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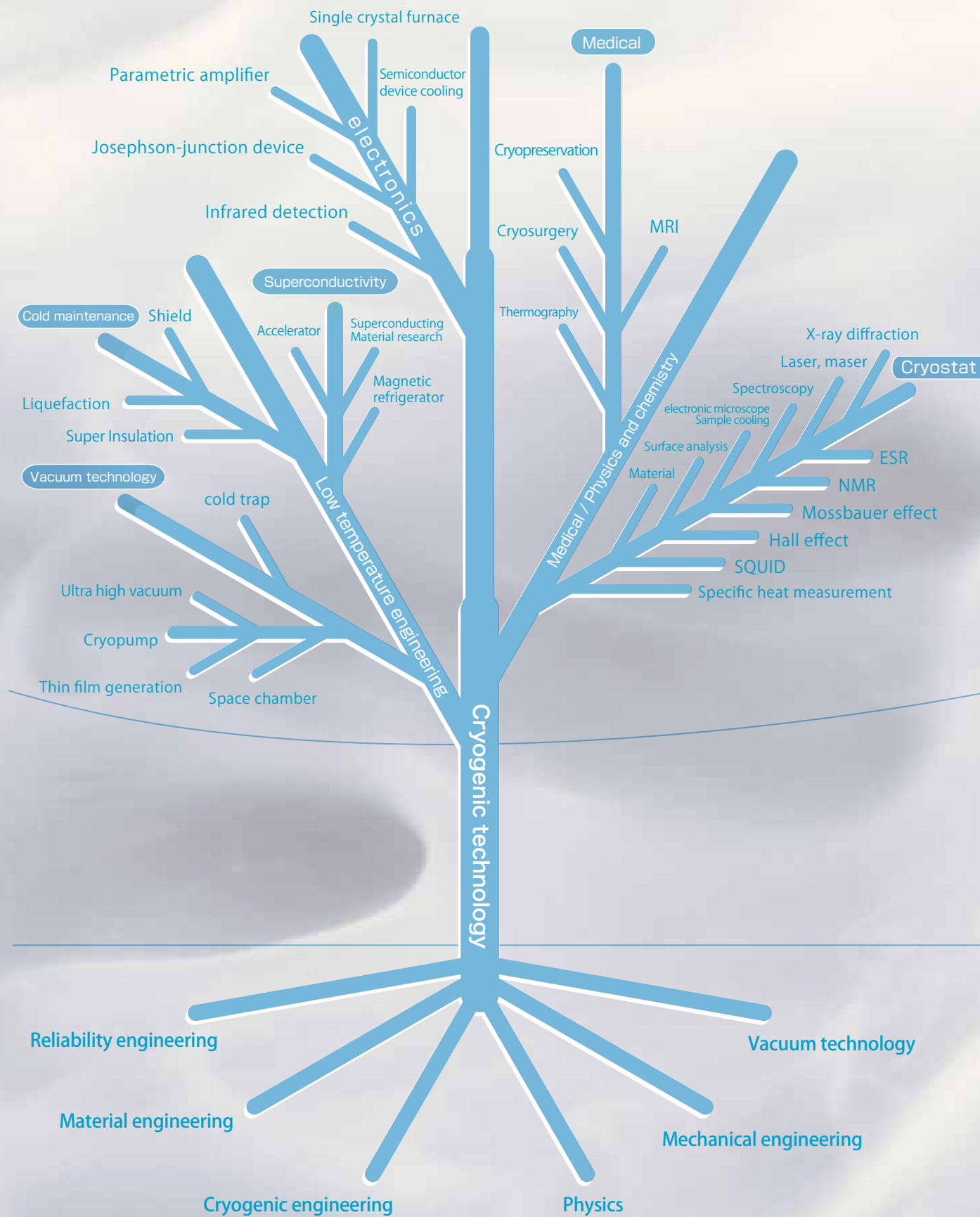
www.ulvac-cryo.com



Contact Us



Cryogenic Technology in a Variety of Fields



Our Cryocoolers

ULVAC CRYOGENICS has provided a large number of cryopumps to be mounted on vacuum systems for semiconductor or LCD manufacturing equipments based on our rich experience and expertise in vacuum and cryogenic technology.

Recently, G-M refrigerators for cryopumps have been expanding the applications into new fields such as superconductivity.

As the demand for 4K or pulse-tube cryocoolers expands, we believe that our cryocoolers with proven technology will respond to the requirements for R&D or in advanced industries.

Application of cryogenic technology



Vacuum technology

Cryopumps, Cryotraps



Environment

Remote sensing for environmental conservation
(Ozone hole, global warming, air pollution, abnormal weather, acid rain, etc.)



Medical Treatment

Magnetic Resonance Imaging (MRI) Thermography Mass Spectrometer



Industry

MCZ (magnetic field applied silicon single crystal furnace device)
Magnetically levitated magnet for maglev LHC (superconducting accelerator)
Cooling electron microscope of semiconductor device Cooling infrared detection system of sample
Transmission electricity distributor · generator SMES (energy storage device)



The study

Millimeter wave measurement optical measurement NMR (nuclear magnetic resonance)
ESR / ERP (electron paramagnetic resonance) X ray diffraction Hall effect
SQUID (superconducting quantum interference device) Mössbauer superconducting material
J - J device magnetic cooling surface analysis radio telescope materials research
Compact refrigerator for satellites

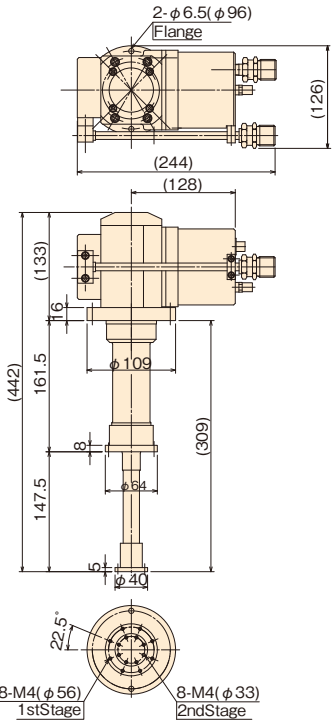
4K GM refrigerator HE01



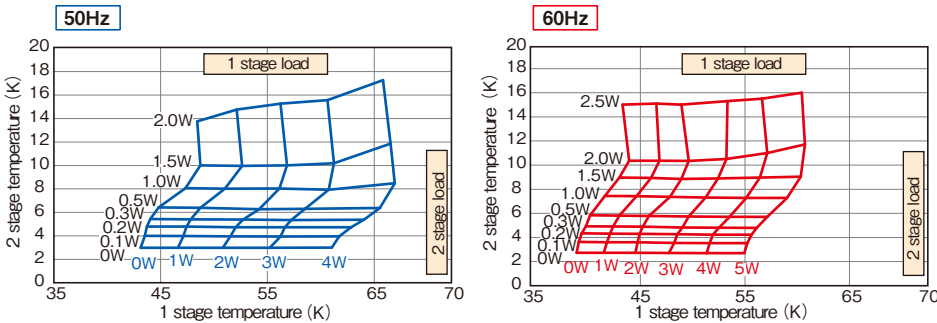
Specification

Power frequency		50Hz	60Hz
Refrigeration capacity※1	First stage	3W/60K	5W/60K
	Second stage	0.1W/4.2K	
Ultimate temperature	Second stage	<2.7K	
Cooldown time (4.2 K) * 1		140min	120min
Weight		7.5kg	
Dimensions		126(W) x 244(D) x 442(H)mm	
Maintenance interval * 2		10,000 hours	

* 1 Value at no load. The performance depends on the installation environment of the refrigerator and the cooling object.
* 2 Maintenance interval is recommended, not guaranteed time.



Examples of Performance curve (coldhead pointing-down)



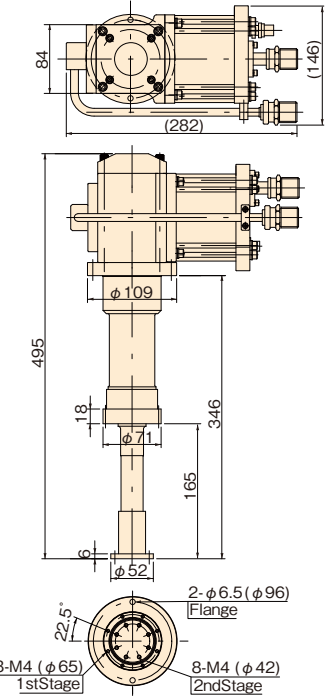
4K GM refrigerator HE05



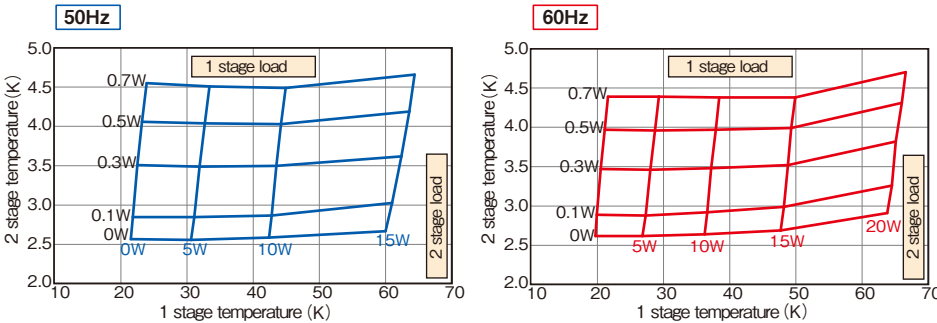
Specification

Power frequency		50Hz	60Hz
Refrigeration capacity※1	First stage	10W/45K	10W/40K
	Second stage	0.5W/4.2K	
Ultimate temperature	Second stage	<2.7K	
Cooldown time (4.2 K) * 1		75min	60min
Weight		11 kg	
Dimensions		146(W) x 282(D) x 495(H)mm	
Maintenance interval * 2		10,000 hours	

* 1 Value at no load. The performance depends on the installation environment of the refrigerator and the cooling object.
* 2 Maintenance interval is recommended, not guaranteed time.



Examples of Performance curve (coldhead pointing-down)



4K GM refrigerator UHE 10

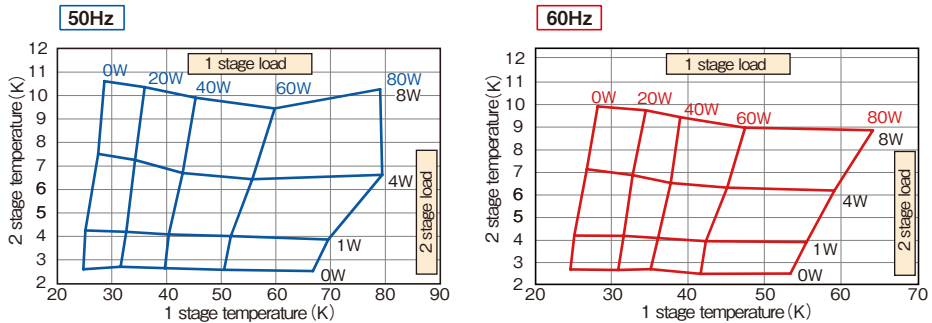


Specification

Power frequency		50Hz	60Hz
Refrigeration capacity※1	First stage	40W/43K	50W/43K
	Second stage	1.0W/4.2K	
Ultimate temperature	Second stage	<2.7K	
Cooldown time (4.2 K) * 1		60min	
Weight		17 kg	
Dimensions		180(W) x 304(D) x 578(H)mm	
Maintenance interval * 2		10,000 hours	

* 1 Value at no load. The performance depends on the installation environment of the refrigerator and the cooling object.
* 2 Maintenance interval is recommended, not guaranteed time.
※ Flexible hose standard length 20 A × 10 m

Examples of Performance curve (coldhead pointing-down)



4K GM refrigerator UHE 15

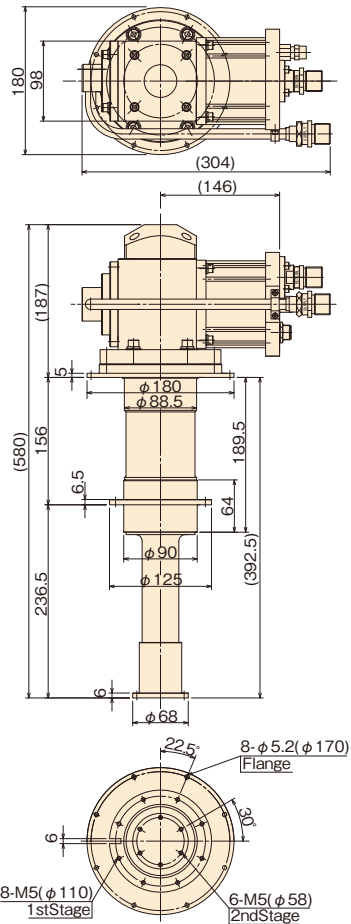
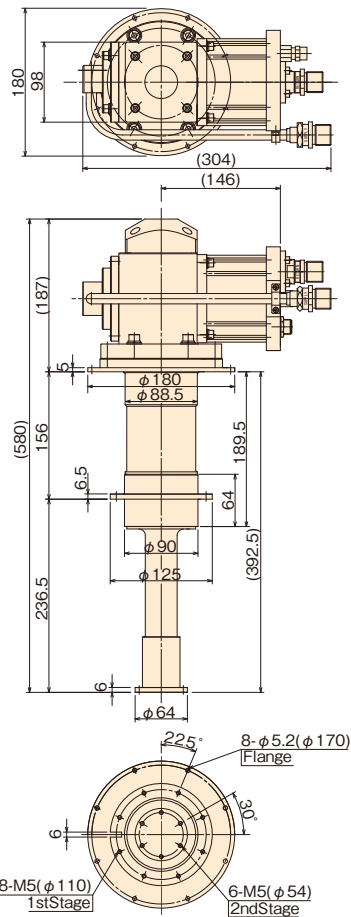
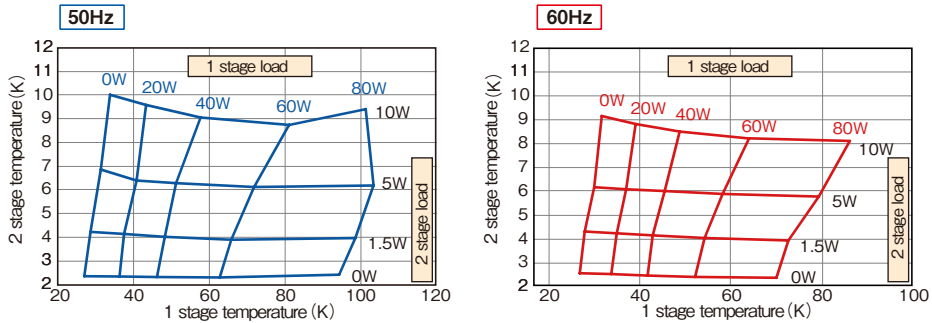


Specification

Power frequency		50Hz	60Hz
Refrigeration capacity※1	First stage	35W/50K	45W/50K
	Second stage	1.5W/4.2K	
Ultimate temperature	Second stage	<2.7K	
Cooldown time (4.2 K) * 1		60min	
Weight		18 kg	
Dimensions		180(W) x 304(D) x 580(H)mm	
Maintenance interval * 2		10,000 hours	

* 1 Value at no load. The performance depends on the installation environment of the refrigerator and the cooling object.
* 2 Maintenance interval is recommended, not guaranteed time.
※ Flexible hose standard length 20 A × 10 m

Examples of Performance curve (coldhead pointing-down)

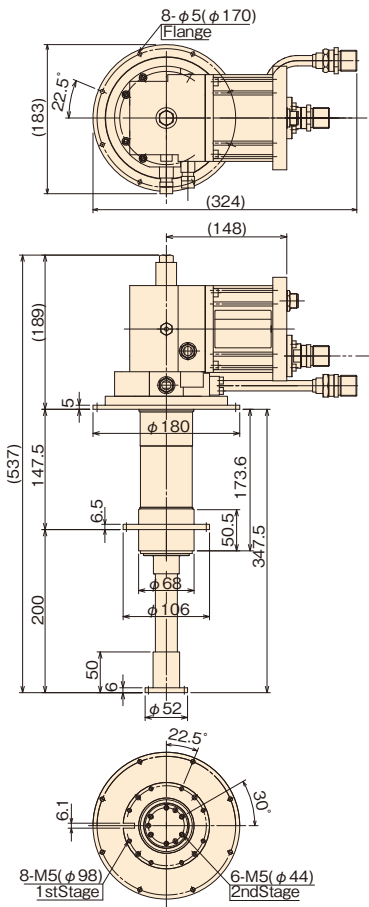


4K GM refrigerator UR4K0420T

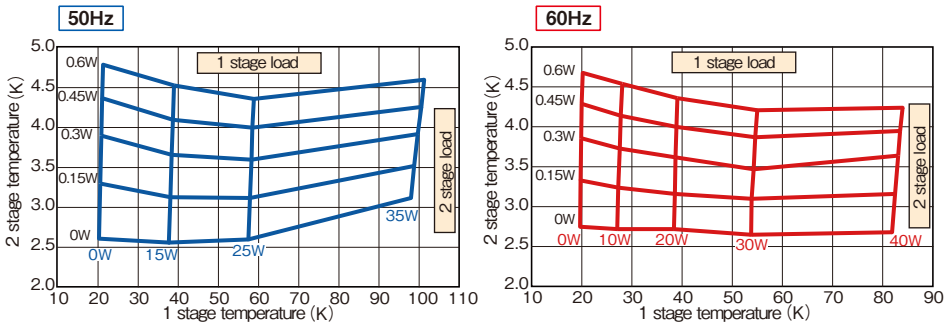


Power frequency		50Hz	60Hz
Refrigeration capacity※1	First stage	15W/40K	20W/40K
	Second stage	0.45W/4.2K	
Ultimate temperature	Second stage	<3.5K	
Cooldown time (4.2 K) * 1		70min	60min
Weight		13kg	
Dimensions		183(W) x 324(D) x 537(H)mm	
Maintenance interval * 2		10,000 hours	

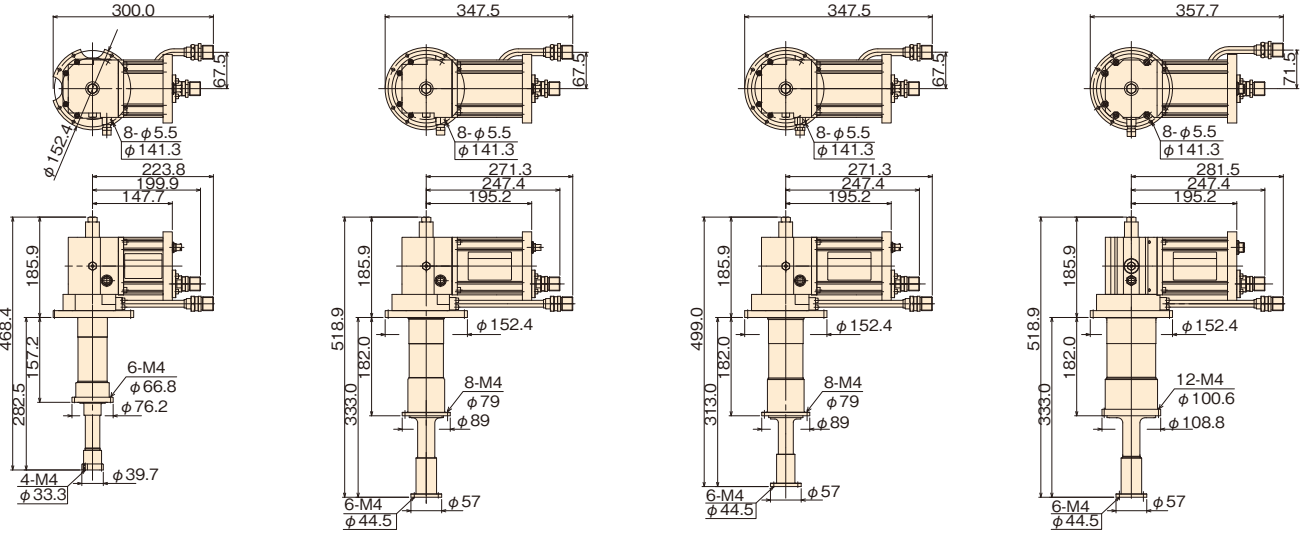
* 1 Value at no load. The performance depends on the installation environment of the refrigerator and the cooling object.
* 2 Maintenance interval is recommended, not guaranteed time.
※ Flexible hose standard length 20 A × 10 m



Examples of Performance curve (coldhead pointing-down)



GM refrigerator RM series

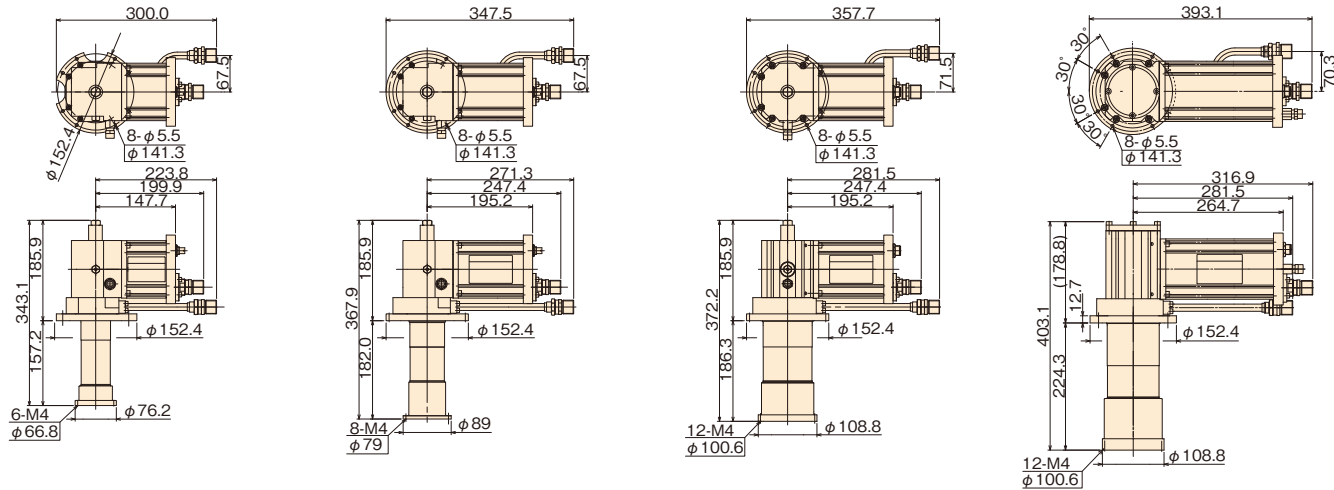


Specification

RM series (2 stage type)		RM10	RM20	RM50	RM80T
Refrigerator system		CRM10	CRM20	CRM50	CRM80T
Refrigeration capacity	First stage	13W / 77K	35W / 77K	65W / 77K	100W / 77K
	Second stage	3.5W / 20K	12W / 20K	7W / 20K	8W / 20K
Ultimate temperature		12K	12K	12K	12K
Cooldown time		40min	30min	40min	35min
Weight (refrigerator)		11kg	14kg	14kg	16kg
Maintenance interval		16,000 hours			

* Refrigerating capacity, reachable temperature, cooling down time are the combination when the refrigerator and compressor are 1: 1 / ambient temperature: value at 24 ° C / no load.
* When the power frequency is 60 Hz.

GM Refrigerator RMS Series



Specification

RM series (1 stage type)		RMS10	RMS50	RMS80T	RMS150T
Refrigerator system		CRMS10	CRMS50	CRMS80T	CRMS150T
Refrigeration capacity	First stage	35W / 77K	85W / 77K	130W / 77K	165W / 77K
Ultimate temperature		30K	30K	35K	40K
Cooldown time		30min	20min	18min	13min
Weight (refrigerator)		10kg	13kg	15kg	20kg
Maintenance interval		16,000 hours		20,000 hours	10,000 hours

* Refrigerating capacity, reachable temperature, cooling down time are the combination when the refrigerator and compressor are 1: 1 / ambient temperature: value at 24 ° C / no load.
* When the power frequency is 60 Hz.

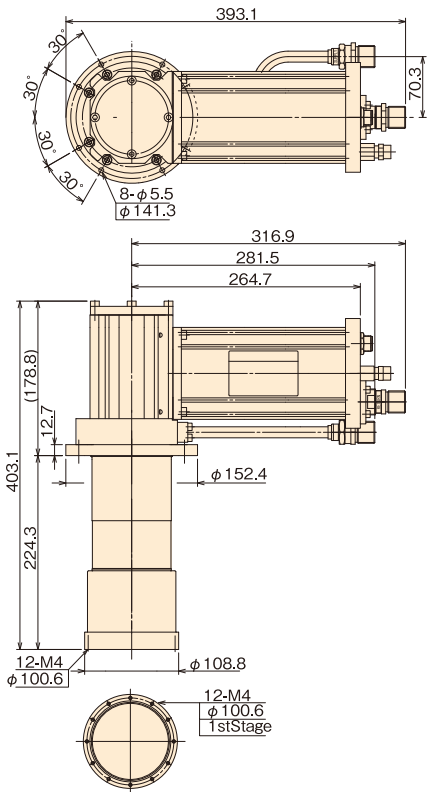
One stage refrigerator RMS 150 T



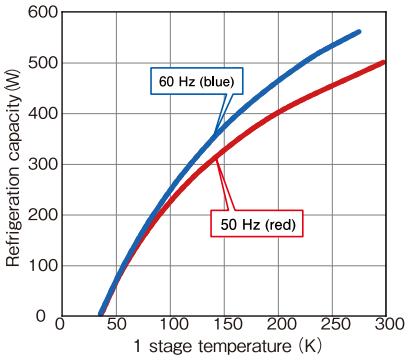
Specification

Power frequency	50Hz	60Hz
Refrigerating capacity (@ 77K) * 1	150W	165W
Cooldown time (@ 77K) * 1	15min	13min
Ultimate temperature * 1	40K	
Weight	20kg	
Dimensions	163(W) x 394(D) x 404(H)mm	
Maintenance interval * 2	10,000 hours	

* 1 Value at no load. The performance depends on the installation environment of the refrigerator and the cooling object.
* 2 Maintenance interval is recommended, not guaranteed time.



Measurement example of refrigeration capacity



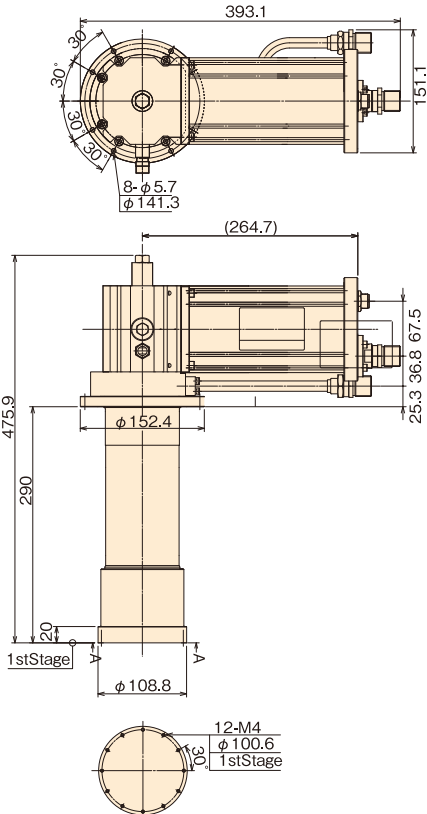
One stage refrigerator RSC 50 T



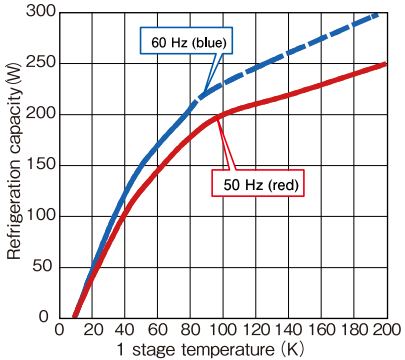
Specification

Power frequency	50Hz	60Hz
Refrigerating capacity (@ 77K) * 1	40W	45W
Cooldown time (@ 77K) * 1	50min	40min
Ultimate temperature * 1	13K	
Weight	23kg	
Dimensions	152(W) x 394(D) x 476(H)mm	
Maintenance interval * 2	12,000 hours	

* 1 Value at no load. The performance depends on the installation environment of the refrigerator and the cooling object.
* 2 Maintenance interval is recommended, not guaranteed time.



Measurement example of refrigeration capacity



Please contact us if you are considering use in temperature range with power frequency 60 Hz 77 K or higher.

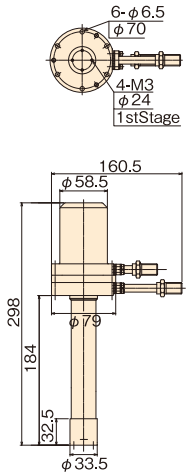
Pulse tube refrigerator PDC 08



Specification

Power frequency	50Hz/60Hz	
Refrigerating capacity * 1 (First stage)	Connection pipe (with buffer tank) $\phi 6.35 \times 2m \times 1$	8W/77K
	Connection pipe (with buffer tank) $\phi 6.35 \times 2m \times 2$	11W/77K
Ultimate temperature * 1	40K	
Cooldown time (@ 77K) * 1	20min	
Weight	1.5kg	
Motor unit	M601(100V)	
Weight	4kg	
Dimensions	179(W) x 161(D) x 298(H)mm	
Maintenance interval * 2	10,000 hours	

* 1 Value at no load. The performance depends on the installation environment of the refrigerator and the cooling object.
* 2 Maintenance interval is recommended, not guaranteed time.



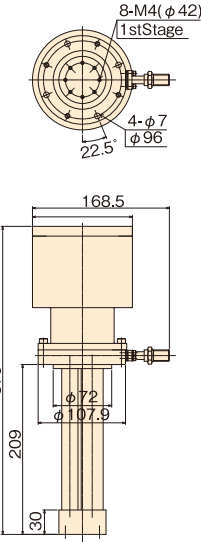
Pulse Tube Refrigerator PD016



Specification

Power frequency	50Hz/60Hz	
Refrigerating capacity * 1 (First stage)	Connection pipe(100V) $\phi 6.35 \times 0.5m \times 1$	12W/77K
	Connection pipe(200V) $\phi 6.35 \times 0.5m \times 1$	18W/77K
Ultimate temperature * 1	40K	
Cooldown time (@ 77K) * 1	30min	
Weight	4.5kg	
Motor unit	M501(100V)/M502(200V)	
Weight	4kg	
Dimensions	123(W) x 169(D) x 379(H)mm	
Maintenance interval * 2	10,000 hours	

* 1 Value at no load. The performance depends on the installation environment of the refrigerator and the cooling object.
* 2 Maintenance interval is recommended, not guaranteed time.



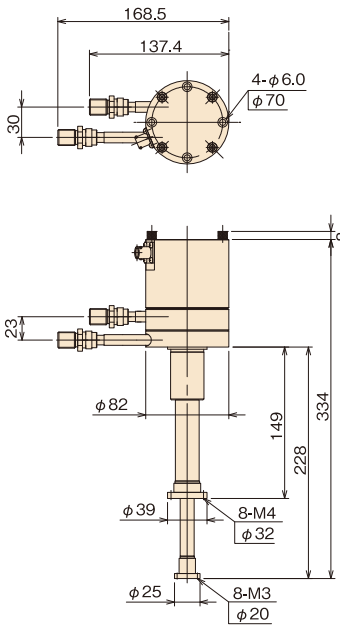
Solvay refrigerator D 105



Specification

Power frequency		50Hz	60Hz
Refrigerating capacity * 1	First stage	4W/77K	4.5W/77K
	Second stage	1W/20K	
Ultimate temperature *1	Second stage	10K	
Cooldown time (20K) * 1		30min	
Weight		2.5kg	
Dimensions		82(W) x 171(D) x 342(H)mm	
Maintenance interval * 2		10,000 hours	

* 1 Value at no load. The performance depends on the installation environment of the refrigerator and the cooling object.
* 2 Maintenance interval is recommended, not guaranteed time.



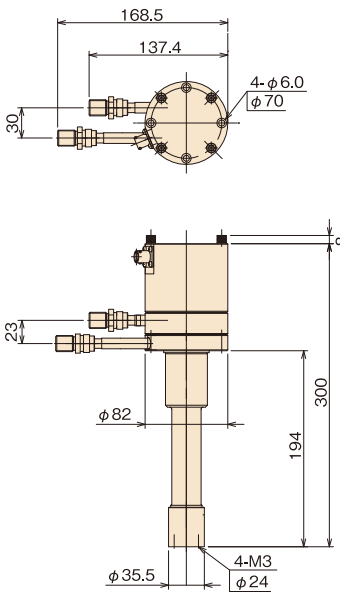
Solvay refrigerator S010N



Specification

Power frequency		50Hz
Refrigerating capacity * 1	First stage	10W/77K
	Second stage	30K
Ultimate temperature *1		30K
Cooldown time (77K) * 1		30min
Weight		3kg
Dimensions		82(W) x 171(D) x 308(H)mm
Maintenance interval * 2		10,000 hours

* 1 Value at no load. The performance depends on the installation environment of the refrigerator and the cooling object.
* 2 Maintenance interval is recommended, not guaranteed time.



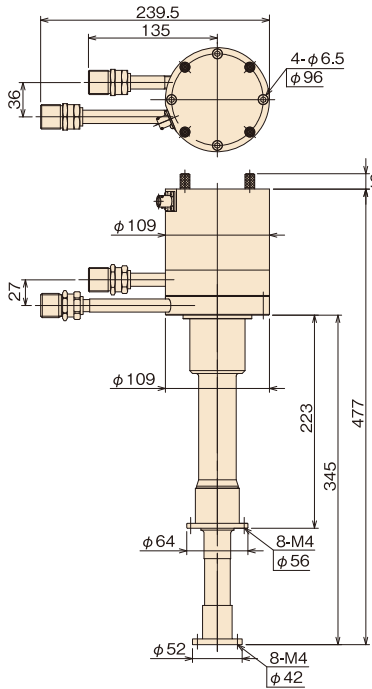
Solvay refrigerator D 105



Specification

Power frequency		50Hz	60Hz
Refrigerating capacity * 1	First stage	9W/77K	
	Second stage	5W/20K	
Ultimate temperature *1	Second stage	10K	
Cooldown time (20K) * 1		45min	50min
Weight		6.3kg	
Dimensions		109(W) x 240(D) x 493(H)mm	
Maintenance interval * 2		10,000 hours	

* 1 Value at no load. The performance depends on the installation environment of the refrigerator and the cooling object.
* 2 Maintenance interval is recommended, not guaranteed time.



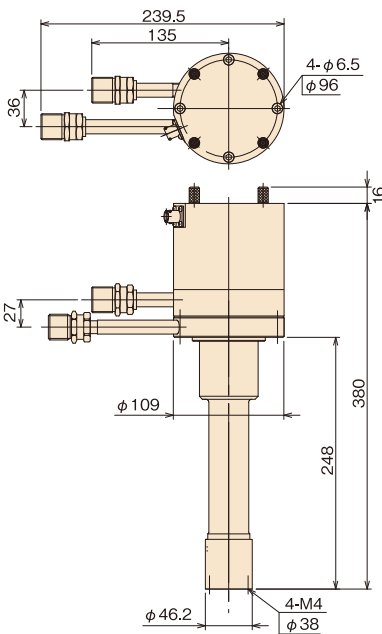
Solvay refrigerator S030



Specification

Power frequency		50Hz	60Hz
Refrigerating capacity * 1	First stage	30W/77K	33W/77K
	Second stage		
Ultimate temperature *1		22K	
Cooldown time (20K) * 1		25min	
Weight		5.9kg	
Dimensions		109(W) x 240(D) x 396(H)mm	
Maintenance interval * 2		10,000 hours	

* 1 Value at no load. The performance depends on the installation environment of the refrigerator and the cooling object.
* 2 Maintenance interval is recommended, not guaranteed time.



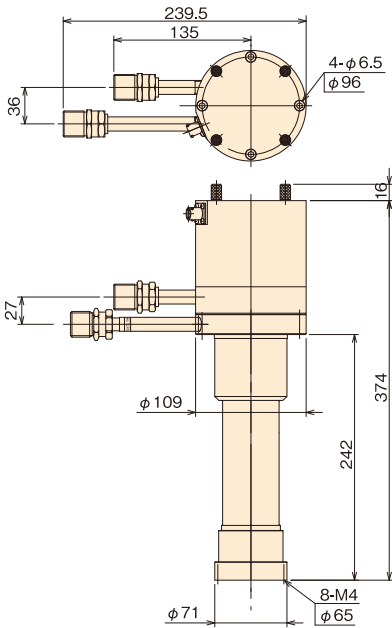
Solvay refrigerator S 050



Specification

Power frequency		50Hz	60Hz
Refrigerating capacity * 1	First stage	60W/77K	62W/77K
	First stage	25K	
Ultimate temperature * 1		77K	
Cooldown time (77K) * 1		20min	
Weight		6.5kg	
Dimensions		109(W) x 240(D) x 390(H)mm	
Maintenance interval * 2		10,000 hours	

* 1 Value at no load. The performance depends on the installation environment of the refrigerator and the cooling object.
* 2 Maintenance interval is recommended, not guaranteed time.



Compressor unit

Specification

	Model	Power supply (ACV ×Φ×Hz)	Power consumption (kw)(50/60Hz)	Breaker capacity (Recommendation)	Dimensions(mm)	Weight(Kg)	Cooling method water quantity (L/min)(20°C)	Adsorber exchange time(H)
	C10	200 x 3 x 50 220 x 3 x 60	1.5/1.7	15A	332(W) 543(D) 573(H)	75	water 2.0	24,000
	C10AT	200 x 3 x 50 220 x 3 x 60	1.5/1.7	15A	489(W) 554(D) 486(H)	77	air —	24,000
	C15R	200 x 3 x 50 220 x 3 x 60	3.3/4.1	20A	339(W) 580(D) 665(H)	100	water 3.5	30,000
	C30VR	200 x 3 x 50 220 x 3 x 60	5.0/6.0	30A	453(W) 510(D) 680(H)	125	water 5.5	24,000
	C30MVR				453(W) 510(D) 680(H)	131		
	C30HVRT	200 x 3 x 50 220 x 3 x 60	5.8/7.2	40A	453(W) 510(D) 680(H)	121	water 5.5	24,000
	C30HMVRT		6.5/8.0		453(W) 510(D) 680(H)			
	SA112	100 x 1 x 50 100 x 1 x 60	1.1-1.2	20A	373(W) 449(D) 396(H)	44	air —	30,000
	SW112		1.0/1.2		373(W) 449(D) 396(H)	53	water 3.5	
	SA115	200 x 3 x 50 200 x 3 x 60	1.6/1.9	15A	449(W) 462(D) 461(H)	59	air —	30,000
	SW115		1.5/1.8		449(W) 462(D) 461(H)	54	water 4.0	
	UW404	200 x 3 x 50 220 x 3 x 60	3.5/4.5	20A	339(W) 580(D) 665(H)	94	water 4.5	30,000
	C30HMVRT-380	380 x 3 x 50	5.5	30A	453(W) 510(D) 740(H)	127	water 5.5	24,000

Refrigerator / compressor combination table 1/3

		4K GM					20K GM	GM (RM Series)
Type expression		HE01	HE05	UHE10	UHE15	UR4K0420T	RSC50T	RM10
First stage refrigeration capacity	50Hz	3 W @ 60 K	10 W @ 45 K	40 W @ 43 K	35 W @ 50 K	15 W @ 40 K	40 W @ 20 K	10 W @ 77 K
	60Hz	5 W @ 60 K	10 W @ 40 K	50 W @ 43 K	45 W @ 50 K	20 W @ 40 K	45 W @ 20 K	13 W @ 77 K
Second stage refrigeration capacity	50Hz	0.1 W @ 4.2 K	0.5 W @ 4.2 K	1.0 W @ 4.2 K	1.5 W @ 4.2 K	0.45 W @ 4.2 K	-	3 W @ 20 K
	60Hz	0.1 W @ 4.2 K	0.5 W @ 4.2 K	1.0 W @ 4.2 K	1.5 W @ 4.2 K	0.45 W @ 4.2 K	-	3.5 W @ 20 K
Reaching temperature	50Hz	2.7 K	2.7 K	2.7 K	2.7 K	3.5 K	13 K	12 K
	60Hz	2.7 K	2.7 K	2.7 K	2.7 K	3.5 K	13 K	12 K
Cooldown time	50Hz	<140 min (4.2K)	<75 min (4.2K)	<60 min (4.2K)	<60 min (4.2K)	<70 min (4.2K)	<50 min (20K)	<35 min (20K)
	60Hz	<120 min (4.2K)	<60 min (4.2K)	<60 min (4.2K)	<60 min (4.2K)	<60 min (4.2K)	<40 min (20K)	<40 min (20K)
Weight		7.5 kg	11 kg	17 kg	18 kg	13 kg	23 kg	11 kg
SA112		○						
SW112		○						
SA115								
SW115								
UW404			○			○		
C10								○
C30VR								
C30PVRT								
C30HVRT				○	○		○	
C30HMVRT-380				○				

Refrigerator / compressor combination table 2/3

		GM (RM Series)						
Type expression		RM20	RM50	RM80T	RMS10	RMS50	RMS80T	RMS150T
First stage refrigeration capacity	50Hz	30 W @ 77 K	55 W @ 77 K	80 W @ 77 K	29 W @ 77 K	67 W @ 77 K	120 W @ 77 K	150 W @ 77 K
	60Hz	35 W @ 77 K	65 W @ 77 K	100 W @ 77 K	35 W @ 77 K	85 W @ 77 K	130 W @ 77 K	165 W @ 77 K
Second stage refrigeration capacity	50Hz	10 W @ 20 K	5 W @ 20 K	8 W @ 20 K	-	-	-	-
	60Hz	12 W @ 20 K	7 W @ 20 K	8 W @ 20 K	-	-	-	-
Reaching temperature	50Hz	12 K	12 K	12 K	30 K	30 K	35 K	40 K
	60Hz	12 K	12 K	12 K	30 K	30 K	35 K	40 K
Cooldown time	50Hz	<35 min (20K)	<45 min (20K)	<40 min (20K)	<35 min (77K)	<25 min (77K)	<20 min (77K)	<15 min (77K)
	60Hz	<30 min (20K)	<40 min (20K)	<35 min (20K)	<30 min (77K)	<20 min (77K)	<18 min (77K)	<13 min (77K)
Weight		14 kg	14 kg	16 kg	10 kg	13 kg	15 kg	20 kg
SA112								
SW112								
SA115								
SW115								
UW404								
C10					○			
C30VR		○	○			○		
C30PVRT				○			○	○
C30HVRT								
C30HMVRT-380								

Refrigerator / compressor combination table 3/3

		Pulse-Tube		Solvay				
Type expression		PDC08	PD016	D105	D510	S010N	S030	S050
First stage refrigeration capacity	50Hz	8 W @ 77 K	12 W @ 77 K	4.0 W @ 77 K	9 W @ 77 K	10 W @ 77 K	30 W @ 77 K	60 W @ 77 K
	60Hz	8 W @ 77 K	12 W @ 77 K	4.5 W @ 77 K	9 W @ 77 K	10 W @ 77 K	33 W @ 77 K	62 W @ 77 K
Second stage refrigeration capacity	50Hz	-	-	1 W @ 20 K	5 W @ 20 K	-	-	-
	60Hz	-	-	1 W @ 20 K	5 W @ 20 K	-	-	-
Reaching temperature	50Hz	40 K	40 K	10 K	10 K	30 K	22 K	25 K
	60Hz	40 K	40 K	10 K	10 K	30 K	22 K	25 K
Cooldown time	50Hz	<20 min (77K)	<30 min (77K)	<30 min (20K)	<45 min (20K)	<30 min (77K)	<25 min (77K)	<20 min (77K)
	60Hz	<20 min (77K)	<30 min (77K)	<30 min (20K)	<50 min (20K)	<30 min (77K)	<25 min (77K)	<20 min (77K)
Weight		1.5 kg	4.5 kg	2.5 kg	6.3 kg	3 kg	5.9 kg	6.5 kg
SA112		○	○ ※1	○		○		
SW112		○	○ ※1	○		○		
SA115			○ ※2		○		○	
SW115			○ ※2		○		○	
UW404								○
C10								
C30VR								
C30PVRT								
C30HVRT								
C30HMVRT-380								

■When applying our refrigerator to a cryocooler for optical sensors, the cryocooler falls under row 6.A.2.d.2 of the control list established by The Wassenaar Arrangement, which is equal to row 10(2) of appended table 1 of Japan’s Export Trade Control Order.

Customers must follow all related rules and regulations such as Foreign Exchange and Foreign Trade Act and take appropriate procedures when exporting or re-exporting our refrigerators.

* 1 Using M501 motor unit * 2 Using M502 motor unit