How to change the prism constant in XPAD

Notebook:	Xpad		
Created:	12/09/2019 16:47	Updated:	28/05/2020 17:05
Author:	Service Hitechniques		
Tags:	Prism, Prism Constant, Prism Offset, Rothbucher, Xpad		

Version 2.00 DL 20200528 - Updated, screenshots added, different prisms added Version 1.00 PH 20190912 - Created

Changing the Prism Constant in X-PAD

Important Background: Prism Constant = Prism Offset = Addition Constant

Why we have to deal with it:

The distance from the total station telescope to the prism is measured by the time that the laser beam takes to go from the telescope to the prism and back again. This is the 'time of flight'.

Distance = Time of Flight x Speed of Light

However, light is slowed down going through the glass in the prism, causing the distance to be measured as longer than it actually is. This is compensated through the use of the Prism Constant, and naturally it is -ve to reduce the measured distance to the actual distance. Some prisms manufacturers offset the back of the prism (which is the measured point) towards the instrument so that they have a 0.0 mm or any other desired prism constant.

There are generally two different approaches to prism constants depending on manufacturers.

- Absolute prism constants (used by majority of instrument manufacturers) these are the fundamental constant of the prism irrespective of which instrument is being used
- Leica prism constant these are the constant that applies when the prism is being used with a Hexagon's Geomax or Leica instrument

The reason Leica Prism Constants is different from absolute prism constant is because there is a pre-installed offset of 34.4mm in all Hexagon's instrument firmware/software.

These are formulas describing the differences in constants:

Leica Prism Constant = Absolute Prism Constant + 34.4mm Absolute Prism Constant = Leica Prism Constant - 34.4mm

If a prism has a 0.0 prism constant you need to know whether it is Leica Prism Constant = 0.0 or Absolute Prism Constant = 0.0

How to change the prism constant in X-PAD

You can reach the prism constant screen from any place where you see the prism icon:

Setting Out application:



Survey Points Application:



Basic Measurement Application (TPS):

TPS St	atus		
Circular H 1.800	r (0.0 mm) Im	IH 0.000	n -* 💼 🔘
HA		E	
VA	90°00'00'	L N	
4 M	-7	z	
↔			
Ţ			
\bigtriangledown	Robotic	Set HA	Measure

Prism Settings Screen:

Select target		NI Stal B
Circular (0.0 mm)	Mini (17.5 mm)	360° (23.1 mm)
₩— Refl.less	R Prism LR	Таре
—* Laser Pointer	🔅 Offsets	$H_{\overline{L}}^{T}$ Target height
\bigtriangledown		🖍 Customize

You can set up three most frequently used prism types in the top row (favourite prisms)

^{15:40} ■ ■ Select target		¥(%.d û	15:40 🖬 🛤 Marine Favorites prisms		થી જી.તા ઉ
Circular (0.0 mm)	₩ini (17.5 mm)	₩ 360° (23.1 mm)	Circular (0.0 mm)	(17.5 mm)	360° (23.1 mm)
— Refl.less	R Prista LR	🐡 Таре	Ţ	Ţ	T
—* Laser Pointer	🔅 Offsets	$H_{\overline{L}}^{T}$ Target height			
\triangleleft		Customize	\triangleleft		

To change the prisms tap on the icons until you get the desired type. If the prism you want to set is not on the list use Custom prism

tan ₽™ •••	sati⊇n ∑ Select target	¥\$ \$\$.⊪I ĝ
360° Circular (23.1 mm) (0.0 mm)	360° Imm Circular Custom (23.1 mm) (0.0 mm) (0.0 mm)	
	Refi.less Customization procedure completed. pe	
	- * Laser Pointer	ıt
	Custom	ize

To change the prism constant for custom prism:

Select target			15:41		
			Prism		
₩ 360° (23.1 mm)	(0.0 mm)	(0.0 mm)	Туре	Custom	×
			Constant (m	m)	0.0
— Refl.less	Prism LR	🔂 Таре	Constant absolute (mm)		-34.4
			Offsets		
—* Laser Pointer	Offsets $H_{T}^{\Gamma_{T}^{2}}$ Target height	Reflectorles	s (mm)	0.0	
		Tape (mm)		0.0	
\triangleleft		🖍 Customize	\bigtriangledown		✓ Accept

Input value in the constant you have from supplier. The other constant will be recalculated automatically. For example - Trimble 360 R10 prism with constant +2mm (this is an absolute constant)

15:56 🔛 🛤	ALC: N THE REPORT OF ALC: N	15:56 🖾 🛤		
🔀 Target type		🔀 Select target		
Prism				
Туре	Custom	₩ 360° (23.1 mm)	(0.0 mm)	(36.4 mm)
Constant (mm)	36.4			
Constant absolute (mm) 2.0		₩— Refl.less	🔦 Prism LR	
Offsets			"LR	
Reflectorless (mm)	0.0			+3
Tape (mm)	0.0	—* Laser Pointer	Offsets	H≟Ţ Target height
\bigtriangledown	✓ Accept	\triangleleft		🖍 Customize

15:56 🖬 🛤	itatus		ains∦
Custor H 1.80	m (36.4 mm) 10m Albertows (and and a straight for the str	IH 0.000m	
HA	46°48'00"	E	
VA	90°00'00"	Ĺ_ N	
Ky.		Z	
↔			
Ţ			
\bigtriangledown	Robotic	Set HA	Measure

Hints:

You can get into prism settings only if you are connected to total station. If the tablet is not connected to the total station, selecting TPS in the Main Menu gives you 'TPS not found. You can fake a TS by adding a manual TS, and making it your current TS.

Most common custom prism settings:

Trimble 360 prism VX&S Series: absolute prism constant of +2mm Leica 360 mini prism GRZ101: absolute prism constant of -4.4mm Leica monitoring/control point prism GMP104: absolute prism constant of -25.5mm Leica 360 setting out prism MPR122: absolute prism constant of -6.35mm Rothbucher prism RSMP280/290: absolute prism constant of -10mm Rothbucher prism RSMP380/390: absolute prism constant of -16.9mm

Hitechniques Ltd. © All Rights Reserved