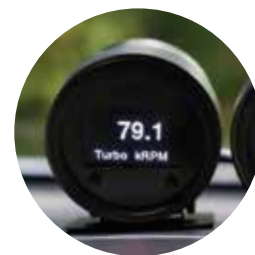


TSG-1 Turbo Speed Gauge

Buying a high-quality turbocharger isn't cheap. But you know what can make it even more expensive? Allowing your turbocharger to get damaged by overspeeding for an extended period of time. Fortunately, the TSG-1 Turbo Speed Gauge monitors turbo speed to protect your investment in your turbocharger.



WHAT IS THE TSG-1?

The Turbo Speed Gauge TSG-1 is a compact, 2 1/16" circular gauge that can be easily attached to the dashboard, A-pillar, instrument cluster or a variety of other locations. The gauge is designed for use with the turbo speed sensor integrated into all BorgWarner EFR and many Airwerks series turbos.

Using a speed sensor attached to the turbocharger, the gauge accurately displays turbo speed in both numeric and graphical formats. Whenever turbo speed exceeds the safe limit and the turbo begins to overspeed, the TSG-1's screen flashes, instantly notifying the driver.

TSG-1 SPECIFICATIONS

- Compact 2 1/16" circular gauge
- 128 x 64 pixel graphical display
- Pairs with turbo speed sensor
- 12-bit 0-5 volt analog input for MAP / pressure sensors
- 12-bit 0-5 volt analog output for ECU and/or datalogging



TURBO SPEED
(GRAPHICAL)



TURBO SPEED
(NUMERICAL)



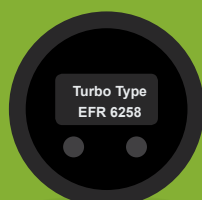
OVERSPEED
STATISTICS



BOOST / SPEED
(NUMERICAL)



TURBO SPEED
0-5V



CONFIGURATION
MENU

TSG-1

HARDWARE



INPUT & OUTPUT CAPABILITIES

The TSG-1 analog input can capture and display data from auxiliary sensors such as MAP/Boost sensor, oil or fuel pressure and more.

The TSG-1 generates a 12-bit 0-5 volt analog turbo speed signal that

can be connected to an engine control system or datalogger.

The TSG-1 also generates a warning output signal during overspeed events that can illuminate a warning light or trigger a relay or other device.

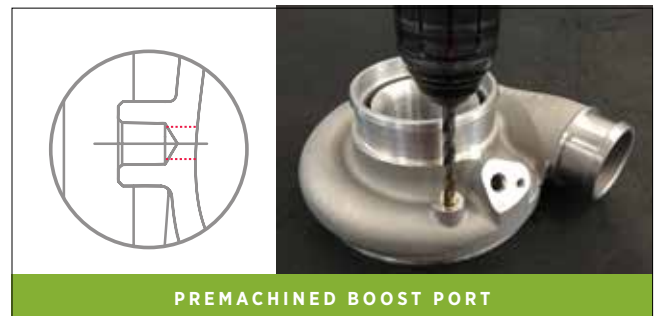
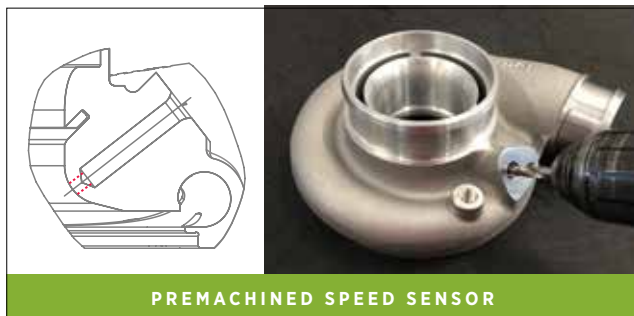
OPTIONAL SPEED SENSOR, BOOST PORT AND V-BAND CONNECTIONS

INSTRUCTIONS

Select BorgWarner turbochargers offer convenient pre-machined options to help users get the most out of their turbocharger in terms of customization and installation needs. These additional features require the user to perform some basic drilling, cutting and de-burring. Please seek help if you are uncomfortable with these operations.

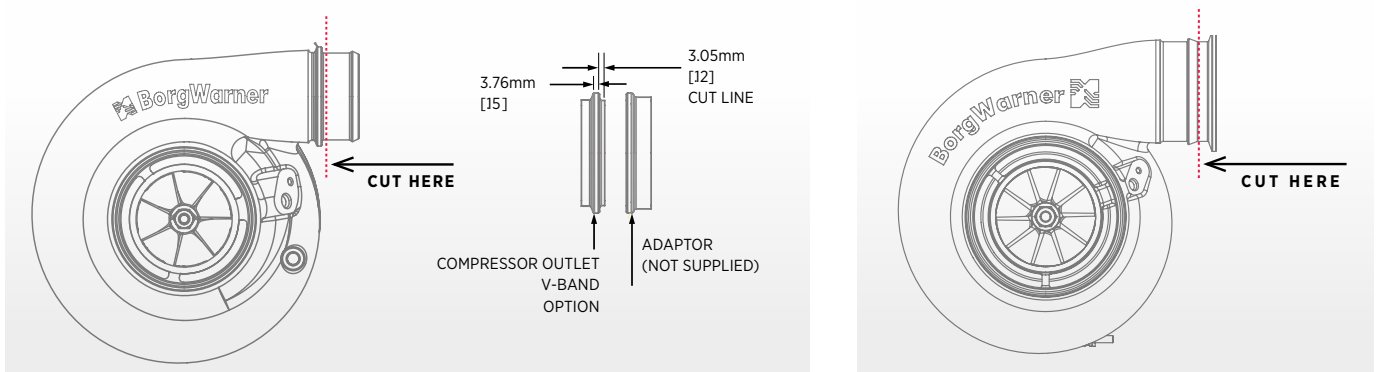
SPEED SENSOR & BOOST PORT

1. Carefully remove the compressor cover from turbo.
2. Place cover on a table, with some kind of backing so that it is secure while being drilled.
3. Using a hand drill with a 1/4" drill bit, drill through bottom of speed sensor or boost port hole while being careful not to damage the pre-machined speed sensor O-ring sealing surface or the boost port threads.
4. De-burr the inside edge of the hole in the compressor cover.
5. **SPEED SENSOR:** Lubricate O-ring and install speed sensor while checking for a good fit. Ensure that the sensor tip is nearly flush with the edge of the hole (within .5mm/.020") and install speed sensor bolt.
BOOST PORT: Install 1/8 - 27 NPT boost fitting with thread sealant or Teflon tape and ensure the joint is leak free.
6. Carefully re-install compressor cover on turbo and verify that the compressor wheel spins freely.




OPTIONAL V-BAND OR HOSE BEAD

1. Carefully remove the compressor cover from turbo.
2. Secure compressor cover and remove connection feature with a straight, clean cut. Reference the drawings below. Be sure to remove all sharp edges when complete.
3. Carefully re-install the compressor cover on turbo and verify that the compressor wheel spins freely.




Ancillary Parts

Hardware/Installation Kit
#179423



- (1) Turbine housing outlet V-band clamp
- (2) V-band clamp nuts
- (2) Water port plugs
- (6) Water port plug sealing washers
- (1) Oil inlet fitting (-4an) w/seal and washer
- (1) Compressor cover outlet V-band clamp for 83 & 91mm
- (5) Clamp plate bolts
- (5) Clamp plates, 1-hole
- (1) Turbine inlet gasket for T25 flange
- (1) Turbine inlet gasket for T3 flange
- (1) Turbine inlet gasket for T4 divided flange

Clamp Kit, Turbine Housing to Bearing Housing for Aluminum B2 Bearing Housings
#59007119005

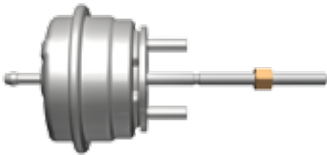


- (1) Clamp Plate, 3-hole
- (1) Clamp Plate, 2-hole
- (5) Bolts, Cross drilled A286
- (1) Shim

V-Band, Turbine Inlet for F(v) Housings
#59001095100




Super Short Canister



59001107255	59001107262	59001107261
Low Boost	Medium Boost	High Boost

Wastegate Bracket Kit for Super Short Canisters
#59007119007



- (1) Stainless steel bracket
- (2) Bracket to bearing housing screws
- (2) Canister to bracket lock nuts
- (1) Actuator rod nut (outboard side)
- (1) Long 410mm wastegate signal hose
- (2) Hose Clamps

Boost Control Solenoid Valve (BCSV) Kit
#179425



- (1) Boost control solenoid valve
- (2) BCSV screws
- (4) Hose clamps
- (1) Compressor cover boost port fitting
- (1) Comp cover boost port washer
- (1) Wastegate signal hose, 110mm
- (1) Wastegate signal hose, 410mm

Compressor Recirculation Valve Kit (CRV)
#179424




- (1) Plastic cover w/hose nipple
- (1) CRV disabling block-off plate
- (1) Diaphragm/piston assembly
- (1) Stiffer Spring #58061191364
- (3) Cover plate bolts w/locking compound

CRV Spring



- Softer spring w/blue mark #58061191379
- Standard / Stiffer Spring w/o mark #58061191364

Speed Sensor Kit
#179430



- (1) Speed sensor, frequency output
- (1) Speed sensor hold-down bolt

***Note: Speed Sensor signal conversion and display accessories can be purchased at: www.roadragegages.com

Wastegate Hose Kit
#179426

- (1) Wastegate signal hose, 410mm
- (2) Hose clamps



Turbo Speed Gauge (TSG-1)
The Turbo Speed Gauge (TSG-1) monitors turbo speed, and a whole lot more

- Plug and play solution for turbos outfitted with BorgWarner turbo speed sensors
- Includes open auxiliary channels for other devices such as MAP, Thermocouples, and Pressure Transducers
- Able to pass speed sensor and auxiliary channels through to data acquisition and/or engine ECU
- Graphically plots speed on a scrolling screen
- Converts speed to 0-5v signal
- Easily configurable for all BorgWarner turbocharger rotor groups

***Note: Available through select BorgWarner distributors

