble the device. This device contains no user serviceable parts. Connecting the AC monitor must be performed by **QUALIFIED ELECTRONICS ENGINEER ONLY.**

The cables from the power-source to the external sockets are connected using the 6 x 2way WAGO Cage Clamp terminal block. The wire should be stripped for 8mm and then the cage clamp opened with a small screwdriver in the slot above the wire connection. Then simply insert the wire into it's connection slot and release the cage clamp by removing the small screw driver. This will produce a secure gas tight connection on wire sizes from 0.08 - 2.5 mm²



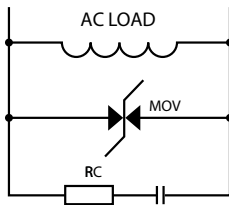
The terminal connections are numbered as follows:



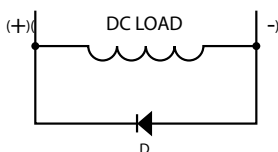
Note:

When using the 3478 Relay Output Module to switch inductive loads such as transformers, electric motors or solenoids external EMI (electromagnetic induction) protection is required.

For AC inductive loads we recommend to place a properly rated MOV (metal-oxide varistor) across the load in parallel with series RC snubber (i.e. a 0.1uF polypropylene capacitor of sufficient voltage and a 47 Ohm 1 Watt carbon film resistor).



For DC inductive loads we recommend to place a diode across the load (i.e. 1N4006). Be sure to observe proper polarity.



Any suppression device must be placed as close as possible to the inductive load. It is the customers responsibility to provide suitable EMI suppression around inductive load.

It is possible to install a number of 3478 Relay Output Modules (or Switch Bank Modules) on a NMEA2000® network so they need to each have a unique Device Instance Address which is set using the two small rotary switches on the front of the unit.

Valid Device Instances are “00” through to “FC”. The switches are simply turned to the desired Device Instance with a small screwdriver.

As the Relay Output Module is being controlled by other devices on the network it is important to ensure that the Device Instance chosen matches the Device Instance being controlled on the controlling unit.

4**OPERATION**

The 3748 unit operates each relay as commanded. When a relay is operated then the matching green LED in front of the WAGO terminal block is illuminated.

- Clean the unit with a soft cloth.
- Do not use chemical cleaners as they may remove paint or markings or may corrode the enclosure or seals.
- Ensure that the unit is mounted securely and cannot be moved relative to the mounting surface. If the unit is loose, tighten the mounting screws.
- Check the security of the cables connected to the NMEA 2000 connector, tighten if necessary.
- Check the security of the cables connected to the WAGO terminal block, reseating them if necessary.

As Offshore Systems are constantly improving their products specifications are subject to change without notice. Offshore System's products are designed to be accurate and reliable however they should only be used as aids to navigation and not as a replacement for traditional navigation aids and techniques.

Relay Outputs

Parameter	Comment
8 Independent Relay Outputs	Fully Isolated, SPDT contacts
DC Power Rating	8 Amps at 35 Volts DC resistive load
AC Power Rating	16 Amps at 250 Volts AC resistive load
Wire Sizes	0.08 - 2.5mm ² section

Certifications

Parameter	Comment
NMEA2000	Level B
Maritime Nav and RadioComm Equipment	IEC60945
CE and FCC	Electromagnetic Compatibility

NMEA2000® Parameter Group Numbers (PGNs)

Type	PGN No	PGN Name
Command	PGN 127502	Switch Bank Control
Monitor	PGN127501	Switch Bank Status (Every 2 secs)
Protocol	PGN126464	Tx/Rx PGN List
	PGN126996	Product Information
	PGN059392	ISO Acknowledge
	PGN059904	ISO Request
	PGN060928	ISO Address Claim
	PGN126208	Command/Request Group

Electrical and Mechanical

Parameter	Value	Comment
Operating Voltage	9 to 32 Volts	DC Voltage
Power Consumption	30 - 340mA	Average Operating
Load Equivalence Number	3 -7	LEN
Reverse Battery Protection	Yes	Indefinitely
Load Dump Protection	Yes	SAE J1113
Size	143x113x53mm	
Weight	300 grams	

Environmental

Parameter	Value
IEC 60954 Classification	Protected
Degree of Protection	IP40
Operating Temperature	-25°C to 50°C
Storage Temperature	-40°C to 70°C
Relative Humidity	93%RH @40° per IEC60945-8.2
Vibration	2-13.2Hz @ ±1mm, 13.2-100Hz @ 7m/s ² per IEC 60945-8.7
Electromagnetic Emission	Conducted and Radiated Emission per IEC 60945-9
Electromagnetic Immunity	Conducted, Radiated, Supply, and ESD per IEC 60945-10
Safety Precautions	Dangerous Voltage, Electromagnetic Radio Frequency per IEC 60945-12

Please note that below are some FAQ/Troubleshoot Questions. If none of these help or apply, then please don't hesitate to contact Technical Support.

No LEDs illuminated on front panel	Check NMEA2000 network cable connection and network power
NMEA2000 control device not switching relays on command	Check Device Instance Switches match the settings required by the control device
Green LED indicates relay operated but device connected to the relay output not operating	Check wiring of device
Yellow restart LED is illuminated.	The attached devices have caused excessive interference which has caused the 3478 to restart. Fit interference suppressors on the troublesome devices.

Offshore Systems warrants this product to be free from defects in materials and workmanship for one year from the date of original purchase. If within the applicable period any such products shall be proved to Offshore Systems satisfaction to fail to meet the above limited warranty, such products shall be repaired or replaced at Offshore Systems option. Purchaser's exclusive remedy and Offshore Systems sole obligation hereunder, provided product is returned pursuant to the return requirements below, shall be limited to the repair or replacement, at Offshore Systems option, of any product not meeting the above limited warranty and which is returned to Offshore Systems; or if Offshore Systems is unable to deliver a replacement that is free from defects in materials or workmanship, Purchaser's payment for such product will be refunded. Offshore Systems assumes no liability whatsoever for expenses of removing any defective product or part, or for installing the repaired product or part or a replacement therefore or for any loss or damage to equipment in connection with which Offshore Systems products or parts shall be used. The foregoing warranties shall not apply with respect to products subjected to negligence, misuse, misapplication, accident, damages by circumstances beyond Offshore Systems control, to improper installation, operation, maintenance, or storage, or to other than normal use or service.

THE FOREGOING WARRANTIES ARE EXPRESSLY IN LIEU OF AND EXCLUDES ALL OTHER EXPRESS OR IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND OF FITNESS FOR A PARTICULAR PURPOSE.

Statements made by any person, including representatives of Offshore Systems, which are inconsistent or in conflict with the terms of this Limited Warranty, shall not be binding upon Offshore Systems unless reduced to writing and approved by an officer of Offshore Systems.

IN NO CASE WILL OFFSHORE SYSTEMS BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, DAMAGES FOR LOSS OF USE, LOSS OF ANTICIPATED PROFITS OR SAVINGS, OR ANY OTHER LOSS INCURRED BECAUSE OF INTERRUPTION OF SERVICE. IN NO EVENT SHALL OFFSHORE SYSTEMS AGGREGATE LIABILITY EXCEED THE PURCHASE PRICE OF THE PRODUCT(S) INVOLVED. OFFSHORE SYSTEMS SHALL NOT BE SUBJECT TO ANY OTHER OBLIGATIONS OR LIABILITIES, WHETHER ARISING OUT OF BREACH OF CONTRACT OR WARRANTY, TORT (INCLUDING NEGLIGENCE), OR OTHER THEORIES OF LAW WITH RESPECT TO PRODUCTS SOLD OR SERVICES RENDERED BY OFFSHORE SYSTEMS, OR ANY UNDERTAKINGS, ACTS OR OMISSIONS RELATING THERETO.

Offshore Systems does not warrant that the functions contained in any software programs or products will meet purchaser's requirements or that the operation of the software programs or products will be uninterrupted or error free. Purchaser assumes responsibility for the selection of the software programs or products to achieve the intended results, and for the installation, use and results obtained from said programs or products. No specifications, samples, descriptions, or illustrations provided by Offshore Systems to Purchaser, whether directly, in trade literature, brochures or other documentation shall be construed as warranties of any kind, and any failure to conform to such specifications, samples, descriptions, or illustrations shall not constitute any breach of Offshore Systems limited warranty.

WARRANTY RETURN PROCEDURE

To apply for warranty claims, contact Offshore Systems or one of its dealers to describe the problem and determine the appropriate course of action. If a return is necessary, place the product in its original packaging together with proof of purchase and send to an Authorized Offshore Systems Service Location. You are responsible for all shipping and insurance charges. Offshore Systems will return the replaced or repaired product with all shipping and handling prepaid except for requests requiring expedited shipping (i.e. overnight shipments). Failure to follow this warranty return procedure could result in the product's warranty becoming null and void.

Offshore Systems reserves the right to modify or replace, at its sole discretion, without prior notification, the warranty listed above.

If you require technical support for any Offshore Systems products you can reach us using any of the following ways:

- Tel: +44(0)1425 610022
- Fax: +44(0)1425 614794
- Email: support@osukl.com
- Web: www.osukl.com
- Post: Offshore Systems UK Ltd
Unit 10-11 Milton Business Centre
Wick Drive, New Milton, Hampshire BH25 6RH

Offshore Systems (UK) Ltd
Unit 10-11 Milton Business Centre, Wick Drive,
New Milton, Hampshire, BH25 6RH, United Kingdom

Tel: +44(0)1425 610022 Fax: +44(0)1425 614794
Email: mail@osukl.com Web: www.osukl.com

Copyright © 2013 Offshore Systems (UK) Ltd. All rights reserved. Our policy is one of continuous product improvement so product specifications are subject to change without notice. Offshore Systems products are designed to be accurate and reliable. However, they should be used only as aids to vessel monitoring, and not as a replacement for traditional navigation and vessel monitoring techniques. NMEA2000® is a registered trademark of the National Marine Electronics Association.

