

ISIS Neutron and Muon Source



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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.

t IOC: EUROTHRM_01					
	Selected: EUROT	HRM_01			
	Sim. Level NONE			∼ ✓ Auto	-Start Auto-R
Aacros PV Values PV Set	ts				
Macro name	Value	Use Default?	Default	Description	Pattern
ADDR_1	1	□ No	(no default)	Address for the 1st Eurotherm on this port e.g. 01. Blank for do not use.	^[0-9]{1,2}\$
ADDR_10	(default)	Ves	(no default)	Address for the 10th Eurotherm on this port e.g. 10. Blank for do not use.	^[0-9]{1,2}\$
ADDR_2	2	No	(no default)	Address for the 2nd Eurotherm on this port e.g. 02. Blank for do not use.	^[0-9]{1,2}\$
ADDR_3	3	No	(no default)	Address for the 3rd Eurotherm on this port e.g. 03. Blank for do not use.	^[0-9]{1,2}\$
ADDR_4	(default)	Ves	(no default)	Address for the 4th Eurotherm on this port e.g. 04. Blank for do not use.	^[0-9]{1,2}\$
ADDR_5	(default)	Ves 🗸	(no default)	Address for the 5th Eurotherm on this port e.g. 05. Blank for do not use.	^[0-9]{1,2}\$
ADDR_6	(default)	Ves 🗸	(no default)	Address for the 6th Eurotherm on this port e.g. 06. Blank for do not use.	^[0-9]{1,2}\$
ADDR_7	(default)	Ves Ves	(no default)	Address for the 7th Eurotherm on this port e.g. 07. Blank for do not use.	^[0-9]{1,2}\$
ADDR_8	(default)	Ves	(no default)	Address for the 8th Eurotherm on this port e.g. 08. Blank for do not use.	^[0-9]{1,2}\$
ADDR_9	(default)	Ves 🗸	(no default)	Address for the 9th Eurotherm on this port e.g. 09. Blank for do not use.	^[0-9]{1,2}\$
BAUD	(default)	Ves 🗸	9600	Serial communication baud rate, defaults to 9600.	^[0-9]+\$
BITS	(default)	Ves 🗸	7	Serial communication number of bits, defaults to 7.	^[0-9]\$
COMMS_MODE	(default)	Ves Ves	eibisynch	Comms mode, eibisynch or modbus. Defaults to eibisynch.	^(eibisynch) (modbus)\$
LOCAL_CALIB	(default)	Ves Ves	no	Use local instrument calibration directory instead of common one? Default is	^(yes) (no)\$
	(defeuilt)		00	Line outra functionality for the Automatic needle value controller?	A(1100)[(00)@

Viewing the Eurotherm component			Viewing the Eurothe	Viewing the Eurotherm component								
Name: E	urotherm				Name: Eurothe	rm		Name: Euroth	erm			
Description: IMAT Eurotherm Crate					Description: IMAT Eu	Description: IMAT Eurotherm Crate						
Protected: Dy	/namic:				Protected: 🗌 Dynamic			Protected: Dynami	c: 🗌			
Date Created: 20)17-05-10 16:38:34				Date Created: 2017-05-	10 16:38:34		Date Created: 2017-05	-10 16:38:34			
Date Modified: 20	24-05-23 14:58:27				Date Modified: 2024-05-	23 14:58:27		Date Modified: 2024-05	-23 14:58:27			
IOCs Blocks	Groups				IOCs Blocks Group	20		IOCs Blocks Grou	ps			
Name	Description	Auto-start?	Auto-restart?	Remote prefix	Name	PV address	Visible?	Groups		Selected group		
EUROTHRM_	Eurotherm PID controller	Ves Ves	🗹 Yes		Heater1	IN:IMAT:EUROTHRM_01:A01:OUTPUT	✓ Yes	Eurotherm		Name: Eurotherm		
					Heater2	IN:IMAT:EUROTHRM_01:A02:OUTPUT	Ves Yes			Blocks		
					Heater3	IN:IMAT:EUROTHRM_01:A03:OUTPUT	Ves Ves			Available:	Selected:	
					MaxPower1	IN:IMAT:EUROTHRM_01:A01:MAX_OUTPUT:SP	Ves Ves				Temp1	
					MaxPower2	IN:IMAT:EUROTHRM_01:A02:MAX_OUTPUT:SP	Ves Yes				Temp2	
					MaxPower3	IN:IMAT:EUROTHRM_01:A03:MAX_OUTPUT:SP	Ves Yes				Temp3	
					Temp1	IN:IMAT:EUROTHRM_01:A01:TEMP	✓ Yes				Heater2	
					Temp2	IN:IMAT:EUROTHRM_01:A02:TEMP	Ves Yes				Heater3	
					Temp3	IN:IMAT:EUROTHRM_01:A03:TEMP	Ves Ves				MaxPower1	
											MaxPower3	
									\bullet			
											P	
											\blacksquare	$\mathbf{\nabla}$

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.

Select Instrument and Component to Import		
		Hel
Instruments		Components
Instrument:		Component:
Name	^	Name
ALE		beckhoff
ARGUS		Eurotherm
CHIPIR		Julabo
CHRONUS		motor
CRISP		Pl_Rotation
CRYOLAB_R80		PortableEurotherm
DCLAB		Syringe_pump
DEMO		TritonDilution
DETMON		
EMMA-A		
EMU		
ENGINX		
ENGINX_SETUP		
GEM		
HIFI		
HIFI-CRYOMAG		
HRPD		
HRPD_SETUP		
IBEXGUITEST		
IMAT		
INES		
INTER		
IRIS		
IRIS_SETUP	×	
Custom Instrument Selection Configure a PV prefix for an unknown instrument. (e.g. "IN	NAME:")	
PV Prefix:	-	Select
L		
		Import Cancel

OK Cancel

- Monitors_Pi	inhole			Motors		Jaws_Gaps			
M1a_Counts	7400754 cnt	PINHOLE	Run_0	x	-0.009 mm	J1_VGAP	89.884	J4_HGAP	60.119
M2a_Counts	6540872 cnt	BeamCurrent	36.891 uA	Y	5.009 mm	J2_VGAP	80.877	J5_HGAP	48.549
M3a_Counts	2007152 cnt	shutter_status	OPEN	Z	-384.999 mm	J3_VGAP	71.685	INC_HGAP	10.996
M4a_Counts	1795120 cnt			ROT	338.598 deg	J4_VGAP	60.121	INC_WITHBEAM	-200.0 mm
M5a_Counts	2237863 cnt			ARC_UP	0.003 deg	J5_VGAP	48.541	INC_UPDOWN	-235.0 mm
M9_POS	155.005 mm			ARC_LO	-0.081 deg	INC_VGAP	29.997	inc_north	15.003
Cal_Mon	0 cnt			LargeRot	-0.025 deg	J1_HGAP	89.877	inc_south	-14.994
ATTN_STATUS	OPEN			LensPos	-5.0E-4 mm	J2_HGAP	80.881	inc_west	-10.999
PINHOLE_MTR	0.0 deg					J3_HGAP	71.677	inc_east	-0.003

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 them 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	75302.990 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	7//7/9 991 me	true	falea	0.0	0.0	falea

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.

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