GARMIN™

TR-1 Gold Basic Operation Guide

**Remember safe and prudent operation of the
vessel is your responsibility as Captain.**

How To Turn the Autopilot on:

Press and release Deckmount (on/off) button, usually found on stern of boat close to the out board. The deckmount light and standby LED on the hand held will both blink, the autopilot system is in a start-up mode and no operations are available for 30 seconds.

Bull's eye   STBY LED

How to engage Autopilot:

When the STBY LED turns solid press the bull's eye and release to engage the autopilot.

AUTO LED

When the AUTO LED is solid the autopilot is engaged.

Press and hold the left straight arrow button to make a **port** turn, AUTO LED will start blinking, to stop turn release button, AUTO LED will revert to solid when a new heading is captured. Or momentarily press button to make a 1 degree heading change. (Momentarily pressing the button twice = 2 degree change, three times = 3 degree change, etc.)

Press and hold the right straight arrow button to make a **starboard** turn, AUTO LED will start blinking, to stop turn release button, AUTO LED will revert to solid when a new heading is captured. Or momentarily press button to make a 1 degree heading change. (Momentarily pressing the button twice = 2 degree change, three times = 3 degree change, etc.)

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How to adjust throttle:

Throttle up button, press and hold for large RPM changes or momentarily press for small RPM changes. LED in upper left will illuminate every time button is pressed.
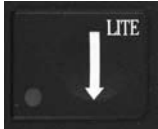
Throttle down button, press and hold for large RPM change or momentarily press for small RPM changes. LED in lower left will illuminate every time button is pressed

The next two basic operations are factory defaults and may be changed by user at any time using the feature operation changes.

Pushing and releasing the **Idle/Resume** button will cause the motor to go to idle. Press and release the button again and the motor will return to its previous RPM setting. To use this button as a MOB (man overboard) or Zig-Zags see page 4.

Bent Arrow Buttons are programmed from the factory for **Remote Steering**. No Heading hold operations are available while using this feature. If you wish to program the bent arrows for Step Turns or Circles, see page 4.

When the button is pressed the LED next to 6 will come on, the system will drop out of autopilot and put you in a **port** remote turn. To return to autopilot press and release the left straight arrow button.
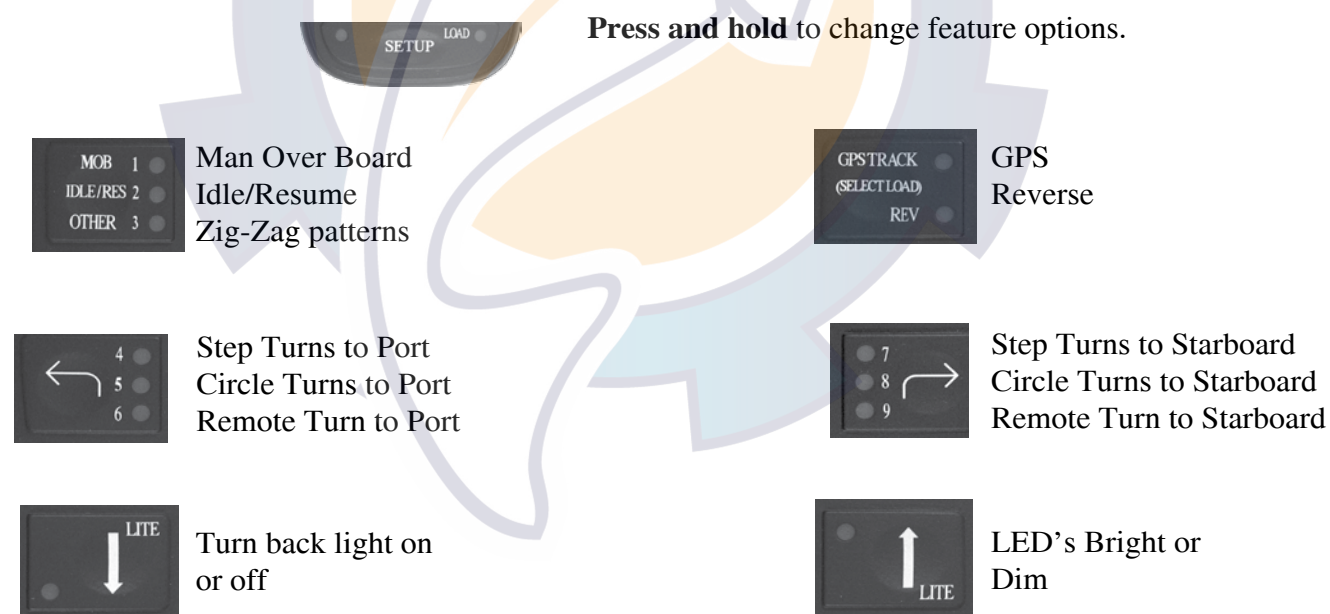
When the button is pressed the LED next to 9 will come on, the system will drop out of autopilot and put you in a **starboard** remote turn. To return to autopilot press and release the right straight arrow button.

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Feature Operations (Pattern Steering)

How to Select Feature Operations

1. Autopilot must be in Heading Hold or Standby Mode before selection process can start. (AUTO LED solid on or STBY LED solid on. No other LED's on.)

2. **Press and hold** the Setup Button. Two LED's next to number 1 through 6 will illuminate, indicating which special functions are programmed to operate.

3. Make selection of the Special Function you want to use by pressing and releasing the Special Function buttons until the appropriate LED's are lit. (See Table below for Special Function Indicators.)

4. Release the Setup Button

5. **To make the selected Special Functions into startup defaults (Save The Setting): Press and release** the setup button, (LED will light) next **press and hold** the Select Load Button, then press and release the DeckMount Button quickly, last release the Select Load Button. (You can change this default by repeating this process.)

Number 7, 8 and 9 are GPS features and only work when coupled with GPS
(See your owner's manual)

Press and hold to change feature options.

MOB 1 — Man Over Board
IDLE/RES 2 — Idle/Resume
OTHER 3 — Zig-Zag patterns

GPSTRACK (SELECT LOAD) — GPS
REV — Reverse

4 — Step Turns to Port
5 — Circle Turns to Port
6 — Remote Turn to Port

7 — Step Turns to Starboard
8 — Circle Turns to Starboard
9 — Remote Turn to Starboard

LITE — Turn back light on or off

LITE — LED's Bright or Dim

Special Function Indicator LED Numbers

1	MOB	4	Steps	7	Orbit Wpt.
2	Idle/Resume	5	Circles	8	Three Leaf Clover
3	Zig-Zag (other)	6	Remote Steer	9	Search

How to Setup Steering Patterns (No GPS required)

The following will lead through the following features step by step, **Reverse, MOB, Idle/Resume, Zig-Zags, Step Turns, Circles and Remote Steer.**

Reverse: The Autopilot will attempt to perform any of it's steering functions when the boat is backing in reverse gear. To engage the system in reverse; 1) Motor must me in reverse 2) Start from Standby 3) Press and hold the GPS (Rev) button 4) Press and release the Auto/STBY 5) Release the GPS (Rev) button. The reverse LED will stay lit until you go to Standby mode.

MOB: 1) Press and hold *Setup* button 2) Select and light up number 1 on handheld 3) Release *Setup* button. When you want to do a MOB turn, press the *Idle/Resume* button once and it will make the turn. When the maneuver is over the LED will go out. Remember if you want to use the *Idle/Resume* you will need to change it back.

Idle/Resume: The Idle/Resume is set as default from the factory. If you need to change it back from MOB or Zig-Zags; 1) Press and hold *setup* button 2) Select and light up number 2 on the handheld 3) Release *Setup* button. Now when you press and release the *Idle/Resume* button the throttle will go to idle and when pressed again will resume to your previous RPM's.
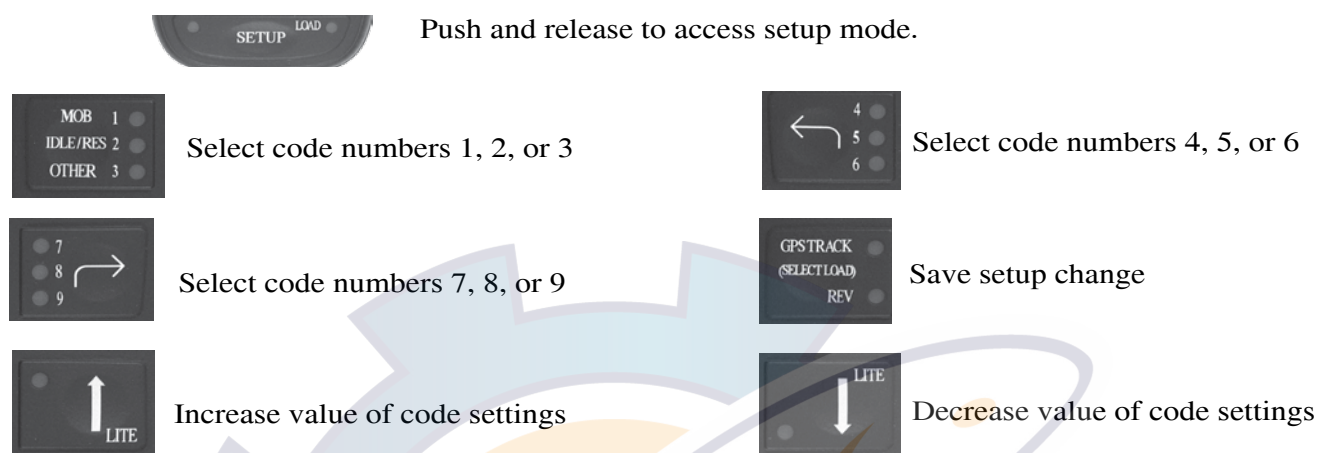
Zig-Zags: 1) Press and hold the setup button 2) Select and light up number 3 on the handheld 3) Release setup button. To start your Zig-Zags press and release the *Idle/Resume* button on the handheld, the autopilot will start the Zig-Zags. Factory default sets the Zig-Zags at 30 degrees per Zig-Zag and they cycle at 3 minutes. If you wish to change those setting refer to the table of setup codes #8 and #9.

Step Turns: 1) Press and hold the setup button 2) Select and light up number 4 on the handheld *(First number, left bent turn arrow)* 3) Release the setup button 4) When you are ready to use step turns press the bent arrows at the bottom of the handheld. *Right bent arrow* turns you right and *left bent arrow* turns you left in the degrees per step you select from the table of setup codes. Factory default sets them at a 45 degree turn with each press of the bent arrows. Example : press the bent arrow 2 times and you will make a 90 degree turn. To change the degrees per step refer to set up code #6. Remember that if you have step turns setup you will not have remote steer. If you like the step turns setup better than remote steer you can save them as factory defaults by lighting up the setup button, press and hold the *Select Load* button, press and release the deckmount (of/off) button. This will keep the bent arrow buttons as step turns each time the system is turned on. *(Until you change them)*

Circles: 1) Press and hold the setup button on the handheld 2) Select and light up number 5 on the handheld 3) Release the setup button 4) When you are ready to start your circles press the *bent arrow button* in the direction you would like to turn. Example: to start your turns in a clockwise rotation, press the *right bent arrow* button to start the turn. Factory default has the turns set up at 5 minute circles. If you would like to change those settings refer to code 7 on the table of setup codes.

Remote Steer: Remote steer is setup as a factory default. If you wish to return to remote steer after using Step Turns or Circles use these steps, 1) Press and hold *setup* button 2) Select and light up number 6 on your handheld 3) Release setup button. You may now use remote steer by pressing the *bent arrows* on the handheld. If you would like to lock this feature in as your new default setting; press and light up the setup button on the handheld. Press and hold the select load button (GPS) on the handheld. Press and release the deckmount button and then release the *select load* button.

System SETUP and Codes

SETUP LOAD   Push and release to access setup mode.

MOB 1 / IDLE/RES 2 / OTHER 3   Select code numbers 1, 2, or 3

4 5 6   Select code numbers 4, 5, or 6

7 8 9   Select code numbers 7, 8, or 9

GPS TRACK (SELECT LOAD) REV   Save setup change

↑ LITE   Increase value of code settings

↓ LITE   Decrease value of code settings

How to Make System Changes with Setup
(How to change the parameters of the codes on page 7)

1) Autopilot must be in Heading Hold or Standby Mode before selection process can start. (AUTO LED solid on or STBY LED solid on. No other LED's on.)

2) Press and release the Setup Button. The Setup LED will illuminate to indicate the system is ready to take setup commands (button pushes).

3) Make selection of the Setup Function you want to use by pressing and releasing the buttons labeled 1 through 9 until the appropriate LED's are lit. (See the Table on next page for Setup Codes).

4) Increase an adjustable parameter one step by each press of the Up Arrow Button. When the parameter is adjusted to its maximum value, the Up arrow LED will light. The parameter is adjusted and is in use by the autopilot immediately.

5) Decrease an adjustable parameter one step by each press of the Down Arrow Button. When the parameter is adjusted to its manimum value, the Down Arrow LED will light. The parameter is adjusted and is in use by the autopilot immediately.

6) You can stay in Setup and adjust more than one parameter

7) Compass Calibration, and resetting to factory defaults are setup conditions that take the system over and restart the autopilot computer. The button sequences for their operation is given in the Table of Setup Codes on the next page.

8) To view the operating value of an adjustable parameter, select its code per the Table of Setup codes, then press and hold the Select Load Button. The LED on the UP Arrow Button will blink the number of tens the parameter is set to and the LED on the Down Arrow Button will blink the number of ones the parameter is set to. For example if the parameter is set to a current value of 15, the Up Arrow LED will blink once and the Down Arrow LED will Blink 5 times to indicate the parameter is set to 1 (blink) X 10 + 5 (blinks) X 1. Of course, when a parameter is adjusted to its minimum or maximum value, the appropriate LED stays on solid per 4 and 5 above.

9) For temporary use of the selected Special Functions: Press and release the Setup Button to exit the setup mode.

10) To download changes to permanent memory and to save the selected and modified settings into startup defaults: Enter Setup (press and release the setup button, the setup led will light) Press and hold the Select Load (GPS) Button and while holding down the select load button, press and release the Deckmount Button quickly, then release the Select Load Button.

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Table of Setup Codes

Setup Action	Code #	Range of Settings or Responses	Factory Default Setting
Tach on/off	34	2 Settings: on or off	on
Show motor RPM	36	Hold Down Select Load Button: 1000's blink on up arrow 100's blink on down arrow	
Standby Safety Monitor	349	2 settings on, off defaults to on every power up	on
Throttle Delay	25	1 lowest speed, 10 highest speed	5
Throttle Speed	24	1 lowest speed, 10 highest speed	5
Reversed Hoses	259	2 settings normal up arrow lit, reverse down arrow lit	norm
Calibrate Compass	47	Hold down select load button, press and release Deckmount button to start Calibration process	
Load Factory Compass	49	Hold down select load button, press and release Deckmount button to reload Factory Compass Calibration	
Load Factory Pilot	59	Hold down select load button, press and release Deckmount button to reload Factory Pilot Settings	
Nav Gain	15	1 lowest gain, 73 highest gain	42
Nav Trim Gain	16	1 lowest gain, 73 highest gain	49
Use Synthetic XTE	37	2 settings on, off	off
Change Sigh of XTE	18	2 settings on, off	off
Use Magnetic North	39	2 settings on, off	on
Enable Checksums	347	2 settings on, off	on
Set North	48	Hold down Select load, press & release DM button to set	
Seastate Filtering	1	1 least responsive steering, 4 most responsive steering	4
Rudder Gain	2	1 lowest gain, 60 highest gain	22
Counter Rudder Gain	3	1 lowest gain, 60 highest gain	37
Speed Schedule	35	4 settings 1 aggressive, 2 moderate, 3 mild, 4 weak	4

Special Steering Functions Setup Codes

Degrees per Step	6	10 Choices 1, 2, 3, 4, 5, 10, 15, 30, 45 or 90 Degrees	15
Circle Time	7	10 Choices 1, 2, 3, 4, 5, 10, 15, 30, 45 or 90 Minutes	5
Zig-Zag Amplitude	8	10 Choices 5 to 50 Degrees by 5's	30
Zig-Zag Period	9	20 Choices 1/2 to 10Minutes by 1/2's	3
MOB Overshoot	28	1 most overshoot command, 40 most undershoot command	20
Clover Leaf Length	29	500 ft. to 6000 ft. by 100 ft. increments	1000
Search Spacing	249	50 ft. to 1000 ft. by 50 ft. increments	50

Compass Calibration, Autopilot Tuning and Setup

1) Calibrate your Compass. Compass calibration is a very important step and must be done. (North needs to be set also for GPS functions.) Find some smooth water where you can drive in circles without running into anything.

- With the Pilot in Standby mode, press and release the Setup button and select code 47
- Press and hold Select Load, press and release the Deckmount Button, then release Select Load
- The Up Arrow LED will turn on
- Now drive in a straight line and watch for the UP Arrow LED to start blinking. When it starts to blink, begin turning to starboard. Turn at a rate that makes a full 360 degree turn in 30 seconds to one minute. You will need to make about 3 full turns.
- Continue to turn until the UP Arrow and Down Arrow LED's are both lit up.
- They will stay lit for about 5 seconds and then the system will completely power down. Your compass is now calibrated.

If the Up and Down Arrows both continue to blink and does not power down, the compass Calibration failed. Check for magnetic disturbances in the space around the compass and try to calibrate again. Make the turn as smooth (unaccelerated as you can. You will need to shut down the Autopilot and restart it before re calibration.

2) **Verify your tachometer is functioning properly**
• Press Setup and select code 36.
• Press and hold Select Load and you should see the UP Arrow and Down Arrow LED's blink your RPM. For example; when the Up Arrow LED blinks 2 times and the Down Arrow LED blinks 5 times your engine is running at 2500 RPM. The autopilot tachometer system has a lower limit setting of 500 RPM, so if your motor is running more than 500 RPM and you see 500 on the remote, you are not receiving the tach signal. Move your tachometer cable closer to your spark plug wires if you don't see the correct RPM's on your remote. If you see erratic readings, clip off some of the white antenna, most of the time a 1/2 inch antennae ties to the plug wire is best.

3) Tune the feedback gains. Start from **Standby** mode. **Press and release Setup button** (setup button will light and select code 2; this is the rudder gain adjustment code. Run your boat in a straight line at 1/3 to 1/2 full speed and engage the pilot by pressing the Auto button. Don't expect to see good performance yet.

a) If the boat is heading and the kicker starts oscillating, turn the Rudder Gain down by pressing and releasing the Down Arrow button as many times as required to calm the oscillation.
b) If the boat is making slow "S" turns, turn the Rudder Gain up by pressing and releasing the Up Arrow button until the boats heading and kicker start to get "twitchy" then back down on the Rudder Gain a few clicks.

Now select an enter code 3, this is the Counter Rudder Gain adjustment code.
a) If the boat heading has slow oscillations, increase the Counter Rudder Gain.
Alternately adjust the Rudder Gain and Counter Rudder Gain until the boat is steering well.

Now initiate some turns with the Straight Right or Straight Left Arrow buttons. Hold the button down only long enough to move the kicker 30 degrees or so, then let up. The pilot will try to stop then turn smoothly and then maintain the new heading.
a) If the pilot doesn't stop the turn very well, decrease Counter rudder gain and increase Rudder Gain.
b) If the pilot moves the rudder to far when stopping the turn, increase the Counter Rudder Gain.

You should be able to home in on the proper gain settings in a few minutes.

You now want to try different speeds and make mirror adjustments to the gains. You will probably need to readjust several times at different speeds to get the system working well at all speeds. If you find that it just won't tune for all speeds consider the following.
a) If you find that high speed performance gets "twitchy" when low speed performance is adjusted well, reduce the speed schedule (code 35) with down arrow and re-tune.
b) If you find that high speed performance gets "loose" when low speed performance is adjusted well, increase the speed schedule (code 35) with down arrow and re-tune.

4.) For Temporary use of these selected Special Functions: Press and release the Setup Button to exit the setup mode.

5.) **Download to permanent memory that parameters you have adjusted so far.** With the Setup LED lit, press and hold the GPS (Select Load) button-the load LED should illuminate, press and release the deckmount On/Off button quickly, then release the GPS (Select Load) button.

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Compass Calibration
Example of button sequence below;
Autopilot in Standby

1) Put the autopilot in Setup mode by momentarily pressing [SETUP LOAD] the setup LED should be lit on the Hand Held

2) Now press [4 5 6] button the 4 LED will now be on. Now press [7 8 9] button the 7 LED will now be on and display code "47"

3) Press and hold the [GPS TRACK (SELECT LOAD) REV] button, now press and release the Deckmount (on/off) button quickly, the Up Arrow LED [↑ LITE] will now [GPS TRACK (SELECT LOAD) REV] come on now release button

4) Steer your boat (with the tiller or main engine) on a steady heading, in forward at a low RPM.

5) When Up Arrow LED starts blinking [↑ LITE] steer your boat in a medium to slow starboard turn (with tiller or main engine) and start your first 360 degree circle.

6) When approximately 3 circles are complete [4 5 6] and [7 8 9] LED's will extinguish and the Up and Down Arrow LED's will light solid for about 5 seconds [↑ LITE] [↓ LITE] the system will then shut down completely, the compass calibration is complete

If Up and Down Arrows both continue to blink and does not power down after 5 seconds, the compass Calibration failed. Shut down system completely and re calibrate compass.