# Using variant pointer in TIA V15 and the new simplified '?= ' operator

Reference Link: <a href="https://www.linkedin.com/pulse/programming-s71500-using-tia-v15-small-tips-trix-part1-mattias-lindh-1/?">https://www.linkedin.com/pulse/programming-s71500-using-tia-v15-small-tips-trix-part1-mattias-lindh-1/?</a>
<a href="mattias-lindh-1/?">trackingld=CAJ0slV9SzgBtlJommMeLg%3D%3D</a>





Platinum Expert

Joined: 9/23/2005 Last visit: 3/3/2022

Posts: 4055 Rating:

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Technical Forum
EXPERT

Hi,

As from TIA V15 it is possible to use references in program blocks. "References" provides a new type of pointer. References are typed pointers that refer to a specific data type.

With this features a variable address could be stored in "references" variables (of type REF\_TO\_ + data type, for example, REF\_TO\_int for references to integer variables).

To transfer the address of one variable to a "reference" variable it is used "REF( variable name)".

To access the value of a "pointered" variable by a "reference" variable it is used the "reference" variable + "^".

The instruction "?=" could be used to convert Variant in "reference".

It is possible to compare if a "reference" variable is equal (or different) to NULL to check if it contain a valid reference (i.e. a reference for the same data type).

Requirements:

STEP 7 >=15

CPU S7-1500 FW >= 2.5

Use in FC: In, Out, Temp, Return

Use in FB: Temp

Data types: basic data types (exception of bools), UDT, SDT.

The attached sample program exemplify this new feature (see FB1)

#### Attachment

↓ ☐ References.zip (816 Downloads)



Variant pointer kullanmak için minimum gereksinimler yukarıda resimde var

An Example Calculating area of different objects.

## What is an Variant pointer?

An Variant pointer is nothing else than a pointer that can point to a data area in your controller. Quite similar with the old any pointer but with a more symbolic approach. It can point on a datatype that you created yourself or any other predefined data type and even other blocks. You can easily check which datatype the any pointer points at by using the instruction: TypeOf. E.g.

### An Example Calculating area of different objects.

We want to create a simple function that can calculate the area of different objects, in this example we use Circle, Rectangle and Triangle. First, we define our three different objects by means of creating three different data types:

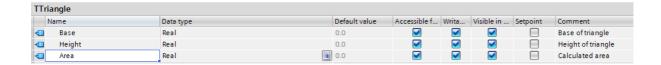
DataType #01: TCircle: 2 reals one radius and one area variable:



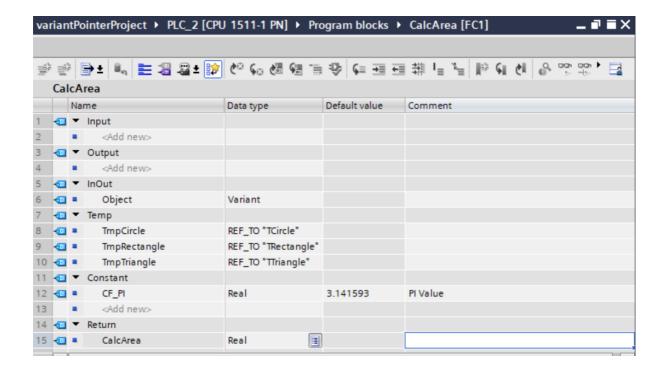
DataType #02: TRectangle: 3 reals one Height, Base and one Area.



DataType #03 Triangle, Same data as above.



Now we want to create our function for calculating the area of any of the above objects. We create a new FC called *CalcArea* , We define parameters in head as shown below



We define one in/Out Parameter That is defined as a variant to be able to point on any object from which we want to calculate the area. Our function will return the calculated area and update the object .area variable. We define 3 Temp variables as references to the defined objects.

REF\_TO "TCircle", REF\_TO "TRectangle", REF\_TO "TTriangle"

Defined as a reference to a circle. (Note the REF\_TO in front of the declaration, this indicates that this is to be a reference to a variable.

#### Operators are used in function

- 1. ?= operator used for assign reference to a object
- 2. operator used for accessing elements of a reference