## Our Stirling Rotary Coolers

**Overview**

<table>
<thead>
<tr>
<th>Model</th>
<th>Cooling Power</th>
<th>Weight</th>
<th>Cool Down Time</th>
<th>Steady State Input Power</th>
<th>MTTF</th>
<th>Max. Dimensions</th>
<th>Cold Finger Ø</th>
<th>Operating Temperature</th>
<th>Electronic Driver</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RMS1</strong></td>
<td>1000 mW @ 150K</td>
<td>150 gr</td>
<td>&lt; 2 min @ dewar 120 J, 150 K</td>
<td>1.0 Wac @ 150 mW, 150 K</td>
<td>&gt; 15,000 hours</td>
<td>72 x 42 x 42 mm</td>
<td>¼” IDCA – SWaP (Common Interface)</td>
<td>- 40°C to + 70°C</td>
<td>Separated</td>
</tr>
<tr>
<td><strong>RM2</strong></td>
<td>400 mW @ 77 K</td>
<td>275 gr</td>
<td>&lt; 5:30 min @ dewar 150 J, 77 K</td>
<td>&lt; 2.9 Wac @ 130 mW, 77 K</td>
<td>&gt; 24,000 hours</td>
<td>95.5 x 82 x 46.5 mm</td>
<td>¼” IDCA</td>
<td>- 40°C to + 70°C</td>
<td>Separated</td>
</tr>
<tr>
<td><strong>RM3</strong></td>
<td>600 mW @ 77 K</td>
<td>450 gr</td>
<td>&lt; 4:30 min @ dewar 356 J, 77 K</td>
<td>5.0 Wdc @ 180 mW, 77 K</td>
<td>&gt; 24,000 hours</td>
<td>117.5 x 71 x 56 mm</td>
<td>8 mm IDCA</td>
<td>- 46°C to + 85°C</td>
<td>Embedded</td>
</tr>
<tr>
<td><strong>RM4</strong></td>
<td>850 mW @ 77 K</td>
<td>420 gr</td>
<td>&lt; 3 min @ dewar 250 J, 77 K</td>
<td>3.4 Wac @ 130 mW, 77 K</td>
<td>&gt; 24,000 hours</td>
<td>98.5 x 71 x 43.5 mm</td>
<td>¼” IDCA</td>
<td>- 46°C to + 85°C</td>
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</tbody>
</table>

**Option:** we can provide different cold fingers adapted to our RMx coolers

(Contact us for more information)
Rotary Monobloc RMs1 Cooler
The best SWaP cooling solution

OVERVIEW
Our RMs1 is the cooler for SWaP applications were high efficiency and silent operation at cooler level but also at system level are key. It has been designed as a reliable solution providing maximum operational benefits for compact camera systems. Thanks to its efficiency and cooling capacity, the RMs1 can be used with a wide range of detectors and applications.

FEATURES AND BENEFITS
> Compact, high performance and silent cooler, for compact solutions
> Designed for low power detectors operating above 90K
> One cooler suitable for different detectors and numerous applications

APPLICATION
Especially suitable for hand held thermal imager applications

TECHNICAL DATA
Typical performance @ 20°C

Cooling Power: 1000 mW @ 150 K
Weight: 150 gr cooler
Standard Input Voltage: 12 Vdc
Steady State Input Power: 1.0 Wac @ 150 mW, 150 K
Cool Down Time: < 2 min @ dewar 120 J, 150 K
MTTF: > 15,000 hours
Max. Dimensions: 72 x 42 x 42 mm
Cold Finger Ø: ¼” IDCA Common interface
Operating Temperature: - 40°C to + 70°C
Acoustic noise: 40 dBA
Rotary Monobloc RM2 Cooler
High reliability rotary cooler

OVERVIEW
Our best seller cryocooler combining compactness and efficiency along with very low acoustics and vibration levels. The RM2 cooler is suitable for different types of applications and can cover a wide range of detector temperatures. This cooler has been continuously improved over the years, thus increasing its overall performance and ensuring that this cooler meets the latest high reliability requirements.

FEATURES AND BENEFITS
> Low consumption in regulation
> Highly reliable cooler definition
> Compact, low weight design
> Very low noise and vibration levels: qualified for Gimbal applications

TECHNICAL DATA
Typical performance @ 20°C

<table>
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<tr>
<th>Specification</th>
<th>Value</th>
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<tr>
<td>Cooling Power</td>
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<tr>
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</tr>
<tr>
<td>Acoustic noise</td>
<td>&lt; 38 dBA</td>
</tr>
</tbody>
</table>

APPLICATION
Suitable for compact camera cores, handled cameras and UAV applications.
**OVERVIEW**

RM3 is a high-performance rotary cooler for 8 mm IDCA dewars. The RM3 has embedded digital drive electronics enabling simplifying integration, and thus provides a compact and lightweight cooling solution for various applications. The RM3 can be delivered in 4 variants depending on your requirements. The drive voltage can be either 12 V or 24 V and the stator can be either smooth or finned depending on your heatsinking options.

**FEATURES AND BENEFITS**

- Compact & lightweight
- Embedded drive electronics
- Quick factory tuning & mode setting (temperature set point, standby, etc.)
- Easy stator subassembly for easier maintenance

**APPLICATION**

Suitable for vehicle-mounted cameras, surveillance IR-camera systems, and applications requiring compact coolers

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**TECHNICAL DATA**

*Typical performance @ 20°C*

- Cooling Power: 600 mW @ 77 K
- Weight: 450 gr
- Standard Input Voltage: 12-28 Vdc // 9-12 Vdc
- Steady State Input Power: 4 Wac @ 180 mW, 77 K
- Cool Down Time: < 4:30 min @ dewar 356 J, 77 K
- MTTF: > 24,000 hours in 24/7 application
- Max. Dimensions: 117 x 71 x 56 mm
- Cold Finger Ø: 8 mm IDCA
- Operating Temperature: -46°C to +85°C
- Acoustic Noise: < 45 dBA
OVERVIEW
RM4 is used where cooling power is required to ensure very short cool down times or when the detector needs to be cooled to sub 77 K temperatures. The RM4 is compatible with demanding applications exposed to severe conditions. This cooler can also be used to cool down various semiconductor and superconductive components to around or below liquid Nitrogen temperatures.

FEATURES AND BENEFITS
> Designed to operate in severe environmental conditions
> High cooling power enabling below 77 K detector temperatures or very short cool down time

APPLICATION
Particularly suitable for vehicle-mounted applications

TECHNICAL DATA
Typical performance @ 20°C

- Cooling Power: 850 mW @ 77 K
- Weight: 420 gr
- Standard Input Voltage: 30 Vdc
- Steady State Input Power: 3.4 Wac @ 130 mW, 77 K
- Cool Down Time: < 3 min @ dewar 250 J, 77 K
- MTTF: > 24,000 hours
- Max. Dimensions: 98.5 x 71 x 43.5 mm
- Cold Finger Ø: ¼” IDCA
- Operating Temperature: -46°C to +85°C
- Acoustic Noise: < 43 dBA
OVERVIEW
Portable filling bench with a touch-sensitive user interface screen, the VM0008 has been designed to enable an optimal purge and fill procedure for all RMx coolers. It can also be used to purge and fill other coolers with grade 5 helium gas.

FEATURES AND BENEFITS
> VM0008 needs to be connected via the supplied high pressure flexible hose to a high pressure grade 5 helium bottle
> The VM0008 can also be connected to an external primary vacuum pump to facilitate more stringent purge and fill procedures

Option: RMx filling tools available
(Contact us for more information)

TECHNICAL DATA
Dimension: 570 x 365 x 475 mm
Weight: < 40 kg
Maximum inlet pressure: 250 bar
Maximum outlet pressure: 40 bar
Supply voltage: 200-230 VAC / 50-60 Hz
Noise (measured at 1 m): 70 dB
Drive Electronics
Efficient and unique solution for all RMx coolers

OVERVIEW
DE0009, RMs1 solution
NEO, SWAP RMx driver

FEATURES AND BENEFITS
- Full digital solution
- Very good accuracy
- Size: 53 x 35 mm
- Small electronic driver: 35 x 30 mm
- Very efficient: at least 0.4 W saved compared to existing driver
- Setting of digital solution through USB interface
- Adjustable safety functions
- Hours counter
- Failure reporting

Test Bench & Monitoring Kit
Tests benches monitoring for all RMx coolers

OVERVIEW
The test bench can controls up to 8 coolers of the same type simultaneously.
It realizes measurements on 8 calibrated measurements channels (RM1, RM2, RM3, RM4)

The monitoring kit allows to monitor and to check the good behavior of Thales RMx coolers

FEATURES AND BENEFITS
- Definition of specific test sequences
- Controls coolers in temperature or speed regulation mode
- Real time recording of coolers’ performances (consumption, cold temperature, speed, etc.)
- Can interface with climatic chamber

- Applicable coolers: RM2, RM3, RM4
- Main functions:
  - Supply voltage (12 Vdc to 35 Vdc) depending on connected cooler
  - USB communication interface
  - Cooler control via switches on monitoring box (remote on/off)
  - Integrated diode current source enabling temperature measurement

8 Channel test bench not calibrated, for laboratory use only
Services Offer
Services, support and close relationship

CUSTOMER TRAINING
> Training sessions
> Precautions regarding integration process

TECHNICAL SUPPORT
> Technical advice and availability
> 8D approach

DEWAR INTEGRATION
> Integration protocol
> Burn in sequence
> Cooler replacement

MEASUREMENT, VALIDATION & CHARACTERIZATION
> Cryogenics performances
> Induced vibration and Acoustics
> Conditioning & filling bench
> Hydraulic test bench
> Electromechanical shaker

TECHNICAL ADVICE
> Availability & advice
> Cooler choice and camera integration

LIFETIME ESTIMATION & CALCULATION
> Data from lifetime testing
> Reliability statistical approach
> Lifetime estimation according to mission profile

PRODUCT RETURN - RMA
> Failure typology analysis
> Product maturity & test process robustness

Endurance room realizing accelerated testing on 100 coolers simultaneously