

Editor's Note...

...based on current support questions we decided to report once again on a subject that has been the focus of past newsletters.

The behaviour of the **ATR** (Automatic Target Recognition), Leica Geosystems passive target recognition system, is widely accepted in the Surveying market. Still some questions remain about what is really happening (it is magic?) and correct calibration procedures.

ATR was introduced in the TPS1000 Series instruments in 1995. In 1998 the TPS1100 Professional Series was released with the 2nd generation ATR. The TPS700*auto* instruments were introduced to the market in 2001, also with ATR2 - the first instrument in its class to be automated!

All instrument families have been success stories. To further increase the attractiveness of all three series, we recently released the **Sets of Angles** application (previously only available on TPS1100) for TPS700 and TPS1000 series instruments. A summary of the application features can be found at the end of this edition of TPS NEWS.

Anna

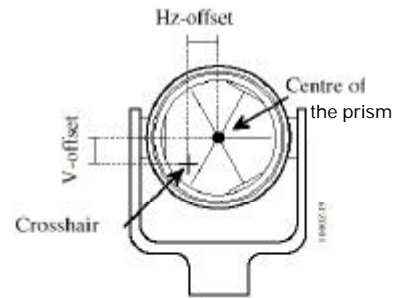
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TPS General

ATR Behaviour – FAQ's**Are the ATR measurements accurate if the crosshairs are not completely on the target centre?**

The ATR sensor transmits a laser beam, which is reflected by a prism and received by an internal CCD-Camera. The intensity and the spot size of the reflected light is calculated in respect to the CCD-camera centre. The offsets from this centre are computed in vertical and horizontal direction. These offsets are used to control the motors, which turn the instrument. The crosshairs are now almost at the prism centre.

To minimise measurement time the crosshairs are only positioned within a 5mgon tolerance (2" instrument; EDM Mode IR-Fine). The remaining offsets are measured and mathematically applied to the Hz and V angles.

**When are the current angle values corrected with the ATR offsets?**

An ATR corrected angle is only available when the sensor is active and a distance measurement has been carried out.

When pressing DIST the instrument updates the display and shows the ATR improved angles.

When pressing the ALL Button the horizontal and vertical angles are measured, the ATR offsets added and the corrected angles saved. Afterwards the display shows uncorrected angles again.

I can't set the Hz circle exactly to zero by pressing the Hz = 0 Button when the ATR is active!

When the ATR is active the reticules usually aren't exactly posited on the prism centre (see 1st question).

By pressing the "Hz=0" Button the prism centre will be set to zero.

But the instrument will display (after Hz set to zero) strictly the current position of the crosshairs.

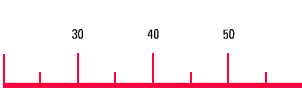
For example:

If the crosshairs are 0.0040 gon away from the prism centre the instrument will display after pressing "Hz=0" Button the 0.0040 gon.

Remember: Still the prism centre will be set to zero.

TIP:

You can check the zero direction if you measure a distance to the target or aim the target exactly without the ATR.



Note:

The allowed ATR offsets are larger in EDM FAST mode (which is one of the reasons FAST mode is so fast). As a result the crosshairs will always be very close to the prism centre when measuring in the STANDARD- mode whereas in FAST mode the crosshairs might be off more than 2' (and still measuring correct angles).

How can I check if I feel unsure about using ATR?

Precisely aim manually at a reflector ca. 100 m away. Write down the angle values. Now turn the telescope away from the reflector and position it again, this time using the ATR (e.g. press DIST). Looking through the telescope, the crosshairs may not be positioned precisely on the centre of the reflector. Check the angle values. They should be the same as the ones you wrote down before (within the instruments angle accuracy)

If not, perhaps it's time to calibrate your ATR.

Why do I need an ATR calibration?

The ATR calibration routine allows checking or defining the alignment of the centre of the CCD camera and the optical axis of the telescope. To determine this ATR collimation error, a reflector must be manually targeted in horizontal and vertical directions. The angular differences in horizontal and vertical directions between the line of sight (crosshair) and the centre of the CCD camera are calculated by the instrument. The angular differences established during calibration are always applied to angles measured with ATR.

This procedure ensures that you obtain the same angle reading to a prism, no matter if you aim manually or you let the ATR do it for you.

What prism do I use for ATR calibration?

Always use a Leica Circular Prism, placed at about 100 m distance from the instrument.

Even when you measure afterwards with another prism you should use a Leica Circular prism as you get the best calibration results. Also make sure that the prism isn't covered by dirt or dust, as this would distort the calibration results.

For more information on ATR, please also see the following Newsletters:

TPS News 11/2000, 19/2000, 45/2000, 49/2000.

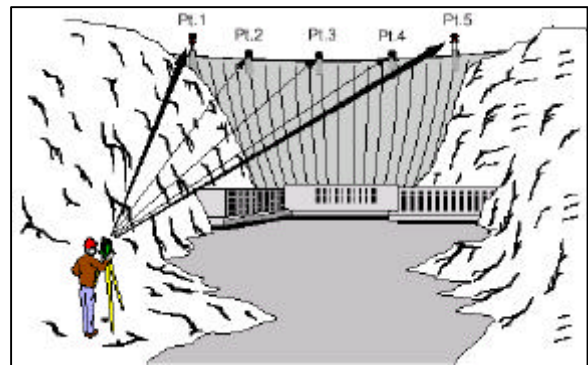
For information on Calibration see TPS News 7/2001.

Susanne

News and Events

Sets of Angles available on all automated Total Stations

The Sets of Angles application program is now available for all total stations of the TPS1000,



TPS1100, and TPS700. The application allows the determination of Hz- and V-angles.

As an option distances can be measured too. The program includes methods of testing and analysing all measurements.

Feature:	Advantage:
<ul style="list-style-type: none"> Import the target ID's and their positions from the fix-point file or measurement file 	<ul style="list-style-type: none"> This allows the target list to be prepared in the office.
<ul style="list-style-type: none"> Guided and very easy to use workflow 	<ul style="list-style-type: none"> Minimal effort for education



Feature:	Advantage:
<ul style="list-style-type: none"> ▪ Analyse and adjust measurements (each measurement made in two faces). Points and sets can be individually switched off/on. 	<ul style="list-style-type: none"> ▪ The quality of the measurements can be checked directly in the field. Simply switching off certain points and/or sets can eliminate bad measurements with big residuals.
<ul style="list-style-type: none"> ▪ Records all measurements and results 	<ul style="list-style-type: none"> ▪ Easy to make detailed protocols and reports with all measurements and results. For TPS700 in any format using the Format Manager. TPS1000 & 1100 create on-board log files.
<ul style="list-style-type: none"> ▪ Remembers target height, EDM mode, prism-type, prism const and ATR status for EACH target. 	<ul style="list-style-type: none"> ▪ Very easy to use different targets in a set. The user has to set the parameters only once. For all following measurements, the program will do this automatically.

In TPS News 31/2000 we dedicated an entire newsletter to the Sets of Angles application. Please refer to this - and the user manual – for more information on this useful application.

Wolfgang

Publishing

If you have an article you would like published in TPS News 2002 which may be of interest to other readers, please contact Anna McKenzie at

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