



Kobelt 6300-0200-1
Steering Station

Owner's Operation, Installation & Maintenance
Manual



NOTES:

RECORD DATA BEFORE INSTALLATION FOR FUTURE REFERENCE	
Model #:	
Serial #:	
Date of Purchase:	
Date of Installation:	

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1 INTRODUCTION

1.1 CONTACT

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This document is intended to clearly present comprehensive product data and provide technical information to assist the end user in design applications. Kobelt reserves the right, without notice, to change the design, or construction, of any products and to discontinue or limit distribution of any products. Kobelt also reserves the right to change, or update, without notice, any technical information contained within this document.

Kobelt recommends that customers visit our website to check for updates to this Manual. Once a product has been selected for use, it should be tested by the user to ensure proper function in all possible applications. For further instructions, please contact our distributors or visit our website.

1.2 COMPLIANT USE

This device is only intended for use by persons trained in operating marine systems.

The installer shall:

- Only use non-defective products.
- Check the safety of operation and the condition of the device before each use.
- Verify that the product is operational at all times and keep it in good working conditions.

Only Kobelt Manufacturing Co. Ltd. Authorized Dealers or Authorized Technicians are to repair Kobelt products.




1.3 COPYRIGHTS & TRADEMARKS

All product names, logos and brands are property of their respective owners. All company, product and service names used in this manual are for identification purposes only. Use of these names, logos, and brands does not imply endorsement.

2 SAFETY

2.1 SAFETY ALERTS

Throughout this manual, the following symbols are used to alert the user to special instructions concerning a service or operation that may be hazardous if performed incorrectly or carelessly. The associated risk levels are stated below.





 DANGER	This symbol indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
 WARNING	This symbol indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
 CAUTION	This symbol indicates a hazardous situation, which if not avoided, could result in minor or moderate injury.
NOTICE	This symbol informs the reader of events not related to personal injury but which there is a risk of damage to property or equipment.
SAFETY INSTRUCTIONS	This symbol informs the reader of safety-related instructions or procedures.

2.2 NOTICE TO INSTALLER

Disregarding the following safety measures can result in an accident, causing severe injury to personnel and damage to material assets.

- Only use the product as directed in this manual.
- Never put the product into service if there is evidence of visible damage.
- Never put the product into service before fully completing installation and commissioning.
- Do not perform any modifications to the product.
- Only use authentic Kobelt spare parts.
- Observe all local regulations, directives, and laws during the installation of this product.
- All installation, commissioning, and maintenance work must be conducted by qualified personnel. (For the purpose of this manual, qualified personnel are people who are familiar with the assembly, installation, commissioning, and operation of the product and who have the qualifications necessary for their occupation.)
- Observe all specifications in this manual. If these guidelines are not followed and damage occurs, the warranty will be voided.


2.3 PRODUCT HAZARDS

 WARNING	Equipment Starts Automatically: The Kobelt Steering Controller valve outputs are controlled remotely and/or through a control loop. They may be driven unintentionally through improper closed loop feedback and or unintentional operator commands. Ensure all power sources are disconnected or locked out prior to performing system maintenance or repair.
 WARNING	Disconnect Power: Turn off power at distribution panel before beginning installation to protect installer from electrical hazards.
 WARNING	Voltage and Power Compatibility: Confirm that the power and voltage requirements of the system are compatible. Ensure that the voltage drops from cabling is within the specifications of the product. If voltage drops are excessive the system could fail due to low voltage conditions resulting in abnormal behavior and or loss of function.
 CAUTION	Voltage and Current Compatibility: Confirm that the power source is compatible with the maximum voltage and current ratings of is product variant. Failure to do so could result in damage or fire.

2.4 SCOPE

This manual covers the installation, configuration, operation, and maintenance of the Kobelt steering station only. Instructions on the steering controller or digital helm can be found in their respective manuals (MNL-6300-0100 and MNL-6301-0100). Information on electric and hydraulic systems present on the vessel requires knowledge not covered within this document.

Information of any Autopilot interfacing to the Kobelt Steering System is not covered within this manual.

 WARNING	The Kobelt Steering System is designed to connect to a correctly installed and commissioned hydro-mechanical steering gear.
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3 TERMINOLOGY AND DEFINITIONS

Before proceeding with the configuration and operation of the Kobelt Steering System, it is important for the user to become familiar with the terminology and basic functions used throughout this manual.

Station	Physical locations around the vessel where steering controls are located. Some common station locations include: <ul style="list-style-type: none"> • the Main Bridge, • the Fly Bridge, • a bow or aft station, • port or starboard wing stations, • the Engine Room.
FFU	Full follow up. A mode of control where the controller will move the rudder to the Rudder Order position from the FFU lever
NFU	Non-follow up. A mode of control which moves the rudder in the Jog Order direction for as long as the NFU lever is engaged
RFU	Rudder feedback unit. An angular position measurement device, connected to the rudder to provide a Rudder Angle signal to the controller.
RAI	Rudder angle indicator. Receives a signal from an RFU to display to the operator the current Rudder Angle
ROI	Rudder order indicator. Receives a signal from an FFU to display to the operator the current Rudder Order
SBW	Steer-by-wire. An electronic helm wheel. Also referred to as 'Smart Helm'
PID	Proportional-integral-derivative. A control method employed for rudder positional control.
CAN	Controller Area Network. A digital communication protocol employed by the Kobelt steering controller.

4 PRODUCT DESCRIPTION

4.1 SYSTEM OVERVIEW

The Kobelt Steering System is a configurable, electro-hydraulic steering control system for marine vessels. The system is comprised of a minimum of one steering controller and one to six steering stations. The system is interconnected by the KNet network for communications and power. The Kobelt steering system controls one or two directional solenoid valves for a single rudder, or two independent rudders. The valve outputs may be configured as on-off type, or proportional control. A steering station can interface with any combination of;

- a. one or two NFU jog lever inputs,
 - o either as twin independent or redundant single speed inputs
 - o one two-speed input
- b. one or two FFU lever inputs, and/or
 - o either as twin independent or redundant inputs
- c. one SBW helm Wheel.

Commands are accepted at the steering station that is in control and transmitted digitally to the steering controller to act upon. The steering controller takes the command and moves the steering gear to the desired position or in the desired direction. An RFU is used by the controller to measure the rudder angle so that it can continually position the rudder to the desired rudder order during full follow up operations. Non-follow up commands are acted upon without the benefit of the rudder angle in single rudder applications. Additionally, an integrated autopilot interface can take control signals from an autopilot to control the valves in the commanded direction.

The Kobelt steering system is capable of;

- Position control of one (1) rudder or mechanically coupled rudders with;
 - o Variable-speed control via a proportional valve, with redundancy, or
 - o Single-speed control via solenoid valve, with redundancy, or
 - o Two-speed control via two solenoid valves, without redundancy.
- Position control of two (2) independent rudders with;
 - o Variable-speed control via two proportional solenoid valves
 - o Single-speed control via two on-off solenoid valves
 - o Electronic tie bar capability.
- Up to six (6) Steering Stations, each with a control panel and one or more input devices.
 - o Stations and controller communicate over our KNet Network
 - o Based on, but not compatible with, the NMEA 2000 standard.



WARNING

The System is not NMEA 2000 compatible and needs to be isolated from any onboard NMEA 2000 network.

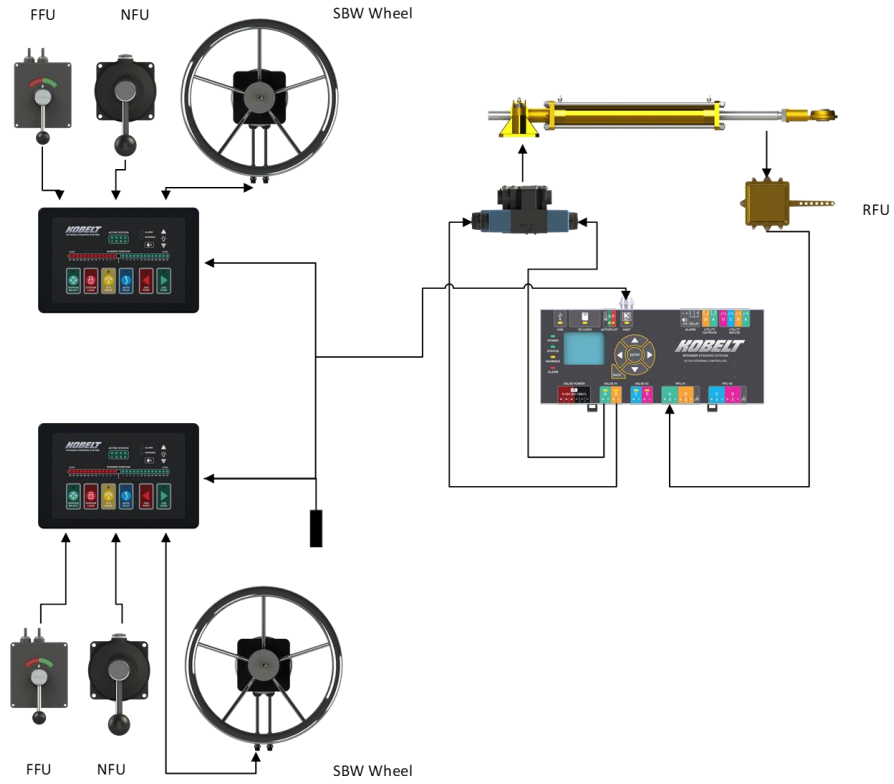


Figure 1: Single Rudder Steering System

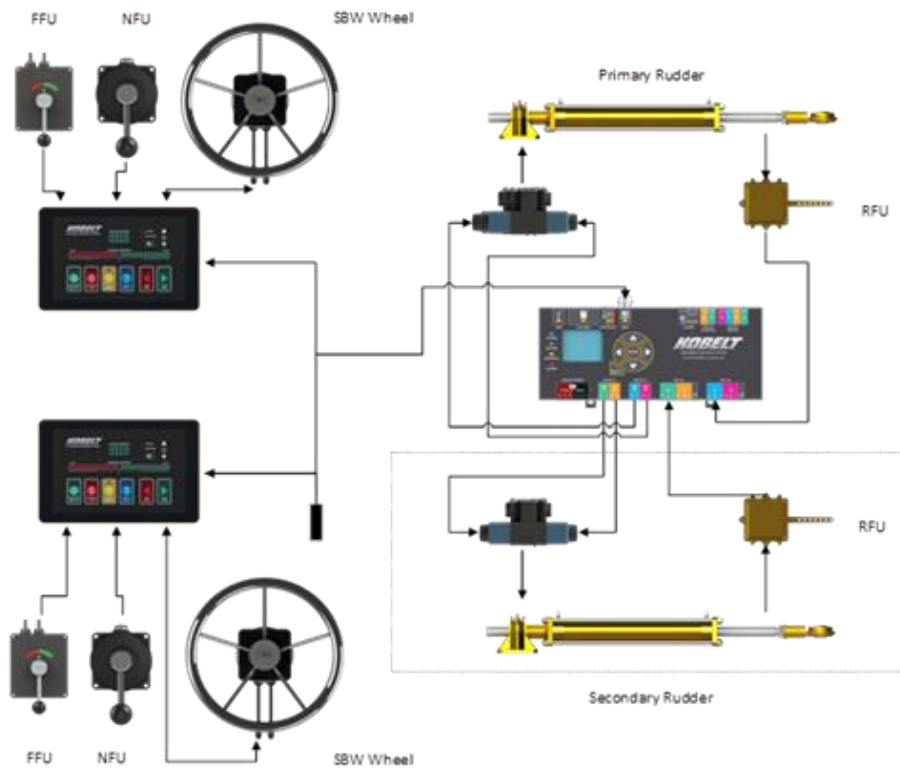


Figure 2: Dual Rudder Steering System

4.2 STEERING STATION OVERVIEW

The steering station is the operator interface to the steering gear. The steering station takes operator control inputs and relays them to the steering controller to drive the steering gear. The figure below identifies the key features of the steering controller referenced in this manual.

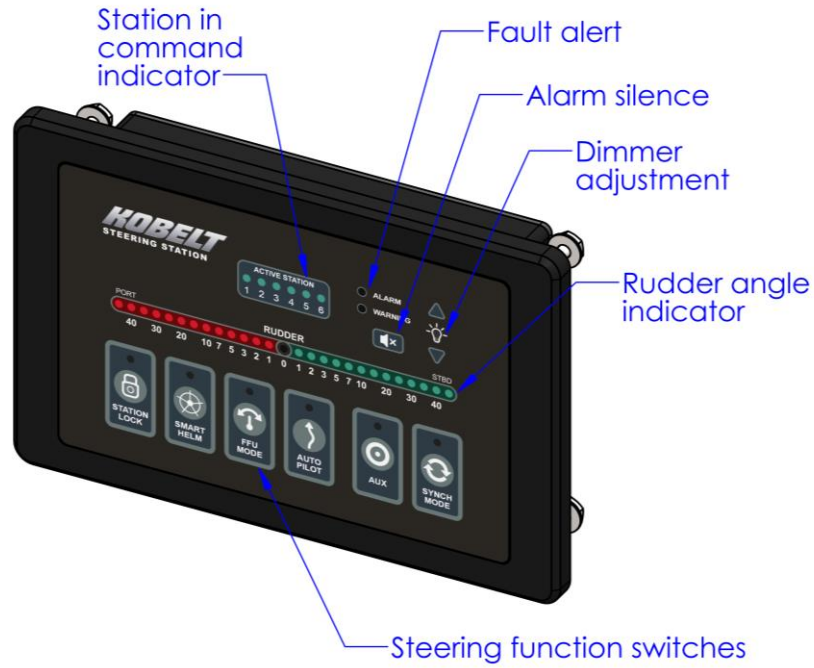


Figure 3: Front Overview



Figure 4: Back Overview

4.3 TECHNICAL SPECIFICATIONS

Table 1: Technical Specifications Controller and Head

ELECTRICAL	
OPERATING VOLTAGE	12-24Vdc
OPERATING CURRENT (at 24 Vdc)	0.35A max (without SBW wheel) 1.35A (max with SBW wheel)
REVERSE POLARITY PROTECTION	Yes.
Compass Safe Distance	1.5 cm
CONNECTORS	1x KNET (NMEA Micro-C) 2x Analog Input Banks, 2 Channels/Bank 1x Digital Input Banks, 4 Channels/Bank 1x potentiometer input for brightness control 1x Electronic CANBUS wheel connection
MECHANICAL	
PHYSICAL DIMENSIONS (L x W x H)	184.2 mm x 120.7 mm x 52.7 mm [7.25" x 4.75" x 2.08"]
MOUNTING DIMENSIONS (L x W)	146 mm x 91 mm [5.75" x 4.13"]
PRODUCT WEIGHT	0.65 kg [1.44 lbs]
SHIPPING DIMENSIONS (L x W x H)	275 mm x 170 mm x 100 mm [10 7/8" x 7" x 3 7/8"]
Environmental Category	ENV5 / Class C / exposed
OPERATING TEMPERATURE	-25°C to 55°C [-13°F to 131°F]
STORAGE TEMPERATURE	-30°C to 70°C [-22°F to 158°F]
OPERATING HUMIDITY	95 % (Non-Condensing) 95% Max.
STORAGE HUMIDITY	98 % (Non-Condensing) 95% Max.
IP RATING	IP56 – Above console IP20 – Below console

5 INSTALLATION

5.1 RECEIPT

Upon receipt of the device ensure that the model number and serial number are noted in the table on page 2 of this manual. The serial number can be found in the location noted at right.

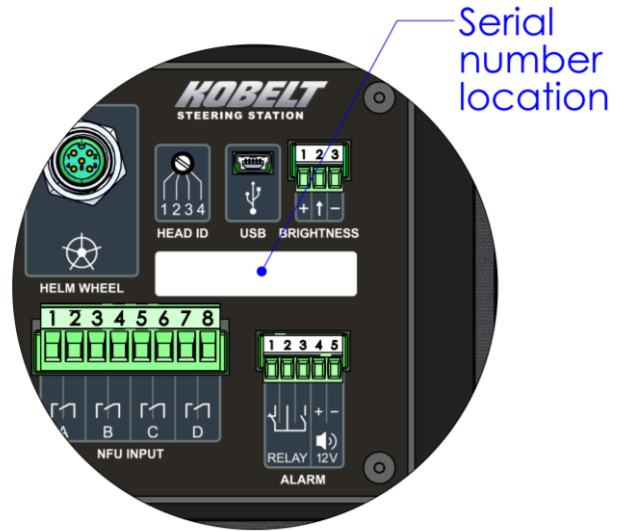


Figure 5: serial Number Location

5.2 MECHANICAL

The location of the console must be a suitable location for an operator. The steering station is rated IP56 and can be mounted to any flat console or dashboard.

⚠ WARNING	Station 1 can override the station locks at another station. It is recommended that this station should be in the main bridge or the machine room depending on emergency procedures.
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The mounting surface must be prepared as per the diagram at right (Refer to

Secure the panel with the four #8 UNC studs supplied. Apply Loctite 243 and tighten using a 11/32" wrench.

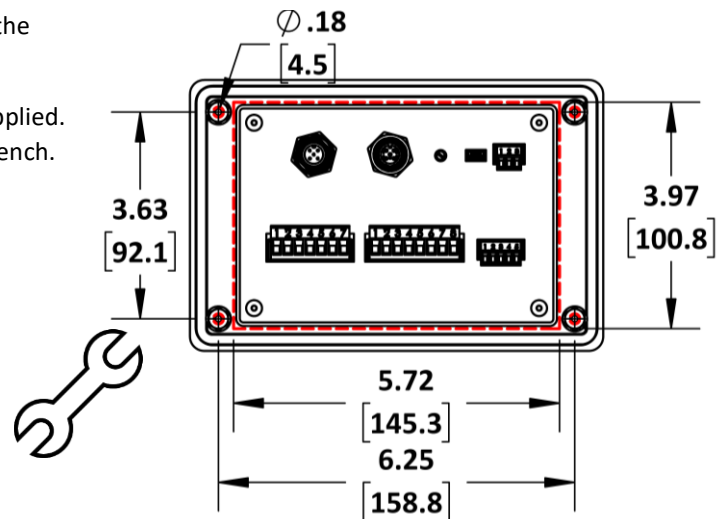


Figure 6: Cutout Dimensions

5.3 ELECTRICAL

The back of the steering station contains the electrical connections for wiring the steering system. The graphics on the back label of the device identifies each connector (see diagram below).

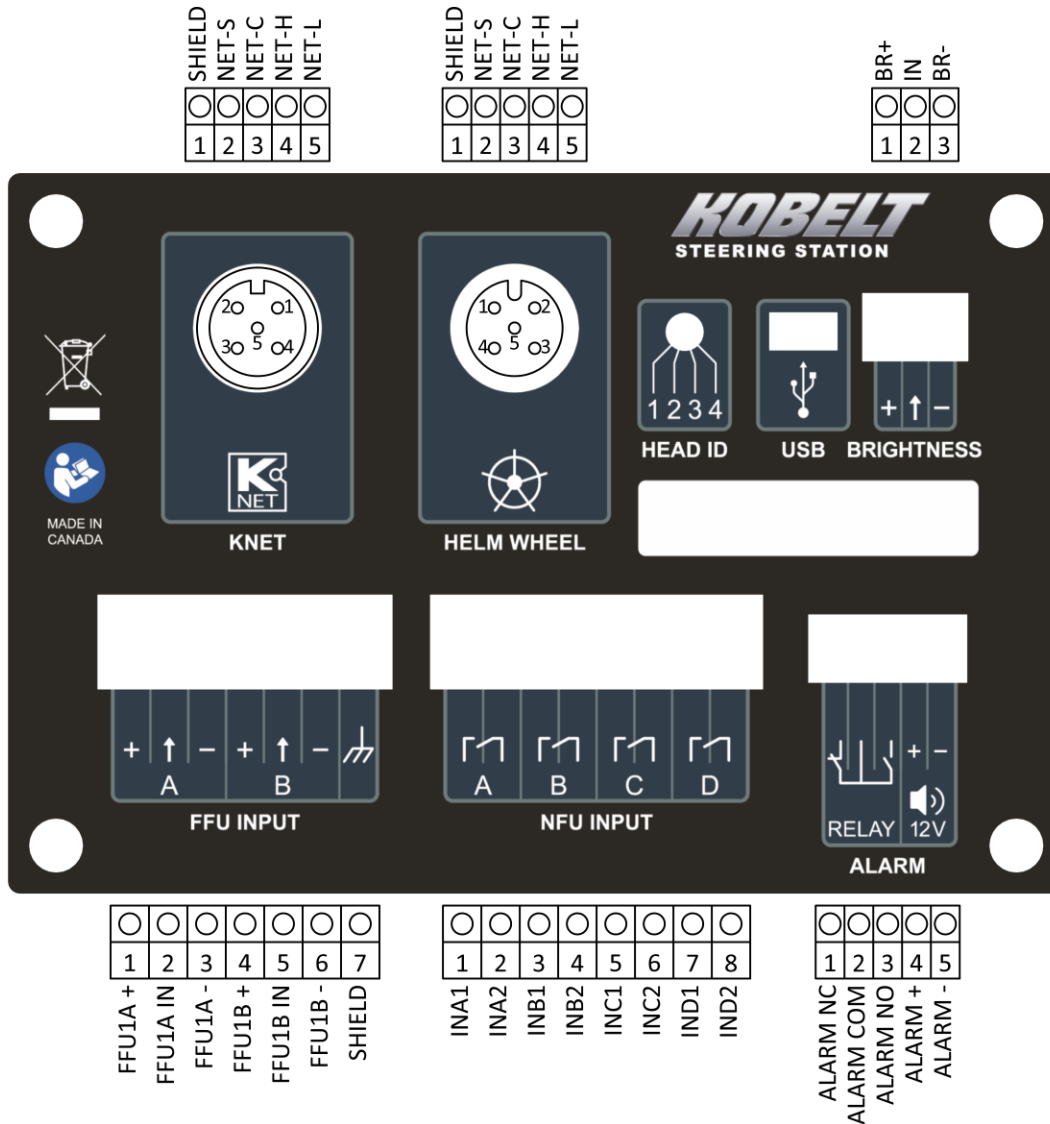


Figure 7: Steering Station Connectors

5.3.1 KNet Connection

Reference user manual MNL-6300-0100 for instruction on the KNET cabling and connection.

5.3.2 SBW Wheel Connection

The steering station is supplied with a standard 5 pin – M12 connector for making the connection with the smart helm.

- Connector Type: 5-pin M12, A-Keyed, Female

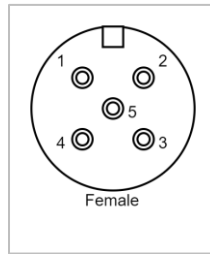


Figure 8: SBW Wheel Female Connector Pinout.

Table 2: SBW Wheel Connector

Pin #	Pin Designator	Pin Type	Function
1	Shield	-	SBW wheel network shield pin
2	NET-S	Power	SBW wheel network power supply positive 24VDC nominal
3	NET-C	Power	SBW wheel network power supply common, COM
4	NET-H	I/O	SBW wheel network CAN high signal
5	NET-L	I/O	SBW wheel network CAN low signal

5.3.3 FFU Connection

The steering controller is equipped with a connector dedicated to FFU steering levers. This connector can accept one or two potentiometer outputs.

- Connector Type: 7-pin 5mm Pluggable Terminal Block

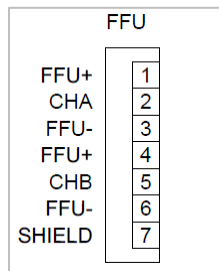


Figure 9: FFU Electrical Connector

Table 3: FFU Connector Pinout

Pin #	Pin Designator	Membrane Symbol	Pin Type	Function
1	FFU+	+	Power	Voltage power for CHA
2	CHA	↓	Input	Pot wiper input for CHA
3	FFU-	-	Power	GND for CHA
4	FFU+	+	Power	Voltage power for CHB
5	CHB	↓	Input	Not used (future support)
6	FFU-	-	Power	GND for CHB
7	SHIELD		Power	Shield

- Labelled “**FFU INPUT**”.
- The connector has two (2) input channels to read both a primary and a secondary sensor.
- These are referred to as Channels A and B.
- Each channel measures potentiometer voltage only.
- Each connector supplies a protected, and regulated, voltage and GND to power the FFUs:
- The voltage supplied to both channels of the FFU connector is monitored. Faults are triggered if this voltage drops too low (indicating excessive load or a short).

NOTICE The Kobelt Steering System is designed to work with 1k, 5k and 10k Ohm potentiometers. If the resistance becomes too low through a short, partial short or incorrect value the FFU will not function correctly

5.3.3.1 Single Potentiometer FFU

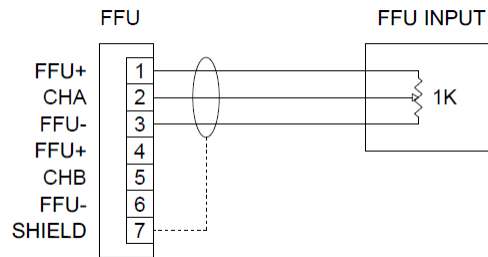


Figure 10: FFU Wiring with 1 Potentiometer Sensor

- FFU+ and GND applied across the pot, and the wiper voltage is measured on FFU Channel A.
- Calibration is required to convert the measured voltage into the Rudder Order Angle. Refer to the commissioning section.
- Channel B left unused
- Supports all Kobelt FFU single potentiometer products (7165, 7166, 7171, 7172 and 7197) without modification.

5.3.4 NFU Connection

The steering controller is equipped with a connector dedicated to NFU jog levers. This connector can accept one two-speed lever or two single-speed levers.

- Connector Type: 8-pin 5mm Pluggable Terminal Block

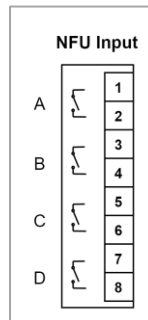


Figure 11: NFU Electrical Connector

Table 4: NFU Connector Pinout

Pin #	Pin Designator	Pin Type	Function
1	A1	Input	Switch input for CH A - Port Slow
2	A2	Power	Source A
3	B1	Input	Switch input for CH B - STBD Slow
4	B2	Power	Source B
5	C1	Input	Switch input for CH C - Port Fast
6	C2	Power	Source C
7	D1	Input	Switch input for CH D - STBD Fast
8	D2	Power	Source D

- Labelled “NFU INPUT”.
- The connector has four (4) input channels to read single or two speed Kobelt jog levers.
- These are referred to as Channels A, B, C and D.
- Each channel is Active Low (GND input signal to activate).

5.3.4.1 Single-Speed Jog Lever

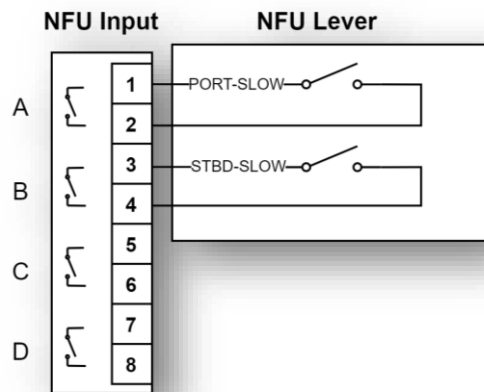


Figure 12: 1-Speed NFU Jog Lever Wiring

- Channel C & D left unused
- For use with a standard Single-Speed Jog Lever (e.g., Kobelt 7170).

5.3.4.2 Dual-Speed Jog Lever

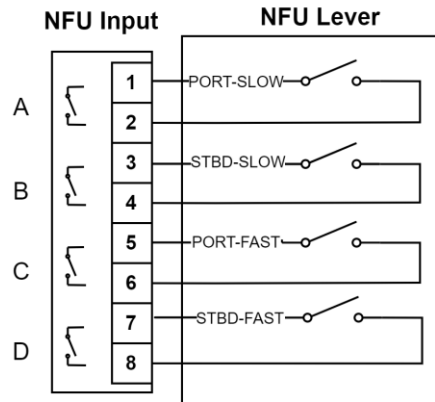


Figure 13: NFU Wiring for Two-Speed Jog Lever

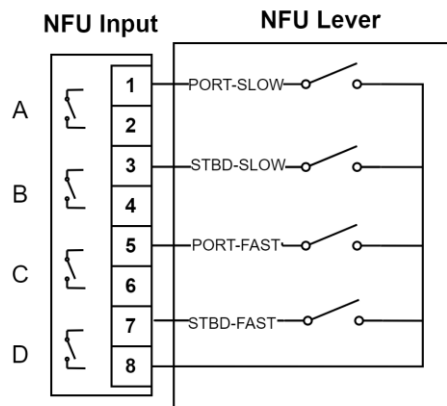


Figure 14: Two-Speed NFU Jog Lever Wiring (Common Negative)

- Channel C & D connected to fast speed contacts
- For use with a standard 2-Speed Jog Lever (e.g., Kobelt 7196).

5.3.5 External Dimmer Connection

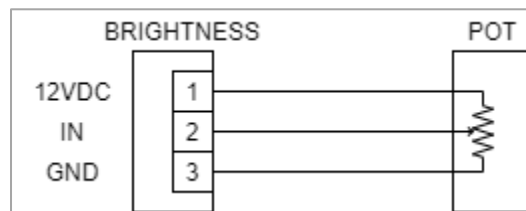


Figure 15: Dimmer Wiring

5.3.6 Alarm Output Connection

The Kobelt steering station has a set of alarm outputs for a Form C alarm relay output and a Transistor type output for a buzzer.

The alarm relay works on the fail-safe principle: the relay is energized when the controller is healthy (not in an alarmed state). Use the N.O. (normally open) contact for connection to the alarm system.

Connector Type: 5-pin 3.5mm Pluggable Terminal Block

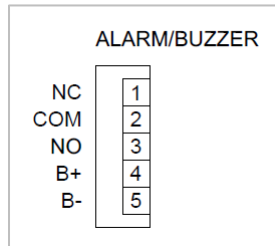


Figure 16: Alarm Buzzer & Relay Connector

NOTICE Connect the relay output to external system through the NO-COM on the alarm connector.

Table 5: Alarm Output Connector

Pin #	Pin Name	Pin Type	Function
1	ALRM_NC	Output	Dry contact normally closed (connected to COM in alarmed state)
2	ALRM_COM	--	Dry contact common
3	ALRM_NO	Output	Dry contact normally open (Connected to COM in normal operation)
4	ALRM_B+	Output	Buzzer output positive
5	ALRM_B-	Power	Buzzer output negative

NOTICE The alarm relay can be configured to signal when the steering station is in control. Use the COM and NO contacts for this use case.

5.3.6.1 Alarm Buzzer

- A standard 12VDC External Alarm Buzzer can be connected to the system.
- B+ and B- supply regulated 12 VDC to the external alarm buzzer.
- The current is internally limited to 100mA.

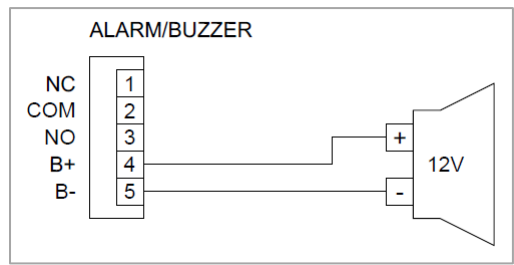


Figure 17: Wiring of External Buzzer

5.4 EMC INSTALLATION GUIDELINES

Shielded cables shall be utilized when connecting FFU levers to the Kobelt steering stations. The cable shield shall be grounded at the station and from there bonded with the vessel to ensure proper EMC compliance.


NOTICE

The user is responsible for implementing the above recommendations. Failure to do so will result in the system not complying with IEC 60945 EMC regulations.

6 COMMISSIONING

6.1 CONFIGURATION



Prior to commissioning and operating the steering system, the controller must be configured for the steering topology of the vessel.

 WARNING	System configuration must be completed prior to commissioning the vessel and calibration. If reference menu pictures do not match, please download the latest manual version at www.kobelt.com .
--	--

Configuration of the steering station is accomplished at the steering controller. Reference manual MNL-6300-0100 for configuration instructions.

6.2 CALIBRATION

Once the steering system has been properly configured for the vessel, the system must be calibrated.

 WARNING	Calibration of the system should be performed while dockside. Upon completion of calibration all systems should be tested to ensure proper function. Calibration at sea should only be performed in the event of an emergency or by trained personnel.
 CAUTION	Calibration and Adjustment should only be performed once wiring of the system has been validated.

After wiring has been checked and validated, power on the system, including the steering HPU and run through all the applicable calibration items. In this step the installer will allow the controller to map the FFU lever hard-over port, midship and hard-over starboard outputs.

6.2.1 FFU Calibration

Every FFU lever at every station, if present, must be calibrated before operation of the vessel. A three-point calibration process is required. To perform this process, enter configuration mode in the controller by following the menu sequence below:

- *Main Monitoring Screen -> Passcode -> Setup Selection Screen -> Setup*

Once the system is in calibration mode, follow the steps below:


Step 1: press the FFU Mode button at the current station.

Step 2: The center LED on the RAI strip is flashing. Move the FFU lever(s) to the center position and press the SYNC button.

Step 3: The 35° port LED on the RAI Strip is flashing. Move the FFU lever(s) to the extreme port position and press the SYNC button.


Step 4: The 35° starboard LED on the RAI Strip is flashing. Move the FFU lever(s) to the extreme starboard position and press the SYNC button.

If no calibration errors are detected, then the FFU calibration is complete for this station. Repeat the process for every steering station with an FFU lever.

 WARNING	For vessels equipped with twin independent steering, dual FFU input or flanking rudder control, both FFU levers must be calibrated simultaneously, or the calibration routine will fail.
--	--


NOTICE	The FFU Calibration is from configured Port End-stop to configured Starboard end-stop. Any error in configuring the end-stops, or in this calibration will cause an error in the steering system controls.
---------------	--

NOTICE	If the 0 position is not calibrated correctly errors will be present when using the FFU position.
---------------	---

 WARNING	After completion of all calibration activities, the calibration should be verified by moving the rudder through the full range of motion with a FFU, or a SBW wheel. Ensure that the rudder does not move past the desired virtual end-stops.
--	---

6.3 FUNCTIONAL TEST

Before commencing with sea trials, a series of basic function tests must be performed to ensure proper rudder movement. Follow the test steps below.

 WARNING	The Function Test should be carried out while the vessel is still at dock and before it is taken out to sea and after installation has been completed.
--	--

6.3.1 Jog Control

At each station equipped with a jog lever, confirm that;

1. Moving the lever to jog port moves the rudder towards the port side
2. Moving the lever to jog starboard moves the rudder towards the starboard side
3. Any station with two speed jog levers will engage high speed in both directions

If the 'Hold-for-Fast-Jog' parameter has been set, confirm that high speed jog will be engaged after the desired hold time.

6.3.2 FFU Control

At each station equipped with a FFU lever or analog helm wheel, enter FFU mode and confirm that;

1. Moving the lever to 15 degrees port moves the rudder to 15 degrees port
2. Moving the lever to 15 degrees starboard moves the rudder to 15 degrees starboard
3. Move the lever to maximum port and confirm that the rudder stops before engaging the travel limit switches.
4. Repeat for the starboard side

7 OPERATION

The Kobelt digital steering station has various function buttons and LEDs. Reference [section 4.2](#) and [section 7.1](#) for identification of the operator interface elements.

7.1 OPERATOR INTERFACE

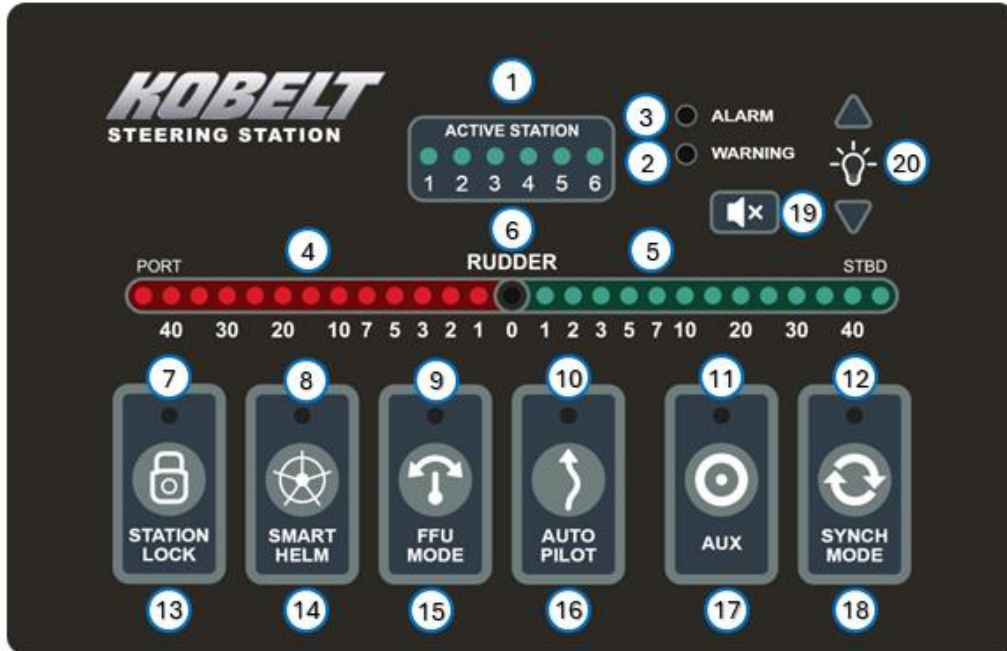


Figure 18: Station Graphics

Table 6: Station HMI Overview

#	Name	Colour	Description
1	Active Stations (1 through 6)	Green	LED will be ON to show which station is active
2	Warning	Amber	Solid ON or flashing if there is a warning or caution
3	Alarm	Red	Solid ON or flashing if there is an alarm
4	Rudder angle – port side	Red	LED strip shows the rudder angle and order.
5	Rudder angle - starboard side	Green	LED strip shows the rudder angle and order.
6	Rudder angle - center	White	Order is bright light
7	Station lock	Red	Solid ON if stations are locked
8	Smart Helm	Green	Solid ON if Smart Helm mode is active
9	FFU mode	Amber	Solid ON if the system is FFU mode, or flashing in the FFU alignment process
10	Autopilot mode	Amber	Solid ON if the system is autopilot mode
11	Aux Mode	Amber	ON if system is under auxiliary FFU control
12	Synchronization Mode	Amber	ON if rudder control is synchronized. Flashing is system is aligning rudders.
13	Station Lock Button	n/a	The station lock button locks out all other stations from taking control
14	Smart Helm Button	n/a	System is under smart helm and NFU jog control

15	FFU Mode Button	n/a	System is under FFU lever control
16	Auto pilot Button	n/a	Auto pilot button engages the autopilot mode if an autopilot is configured
17	Aux Mode Button	n/a	system is under auxiliary FFU control
18	Synch Mode Button	n/a	Jog Stbd will jog the system to starboard as an NFU
19	Silence Button	n/a	Silences alarm for configured amount of time
20	Dimmer buttons	n/a	Adjusts all LED brightness from 100 to 10%

7.1.1 Rudder Angle Indicator



Figure 19: Rudder Angle Indicator Strip

- A horizontal strip of LED indicators is used to indicate Rudder Angle and Rudder Order.
- Total of 27 LEDs in the strip
 - 1 White LED in the center position
 - 13 colored LEDs for port and starboard positions
- Option to configuration system to disable this feature (see MNL-6300-0100, section 6.1.4.10):
- Strip will flash FFU lever position during lever alignment operations.

7.2 STATION LOCK BUTTON



- Pressing the **Station Lock** button from the active Station locks the steering system control to the current active station and does not allow other stations to assume control. After station lock is enabled, the Station Lock LED will be ON solid at all the online stations.
- The button has no effect at inactive stations. Pressing this button at an inactive station will result three beeps and flashes of the switch LED, to indicate denied request.
- Pressing the **Station Lock** button from the active Station again will unlock all steering stations.
- Station #1 (main bridge station) has over-ride authority.
 - holding **Station Lock** button for 3 seconds deactivates station lock engaged from another steering station.
- Station locks are automatically removed whenever the active station goes into a faulted (inoperable) state.

7.3 SMART HELM BUTTON



- Pressing the Smart Helm button will place the steering system under the control of rudder orders generated by the smart helm and jog orders coming from the jog lever.
- If pressing the Smart Helm button from another station, control will transfer to the requesting station
 - If the requesting station does not have a functioning smart helm or jog lever, then control stays with the previous station.
- Station ID#1 will enter Smart Helm Mode after power up
 - If station #1 does not have a functioning smart helm or jog lever, then the station enters FFU Mode.
 - If station #1 does not have a functioning FFU lever, then an alarm will be tripped, and control must be taken at another station.

7.3.1 Jog Control

Operator jog commands to move the rudder to port or starboard energizes the steering valves in the appropriate direction. Once that input is removed, the valves are closed to stop the rudder and hold it in place. No positioning control is accomplished. If the rudder angle changes for some external reason, the system will not attempt to maintain the position.

NOTICE

For independent rudder configurations, a short positioning routine is performed to align the secondary rudder with the primary.

Depending on the input devices attached and the system configuration, the **Jog Command** may be one of the following:

- Hold: No operation
- Jog Port: Jog the rudder to port
- Jog Starboard: Jog the rudder to starboard
- Jog Port – Fast: Jog the rudder to port at fast speed
- Jog Starboard – Fast: Jog the rudder to starboard at fast speed

Fast jog commands are initiated with either two speed jog levers or single speed jog levers configured for 'Hold for Fast Jog'. Holding the lever engaged for the configured time (see MNL-6300-0100, sec 6.1) will engage the second jog speed.

7.4 FFU MODE BUTTON



- Pressing the FFU Mode button will place the steering system under the control of rudder orders generated by the FFU lever.
- If pressing the FFU Mode button from another station, control will transfer to the requesting station unless
 - the requesting station does not have a functioning FFU lever, then control stays with the previous station.
- Station ID#1 will enter FFU Mode after power up if station #1 does not have a functioning smart helm or jog lever.
 - If station #1 does not have a functioning FFU lever, then an alarm will be tripped, and control must be taken at another station.

7.4.1 FFU Lever Alignment

If the Lever Alignment parameter has been set during configuration (see MNL-6300-0100, section 6.1) then the FFU Lever must be set close to the current Rudder Angle to assume control with the FFU lever.

WARNING	If the steering system is not configured to enforce lever alignment, then the Rudder Order may suddenly change by a large amount when the station is transferred causing erratic rudder movement.
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During lever alignment operations:

- The FFU Mode indicator starts flashing.
- The RAI strip displays one bright, flashing light to depict the rudder angle and three dimmer lights showing the current position of the FFU lever.
- As the operator moves the FFU lever to the current rudder angle the three lights move in real-time.
- If the FFU lever is **NOT** aligned with the rudder within **10 seconds**, then FFU mode request is cancelled.
 - If the request was made from Smart Helm mode, then the active station stays in that mode.
 - If the request was made from another station, then control remains with the previous station.

7.5 AUTOPILOT MODE




- Pressing the Autopilot Button at the active station places Autopilot mode in a standby state.
 - In the standby state, the Autopilot indicator will flash to inform the operator that the steering system is waiting for the autopilot jog command.

- Pressing the Autopilot Mode button again will disable Autopilot Mode.
- If pressing the Autopilot button from an inactive station, or autopilot is disabled in the configuration, or autopilot interface is faulted, the station emits three beeps and flashes of the button indicator to notify the operator.
- Autopilot Mode can also be turned off by actuating an Input Device if configured as 'Auto Disengage' (see manual MNL-6300-0100, section 6.1.3.6).
- Autopilot Mode persists when switching stations

7.5.1 Autopilot Indicator

Autopilot Indicator shows the current Autopilot Mode status. The state is received from the Controller as part of regular network data.


- Indicator On = Autopilot is active
- Indicator Flashing = Autopilot Mode is standby
- Indicator Off = Autopilot Mode is NOT active

 CAUTION	The system cannot detect if an autopilot faults or goes offline. It is important to detect this and report to the operator that the autopilot has released control of steering the vessel.
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7.5.2 Autopilot Settings


7.5.2.1 Manual Disengage

Configuring the autopilot interface in the steering system for "Manual Disengage" means the Autopilot Mode exits only when the Autopilot button is pressed at the active station. The system gives full control of the valves to the autopilot input commands while in autopilot mode. Steering controls are not active until Autopilot Mode is exited.

 WARNING	While using "Manual Disengage" the systems controls will NOT be active until autopilot mode is exited. Kobelt strongly recommends having a dodge input device associated with the autopilot device to allow the user to dodge with the autopilot.
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7.5.2.2 Auto Disengage

Configuring the autopilot interface in the steering system for "Auto Disengage" means the autopilot mode exits when the helm wheel or jog lever is operated. This means that if a user is in Autopilot Mode and starts steering with the wheel or jog lever the system will exit Autopilot Mode. To re-enter Autopilot Mode the user is required to press the Autopilot button.

 WARNING	While using "Auto Disengage" type, pushing a jog lever, or moving the helm wheel slightly will cause system to exit Autopilot Mode. The user may not be aware that the system has exited Autopilot Mode. Their autopilot device must have a deviation alarm.
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7.5.2.3 Always Live

Configuring the autopilot interface in the steering system for "Always Live" means the autopilot will not exit when the user operates the steering controls. Instead, the system will temporarily go into an Autopilot Standby state and execute the steering commands. When jog commands are received from the autopilot, the steering system will

automatically jump back into Autopilot Mode. To exit Autopilot Mode the user must press the Autopilot button. Autopilot Mode being disabled will be indicated by the Autopilot Indicator turning off.

NOTICE

A period of three seconds must elapse from the last steering command before the steering system will follow autopilot jog commands.

7.6 AUX MODE BUTTON



Pressing the Aux Mode button will transfer control to a secondary FFU device. Examples of use are;

1. Taking control at a starboard wing station. This is relevant for bridge stations configured to have a smart helm plus two analog helms (Kobelc 7172) on the wings.
2. Taking control with a tethered walk-about controller (Kobelc 7176)
3. Permitting use of an analog helm and FFU at one station.

7.7 SYNCHRONIZE BUTTON



- The default condition for the Kobelc steering system is to have synchronized rudders. The system will come out of power up in Synchronization Mode.
- When in Synchronization Mode, the FFU lever connected to the FFU A terminals will be the active lever.
- To enter Independent rudder control, press the Synch Mode button. The LED will turn off to indicate independent control
- re-entering Synchronization Mode depends on the setting of the Lever Alignment parameter (see MNL-6300-0100, section 6.1.3.4):
 - If the Lever Alignment parameter is set to 'Enabled' then align the two FFU levers within **5 degrees** and press the Synch Mode button.
 - If the Lever Alignment parameter is set to 'Disabled' then simply press the Synch Mode. The Synch Mode LED will flash as the steering controller aligns the secondary rudder with the primary.

7.8 ALARM INDICATORS & BUTTON



When the steering system is not configured to interface with an external alarm system the steering controller will perform some basic alarm management. There are three levels of faults monitored by the steering system:

- i. Alarms,
- ii. Warnings and
- iii. Cautions.

Only alarms and warnings are indicated by the flashing Alarm or Warning Indicators combined with the internal buzzer and/or an external buzzer if installed. Refer to [section 5.3.6](#) for the connection with the external buzzer.

To acknowledge the fault, press the Silence button. If the Alarm or Warning Indicator turns solid red or yellow after pressing the Acknowledge button, this indicates that the fault has been acknowledged but the fault condition still persists. If the Alarm or Warning Indicator turns off this means that the fault condition is no longer present.

The user can find specific information on the fault by accessing the fault monitoring screen (see manual MNL-6300-0100, sections 9.1.10 & 9.1.11) on the steering controller.

8 MAINTENANCE

8.1 USB PORT

The USB port has read access only and is intended for qualified technician use only.

Connector Type: Mini USB Female B



Figure 20: Mini USB Female B Connector

8.2 PREVENTATIVE MAINTENANCE

- Every Sailing
 - Functionally test every NFU jog lever.
 - Functionally test every FFU lever.
 - Review alarm log.

8.3 RECOMMENDED SPARE PARTS

As a minimum Kobelt recommends the following spare parts are on-hand:

Table 7: Recommended Spares


RECOMMENDED SPARES		
QTY	ITEM	KOBELT PART #
1	Steering station	6300-0200-1

To purchase spare parts Contact Kobelt for list of parts numbers available

9 TROUBLESHOOTING

In the event of an abnormal operation, the user can find specific information on the fault by accessing the fault monitoring screen (see manual MNL-6300-0100, sections 9.1.10 & 9.1.11) on the steering controller.

If it is not possible to locate or eliminate the problem using this section, or if the fault is still present, switch off the device and contact Kobelt Manufacturing Co. Ltd. technical support department.

 WARNING	<p>The user must not attempt to repair the unit themselves. It is strongly recommended that any required service work on a Kobelt unit be performed by a factory authorized service representative. Please contact the nearest Kobelt authorized distributor for assistance.</p> <p>Any repairs performed by 3rd party may null and void any warranty or type approvals</p>
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10 WARRANTY

Kobel Manufacturing Co. Ltd. ("Kobel") warrants the Products and Parts manufactured by Kobelt to be free from defects in workmanship or material and that said products are designed mechanically and functionally to perform to specifications.

This warranty is effective providing:

- The equipment is used within the intended operating conditions and in accordance with Kobelt recommendations
- The equipment is installed according to equipment diagrams, specifications, and recommendations which Kobelt has provided

This warranty becomes invalid if the factory supplied serial number has been removed or altered on the product. This warranty does not cover cosmetic damage or damage caused by an act of God, accident, misuse, abuse, negligence, or modification of any part of the product. This warranty does not cover damage due to improper operation or maintenance, connection to inappropriate equipment or attempted repair by anyone other than an authorized Kobelt representative.

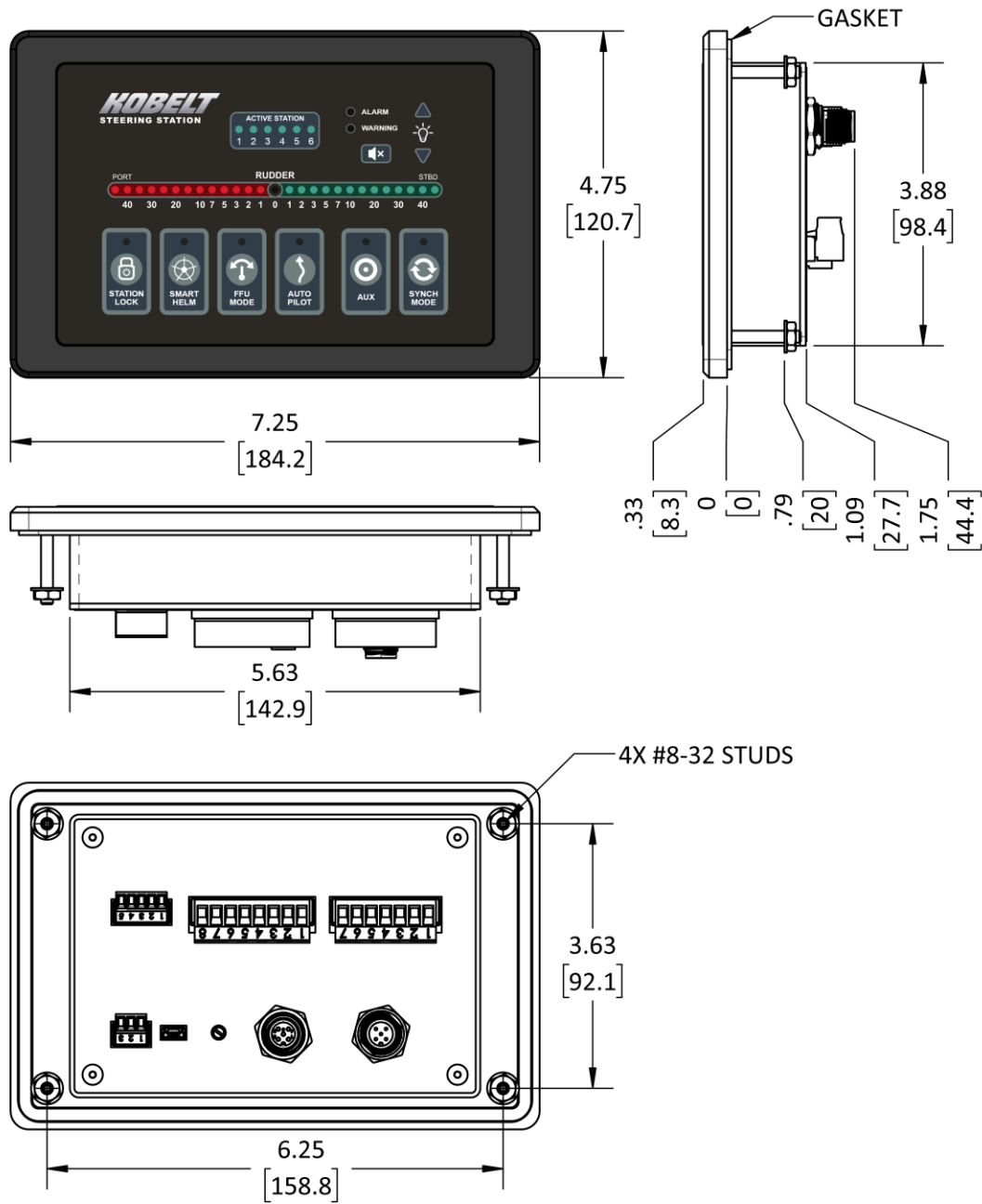
Upon identification of a potential issue or defect with a Kobelt Product or Part, the Warranty Applicant ("Applicant") must immediately contact Kobelt and describe the issue in writing, by letter, fax, email or other electronic conveyance. Kobelt will then assess the cause of the defect and determine warranty applicability and appropriate remediation.

If any part is found to be defective, Kobelt will replace said part FOB the Kobelt factory provided that any such defective part is returned by the Buyer with freight and applicable forwarding charges prepaid by the Buyer. Kobelt's sole obligation to the Applicant will be to repair or replace the defective part with same or similar product, to a maximum value of the list price of the product or part. The Kobelt warranty does not cover labour charges, travel, or any other associated expenses.

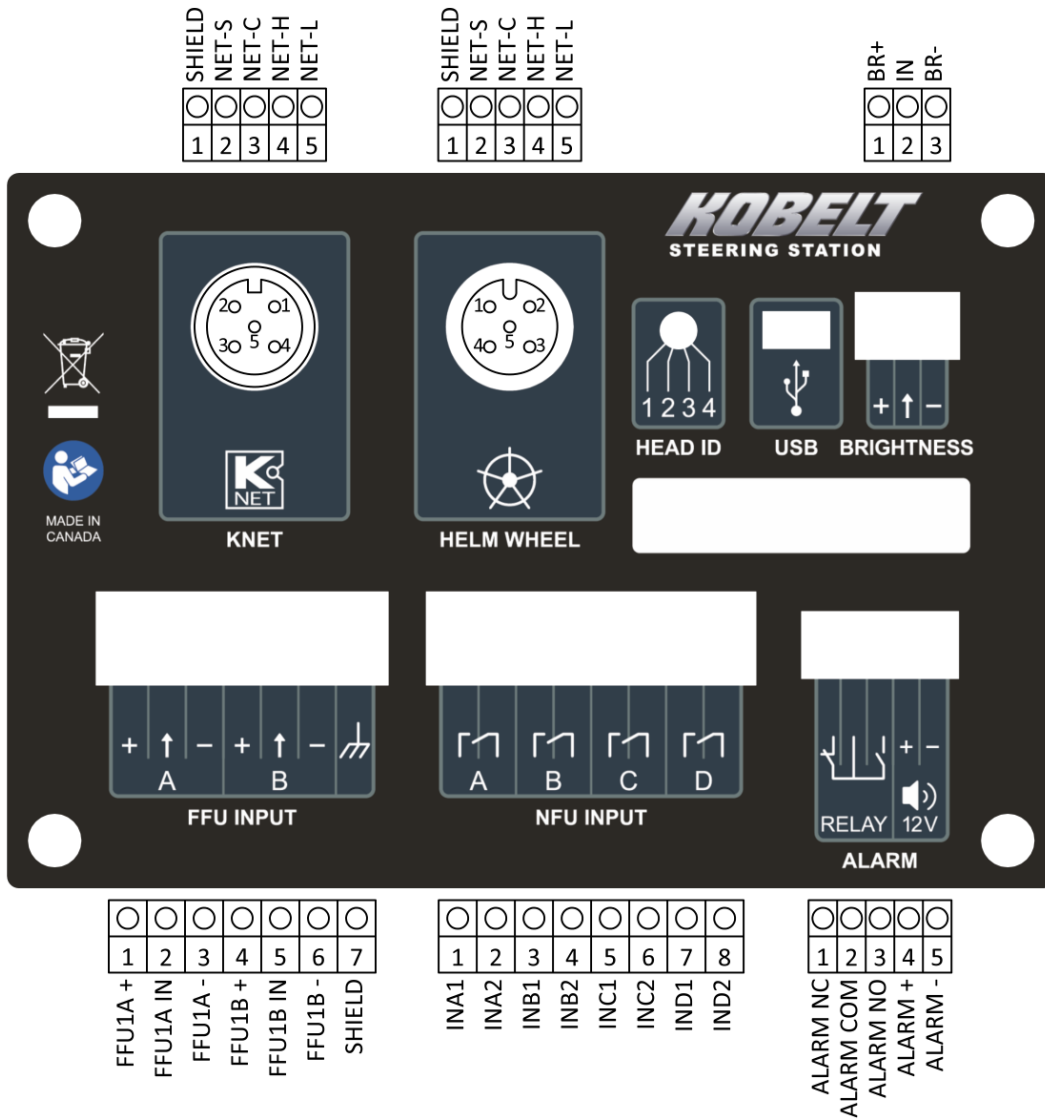
All Products and Parts manufactured by Kobelt, are subject to a warranty against manufacturer's defects in materials or workmanship for a period of two (2) years from the date of purchase.

Kobel will be responsible for all Products or Parts sold by Kobelt but manufactured by 3rd party manufacturing companies. However, these products and parts are subject to applicable 3rd party warranties and may not be the same as the Kobelt warranty.

APPENDIX A: INSTALLATION DIMENSIONS



APPENDIX B: PINOUT



APPENDIX C: STATION CUTOUT TEMPLATE

