

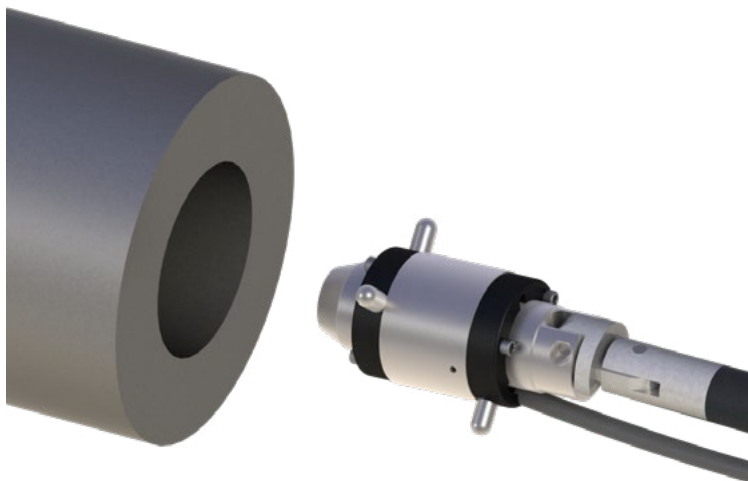
*The ideal alignment tool for large
gun barrel straightness, and small
extruder barrel alignment*

The A-221 Small-Bore Self-Centering Target

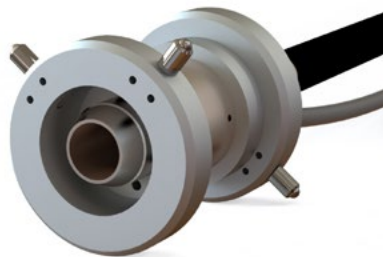
Hamar Laser's A-221 Self-Centering, Small-Bore Target is designed specifically to measure the straightness and alignment of small to medium sized bores, from Ø1.18-8.0 in. (Ø30-205 mm). This small, lightweight, compact target selfcenters to an accuracy of .0007 in. (0.018 mm) and has a sensor area of 10x10 mm.

Features:

- ✦ Self-centering bore adapters customized to fit the bore diameter, but can accommodate diameter changes of $\pm .040$ in. (1 mm) without affecting the self-centering feature.
- ✦ 2-Axis, 10x10 mm PSD (Position Sensing Detector) is concentric to target housing OD to within .0005 in. (0.013 mm)
- ✦ Measurement resolution of .0001 in. (0.001 mm) when used with the R-1307 Readout.
- ✦ 5 ft. (1.5 m) insertion pole with connector for extra lengths up to a total of 15 ft. (4.5 m) insertion length.
- ✦ Accommodates bores from Ø1.18-8.0 in. (Ø30-205 mm) when used with customized Bore Adapters (see specifications for details).
- ✦ Can be used with the R-1307C or R-1307-2.4ZB target readouts. Use the A-910-2.4ZB Radio Receiver for a PC with the R-1307-2.4ZB for wireless data downloads to our Bore9 software.
- ✦ Bullseye level orients the PSD sensor axes to the alignment axes of the bore.



The A-221 Small-Bore, Self-Centering Target



*A-221 with M-221CLS-C-BW/SC
Customized Set of Bore Adapter
Measuring Rings*



*A-221 with A-221LTA + M-221CLL
Customized Set of Bore Adapter
Measuring Rings and Legs*



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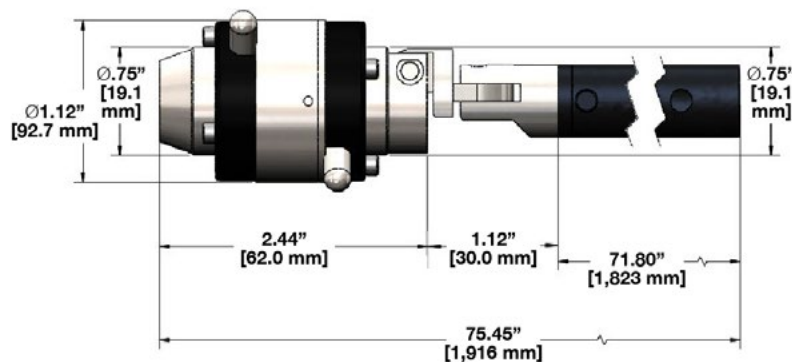


Specifications

The A-221 Small-Bore Self-Centering Target

Dimensions:	1.12 in. (28.5 mm) OD. 3.56 in. (92.0 mm) long without pole
Sensor Size/Resolution:	2-Axis 10x10 mm PSD with .0001 in. (0.001 mm) resolution when used with the R-1307
Sensor Concentricity to Housing:	< .0005 in. (0.013 mm)
Material:	303 stainless steel
Cable:	Hard-mounted 10 ft. (3m) cable with Lemo connector
Weight:	5 oz. (85 g)
Bore Diameter Range:	Ø1.18-8.00 in. (30-205 mm). Each bore adapter can accommodate $\pm .020$ in. (± 0.5 mm) diameter change and still self center. See table below for bore adapter part numbers and diameter ranges.
Insertion Pole:	5 ft. (1.5 m) insertion pole with connector for extra lengths for up to a total of 20 ft. (6.1 m) insertion length.

A-221 Target with M-221CLS-A Measuring Legs



Target Adapters

A-221LTA	Large-Bore, Self-Centering Target Adapter Rings (Set of 2) for T-221 Target for Ø4.13-8 in. (Ø105-205 mm) Bores	Self-Centering/Barrel Wear Bore Adapter Rings (set of 2) for A-221 Small-Bore Extruder Target for Ø4.13-8 in. (Ø105-205 mm) bores. Requires 1 set of M-221CLL customized measuring legs for each bore ID for self-centering the A-221 bore target.
M-221CLL	Customized set of 4 legs for A-221LTA Bore Adapter for bores from Ø4-8 in. (Ø102-205 mm)	Customized set of 4 legs for A-221 Target + A-221LTA bore adapter. Includes a set of 4 legs customized to one bore ID. For bores from Ø4-8 in. (Ø102-205 mm) - the customer provides bore Ø.
M-221CLS-A-SC	A set of 2 barrel adapter rings with 4 measuring balls customized for one bore Ø for A-221 Small-Bore Target for Ø1.18-1.50 in. (Ø30-38 mm) bores	A set of 2 self-centering adapter rings with 4 carbide measuring balls customized for one barrel Ø for A-221 Target. Used for alignment and checking straightness. For bores from Ø1.18-1.50 in. (Ø30-38 mm) bores. Customer provides bore Ø.
M-221CLS-B-BW/SC	A set of 2 barrel adapter rings with 4 measuring legs customized for one bore Ø for A-221 Small-Bore Target for Ø1.50-2.16 in. (Ø38-55 mm) bores	A set of 2 barrel adapter rings with 4 carbide measuring balls customized for one barrel Ø for A-221 Target. Used for alignment/straightness (self-centering) and checking barrel wear. For bores from Ø1.50-2.16 in. (Ø38-55 mm) bores. Customer provides bore Ø.
M-221CLS-C-BW/SC	A set of 2 barrel adapter rings with 4 measuring legs customized for one bore Ø for A-221 Small-Bore Target for Ø2.16-3.94 in. (Ø55-100 mm) bores.	A set of 2 barrel adapter rings with 4 measuring legs customized for one barrel Ø for A-221 Target. Used for alignment/straightness (self-centering) and checking barrel wear. Includes 2 adapter rings and 4 measuring legs for bores from Ø2.16-3.94 in. (Ø55-100 mm). Customer provides bore Ø.
M-221CLS-D-BW/SC	A set of 2 barrel adapter rings with 4 measuring legs customized for one bore Ø for A-221 Small-Bore Target for Ø3.94-5.90 in. (Ø100-150 mm) bores.	A set of 2 barrel adapter rings with 4 measuring legs customized for one barrel Ø for A-221 Target. Used for alignment/straightness (self-centering) and checking barrel wear. Includes 2 adapter rings and 4 measuring legs for bores from Ø3.94-5.90 in. (Ø100-150 mm) - customer provides bore Ø.



*A-221 with M-221CLS-B-BW/SC
Customized Set of Bore Adapter
Measuring Rings & Balls
Self-Centering Mode*



*A-221 with M-221CLS-C-BW/SC
Customized Set of Bore Adapter
Measuring Rings & Legs –
Barrel-Wear Mode*



A-221LTA Adapter Hubs



M-221CLL Measuring Legs



*A-221 with A-221LTA Adapter Hubs +
M-221CLL Measuring Legs in
Self-Centering Mode*