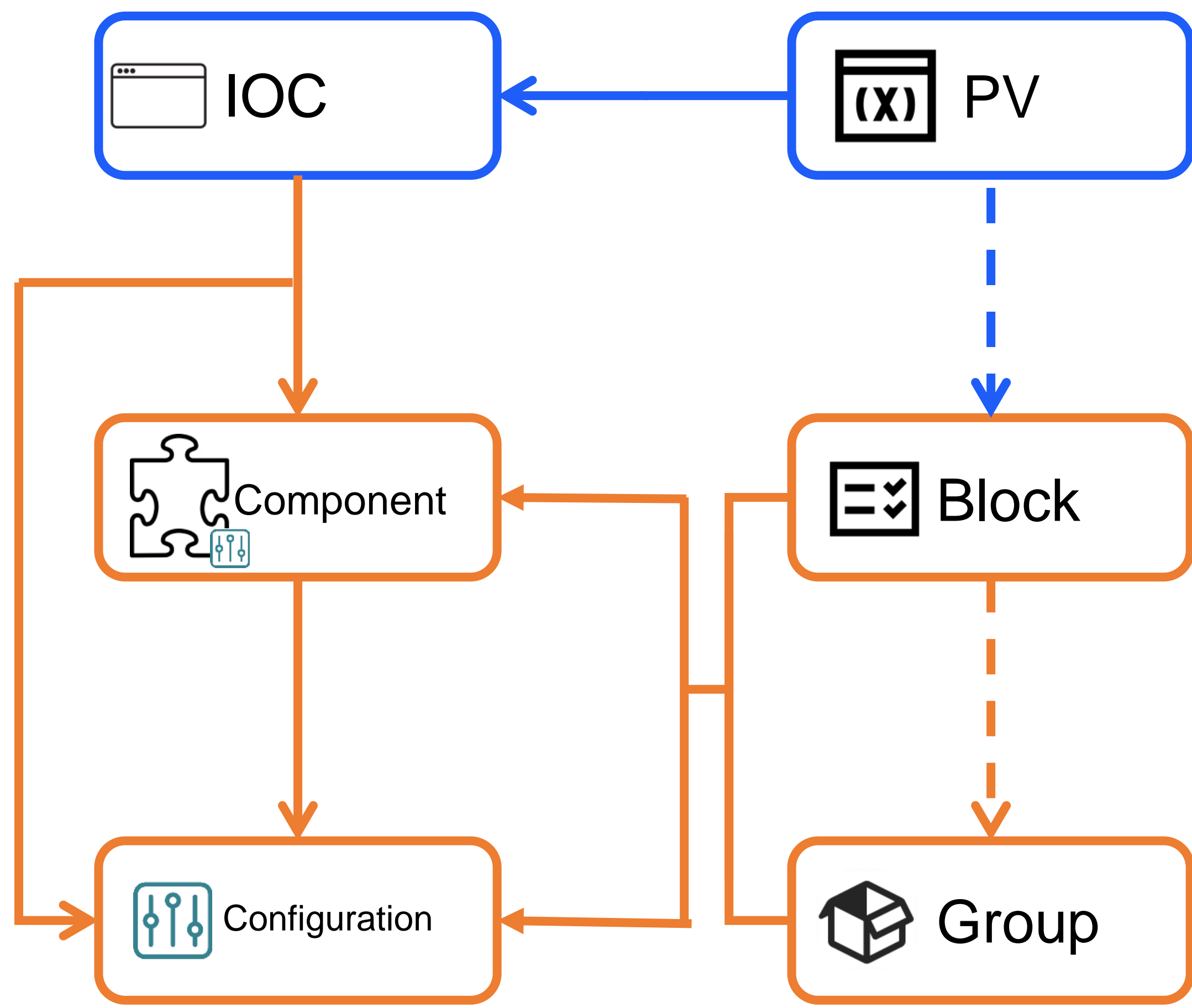


Managing Experiment Configurations in IBEX



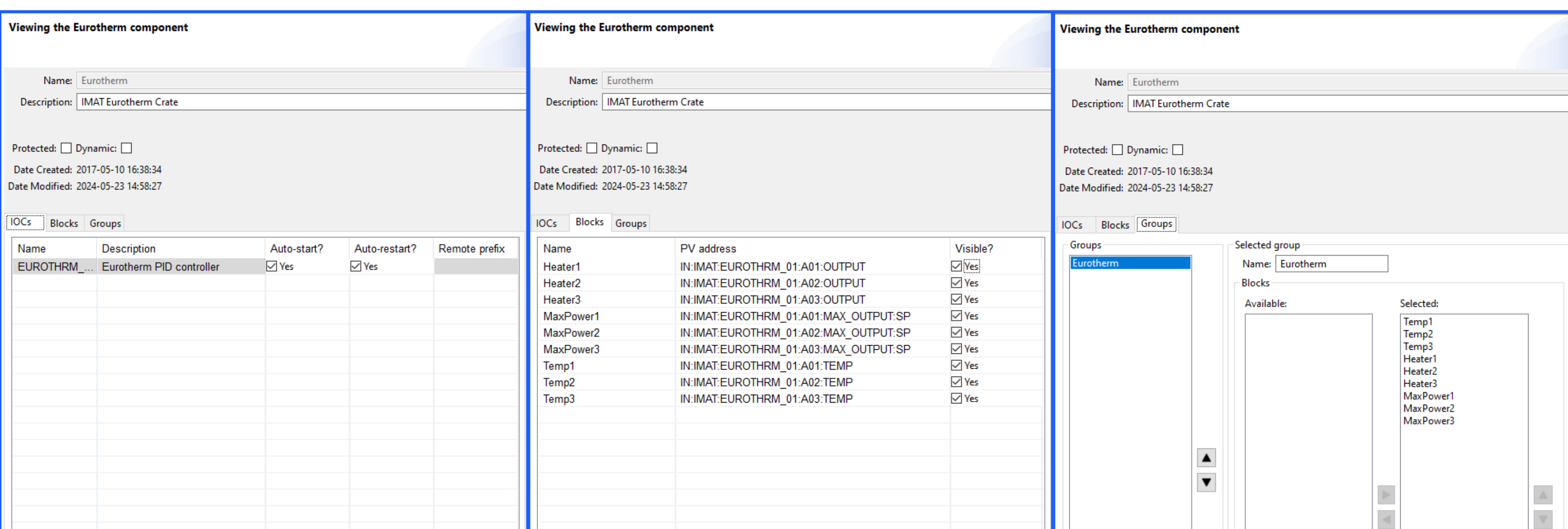
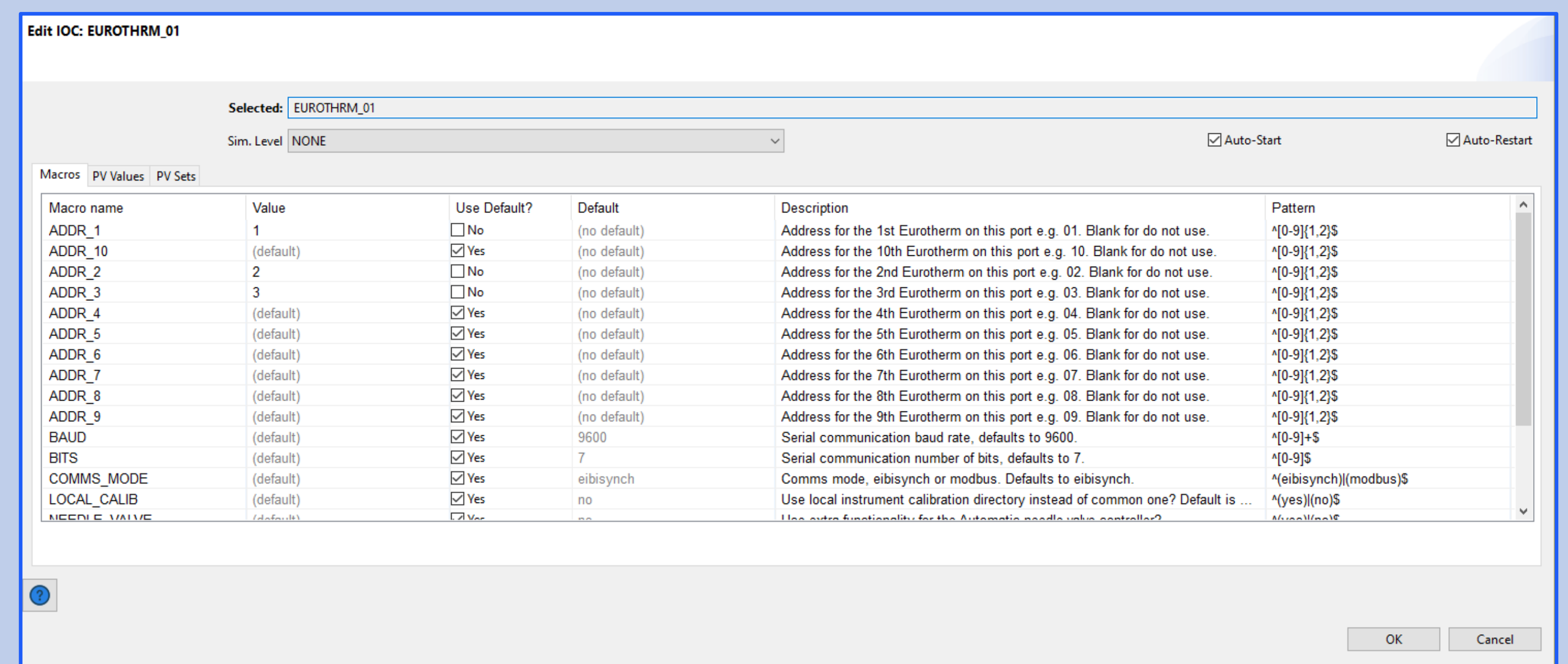
In the effort to make IBEX as easy-to-use and helpful for our users and Instrument Scientists as possible, we abstract the process of running IOCs and looking up data as much as possible. To that end, we employ a variety of different concepts:

- **Blocks** are essentially wrappers for PVs, with user-defined naming for ease of understanding and referencing. Their values are logged automatically, and data collection can be set to pause if they breach user-defined constraints (independent of limits set on the record). Additionally, through our scripting framework, values can be set to and read from PVs using their associated block names.
- **Groups** are user-defined collections of blocks. Groups are purely for display purposes on our GUI, for collating similar values near each other.
- **Components** are lists of IOCs accompanied by the macros needed to run them, and any PVs to set on them on startup. Additionally, components may include blocks and how they are sorted into groups.
- **Configurations** have the same functionality as components, with the exception that they may also include components. Additionally, a configuration can define a synoptic (a series of OPIs and PV values set out in a line to reflect the equipment beam path) to load when a user first switches to it. Instruments are always in exactly one configuration at a time.

When setting up IOCs, we allow scientists to configure all macros to be passed into them via our GUI. In addition to the device-specific settings, all IOCs have the option to be started in a simulation mode, and can be configured to auto-start with our server, and auto-restart if they happen to close.

Regex is used to make sure any entered macros are in valid formats, and the patterns are provided on the setup screen to give scientists an idea of what value to enter.

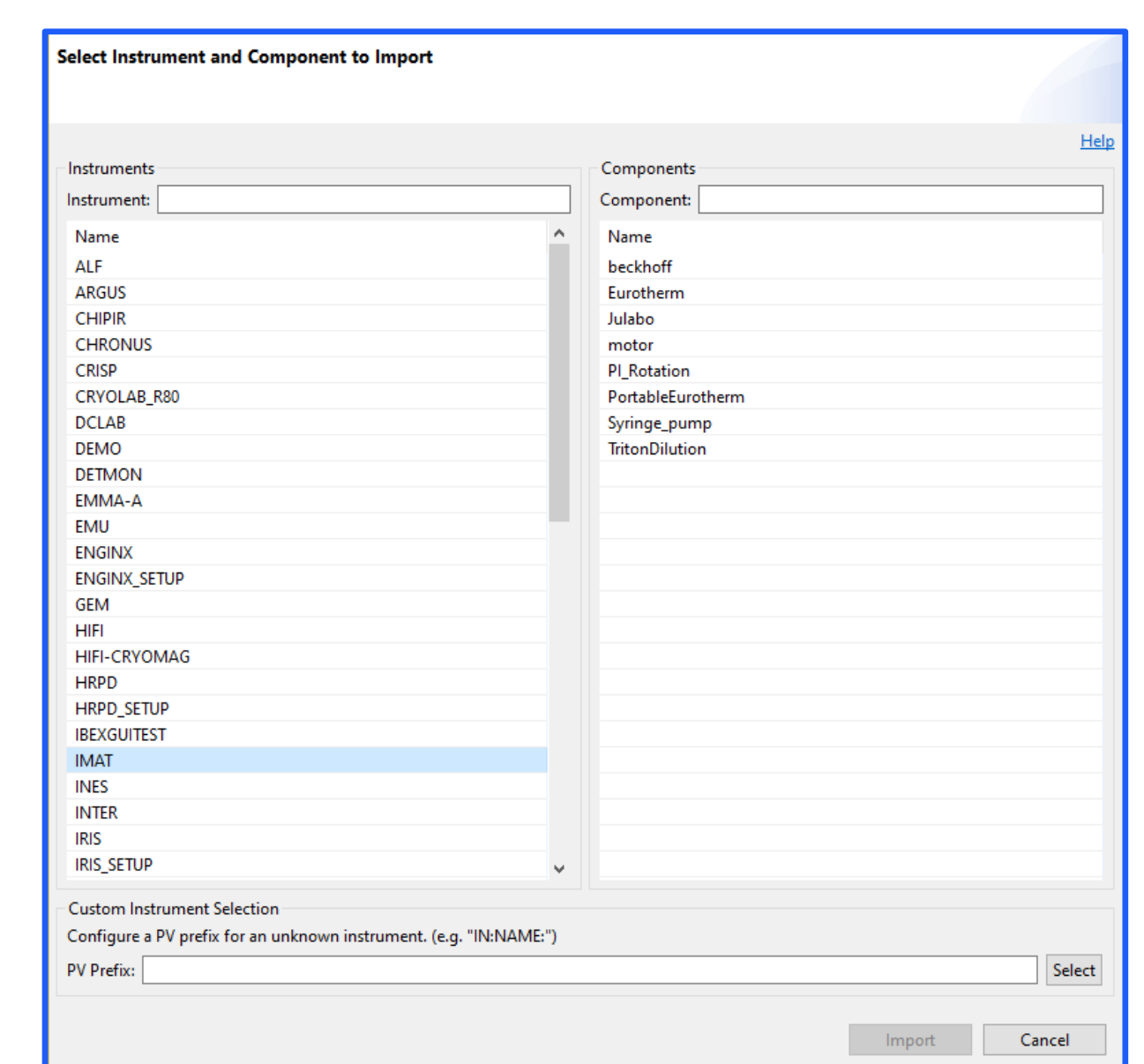
Additionally, configurations and components will not allow the creation of two instances of an IOC with the same name, to prevent macro conflicts. This includes configurations checking if any included components would cause such a clash.



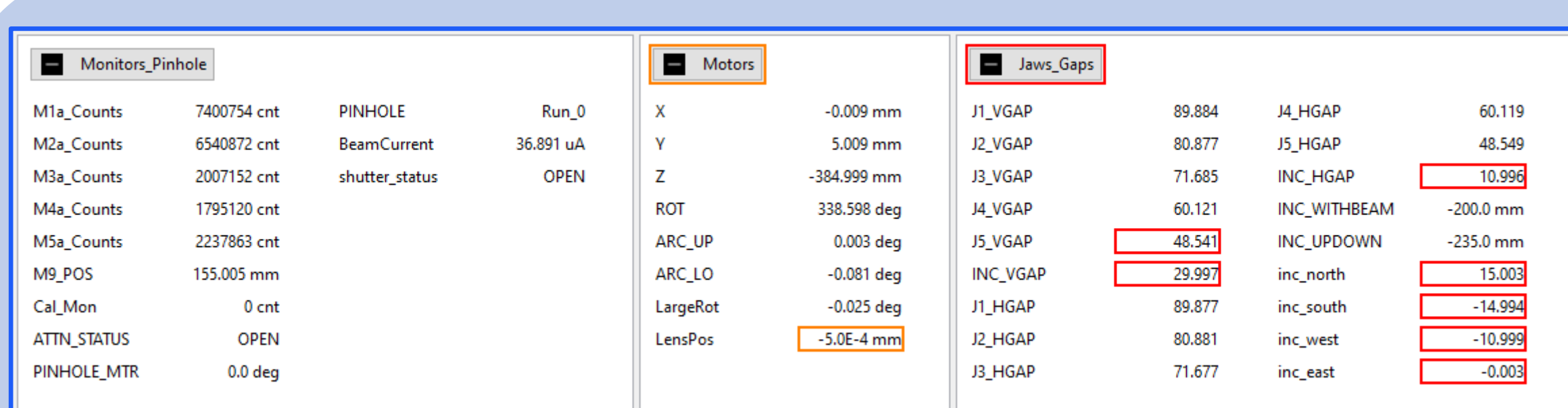
When creating components, scientists can:

- Select which IOCs are included, and configure their macros
- Define blocks which can point to any PV, and set up run control
- Sort any blocks present in the component into any group

We provide scientists with the capability to copy components from other instruments within our facility to their own. At a click of a button, all macros, blocks, and groups are imported from the other instrument.



This is particularly useful for sets of equipment being used on multiple instruments, or for setting up equipment on a test machine and then importing the component to a real instrument once testing is complete.



Blocks defined within a configuration are by default displayed in a banner at the top-right of our GUI, except for any blocks marked as hidden. Hidden blocks function identically to normal blocks, the only difference is they are not being displayed by default in the blocks tab to avoid clutter. If a user wishes, there is an option to display all hidden blocks.

In the blocks tab, blocks are grouped based on the name of any group they are assigned to, or placed in the "Other" group if no group is assigned. Any groups with the same name defined in multiple components will be automatically merged.

Name	Value	In Range	Enabled	Low Limit	High Limit	Suspend if invalid
ARC_LO	-0.081 deg	true	false	0.0	0.0	false
ARC_UP	0.003 deg	true	false	0.0	0.0	false
ATTN_OPEN	OPEN	true	false	0.0	0.0	false
ATTN_STATUS	OPEN	true	false	0.0	0.0	false
AXA	-45.0 deg	true	false	0.0	0.0	false
AXB	-28.1664 deg	true	false	0.0	0.0	false
AXC	-75.7872 deg	true	false	0.0	0.0	false
BeamCurrent	0.0 uA	true	false	0.0	0.0	false
C1D1_FREQ	10.000 Hz	true	false	0.0	0.0	false
C1D1_PHAS	75.302 990 us	true	false	0.0	0.0	false
C1D1_PHAS_ERR	10.0 us	true	false	0.0	0.0	false
C1D2_FREQ	10.000 Hz	true	false	0.0	0.0	false
C1D2_PHAS	71.749 991 us	true	false	0.0	0.0	false

When the PV a block is linked to goes into alarm, the value of that block is outlined in a box of relevant colour (minor = orange, major = red, invalid = purple), and the group name also gains a border to reflect the maximum severity of blocks within it.

In addition to alarm status, run control can be applied to the block. This is stored in background PVs not associated to the linked PV, with user defined limits or conditions. When the linked PV exceeds/breaks these conditions, data collection is paused until the linked PV returns to within the run control parameters.