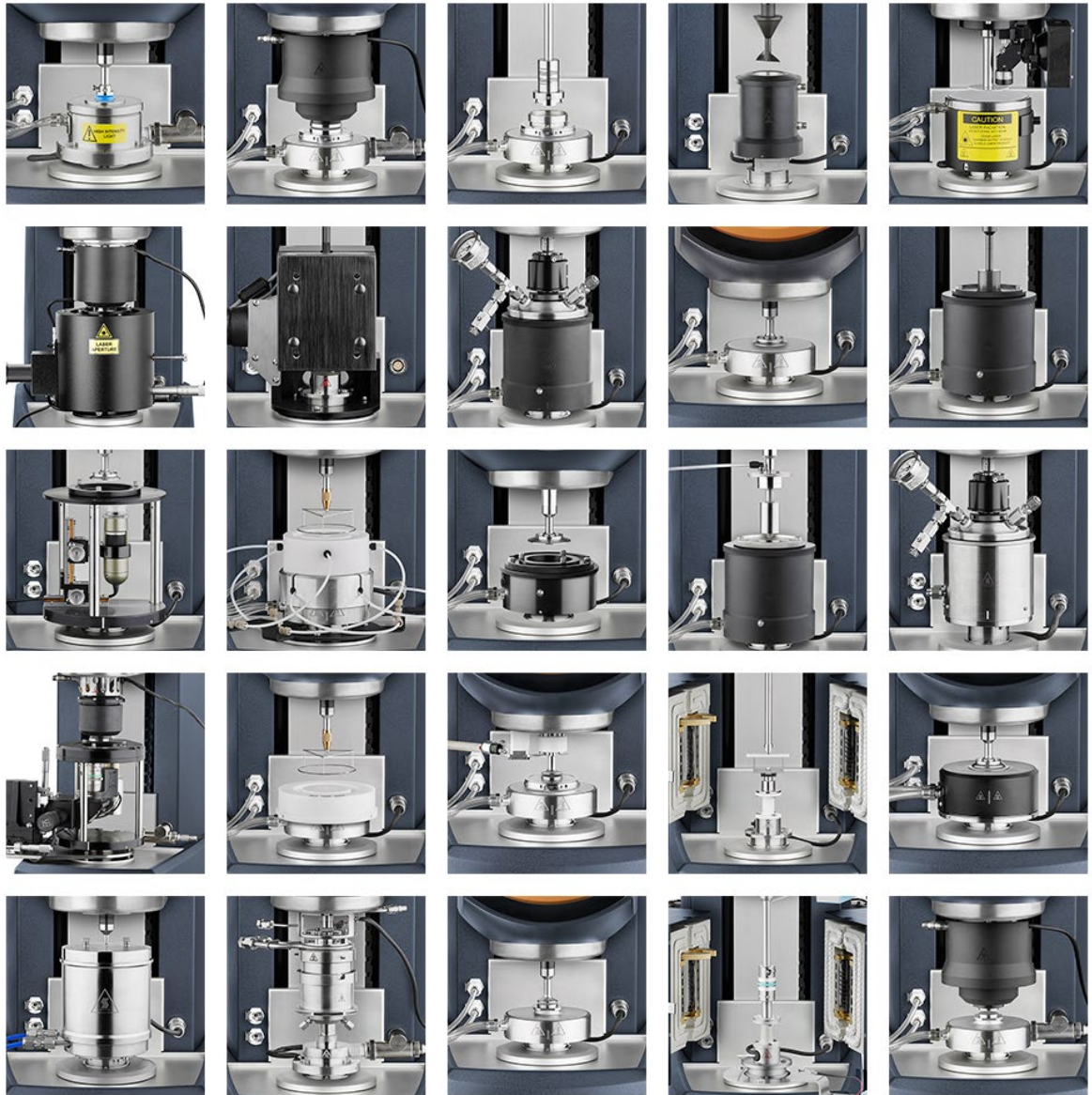


# HR/DHR Accessories Requirements



## Site Preparation Guide for HR 10/20/30 Series and DHR 1/2/3 Series

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Circulator



Power



Cooling



Gas



LN<sub>2</sub>



Fluid



Light



Hardware



Software



Temp











Lab



Customer

# Smart Swap™ Requirements

Accessory	Smart Swap™ Requirements	
<p>Dielectric Accessory</p> 	 	<ul style="list-style-type: none"> <li>• PC with USB port</li> <li>• Customer-supplied <b>Keysight E40980A LCR meter</b></li> </ul> 
<p>Electrically Heated Cylinder (EHC)</p> 		<ul style="list-style-type: none"> <li>• Optional ambient cooling with clean, dry, oil-free compressed air: 206–690 kPa gauge (30–100 psig)</li> <li>• See <a href="#">page 18</a> for gas flow volume</li> </ul>
<p>ETC Viewer</p> 		<ul style="list-style-type: none"> <li>• Clean, dry, oil-free compressed air</li> <li>• 206–690 kPa gauge (30–100 psig)</li> <li>• See <a href="#">page 18</a> for gas flow volume</li> </ul>



Circulator



Power



Cooling



Gas



LN<sub>2</sub>



Fluid



Light



Hardware



Software



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Customer

# Smart Swap™ Requirements

## Accessory

Immobilization  
Cell



Modular  
Microscope  
Accessory  
(MMA)



Magneto-  
Rheology  
Accessory



## Smart Swap™ Requirements



- TA Instruments air cooled **Heat Exchanger** (PN 403209.901) or **TCube Edge Model 5A** (PN 404500.901) with Koolance required.
- Vacuum pump and pressure gauge with connection for 6 mm tubing



PC with spare network card



- Fluid circulator required:
  - For **open loop** temperature control the **TCube Edge Model 5A** (PN 404500.901) is recommended. See [page 17](#) for TCube requirements.
  - For **manual** temperature control, the **Julabo DD-600F** (PN 500020.901) is recommended. See [page 14](#) for Julabo requirements.
- Always consult circulator manual for correct combination of fluid and temperature range



Circulator

Power

Cooling

Gas

LN<sub>2</sub>

Fluid

Light

Hardware

Software








Temp

Lab

Customer



# Smart Swap™ Requirements

Accessory	Smart Swap™ Requirements	
Pressure Cell 		<ul style="list-style-type: none"> <li>Compressed inert gas tank up to 13.8 MPa gauge (2000 psig) with an appropriate regulator</li> <li>High pressure hose and regulator are not supplied with the Pressure Cell option. Regulators and hose are available from your local high-pressure gas bottle supplier</li> </ul>
Starch Pasting Cell 	 	<ul style="list-style-type: none"> <li>Clean, dry, oil-free compressed air is required to purge cooling water from the cell: 206–690 kPa (30–100 psig)</li> <li>See <a href="#">page 18</a> for gas flow volume</li> <li><b>TCube Edge Model 5A</b> (PN 404500.901) or <b>Julabo DD-600F</b> (PN 500020.901) ONLY. Required fluid: Koolance</li> </ul>
SALS 		<ul style="list-style-type: none"> <li>TA Instruments air cooled <b>Heat Exchanger</b> (PN 403209.901) with Koolance at 0.5 L/min required.</li> <li>Circulation fluid temperature should not be below ambient</li> </ul>



Circulator



Power



Cooling



Gas



LN<sub>2</sub>



Fluid



Light



Hardware



Software



Temp










Lab



Customer

# Smart Swap™ Requirements

Accessory	Smart Swap™ Requirements	
UV Light Guide 	 	<ul style="list-style-type: none"> <li>Customer-supplied light source must be an <b><u>EXFO Omnicure Series 2000</u></b></li> </ul> 
UVLED 		<ul style="list-style-type: none"> <li>As per the Peltier Plate (Refer to the HR/DHR Site Preparation Guide for requirements)</li> <li>Circulation fluid should not be below ambient</li> <li>TA Instruments air cooled <b><u>Heat Exchanger</u></b> (PN 403209.901) is recommended; Koolance required with use of the Heat Exchanger.</li> </ul> 



Circulator



Power



Cooling



Gas



LN<sub>2</sub>



Fluid



Light



Hardware



Software



Temp




Lab



Customer

# Smart Swap™ Temperature Systems

The cooling rate and minimum temperature will depend on the source of cooling.

Accessory	Smart Swap Requirements	
<p>EHP</p> 	 	<ul style="list-style-type: none"> <li>Purge flow of 5 L/min (305 in<sup>3</sup>/min) inert gas</li> <li>Motor cooling gas flow of 10 L/min for temperatures above 250°C. Air pressure of 50–100 psig.</li> <li>Optional controlled cooling with <u>GCA</u>. Refer to the DHR Accessories Requirement guide for GCA requirements.</li> <li>Crash cooling pressure of 50–100 psig and a flow of ~2.5 scfm (70 L/min)</li> </ul> 
<p>ETC</p> 		<p>Purge gas flow rate should be 10 L/min (610 in<sup>3</sup>/min) at 206–690 kPa (30–100 psig)</p>
<p>Peltier Plates &amp; Peltier CC</p> 	 	<p>Includes Advanced Peltier Plate, High-Temperature Advanced Peltier Plate, Dual Stage Peltier Plate, Upper Peltier Plate, Lower Peltier Plate</p> <ul style="list-style-type: none"> <li>Always consult the Getting Started Guide for correct combination of fluid and temperature range</li> <li>UPP: If desired, for inert samples, use of nitrogen purge gas at 1 L/min is recommended</li> </ul>



Circulator



Power



Cooling



Gas



LN<sub>2</sub>



Fluid



Light



Hardware



Software



Temp



Lab



Customer

# Smart Swap™ Temperature Systems

## Accessory

Upper Heated Plate  
(UHP)



## Smart Swap Requirements



### Option 1: Standard Cooling Accessory

- TA-supplied Air-Cooled Circulator (PN 403209.901)

- Fluid: Koolance (2 bottles)



### Option 2: Low Temperature Cooling Accessory–TCube Edge

- TA-supplied TCube Edge Model 5A (PN 404500.901)

- Fluid: Koolance (supplied with the TCube)



Circulator



Power



Cooling



Gas



LN<sub>2</sub>



Fluid



Light



Hardware



Software



Temp







Lab

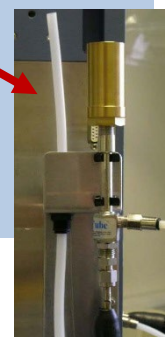


Customer



# Smart Swap™ Temperature Systems

Accessory	Smart Swap Requirements	
UHP, continued	    	<p><b><u>Option 3: Low Temperature Cooling Accessory–Customer-supplied</u></b></p> <ul style="list-style-type: none"> <li>Customer-supplied refrigerated and heating circulator and appropriate fluid (ie. silicone fluid)</li> <li> <b>DO NOT USE WATER AS CIRCULATION FLUID</b></li> <li>Supply: 5°C below the minimum required temperature at a minimum flow rate through the system of 0.5 L/min (12.2 in<sup>3</sup>/min)</li> </ul> <p><b><u>Option 4: Low Temperature Cooling Accessory–Vortex</u></b></p> <ul style="list-style-type: none"> <li>TA-supplied <b><u>Vortex Cooler</u></b> (PN 545809.901)</li> <li>Air: Clean, dry, oil-free, compressed air 200L/min at 552–690 kPa gauge (80–100 psig)</li> <li>Dew point: -30°C or better</li> </ul>



Circulator



Power



Cooling



Gas



LN<sub>2</sub>



Fluid



Light



Hardware



Software



Temp



Lab



Customer

# Air Chiller System (ACS)



## ACS-2 MEASUREMENTS



Height: 88.5 cm (35 in)

Width: 37 cm (14.5 in) WITHOUT Chiller Panel

Width: 56 cm (22 in) WITH Chiller Panel

Depth: 56 cm (22 in)

Weight: 96 kg (211 lbs) WITHOUT Chiller Panel

Weight: 112 kg (247 lbs) WITH Chiller Panel



## ACS-3 MEASUREMENTS

Height: 112 cm (44 in)

Width: 37 cm (14.5 in) WITHOUT Chiller Panel

Width: 56 cm (22 in) WITH Chiller Panel

Depth: 56 cm (22 in)

Weight: 121 kg (267 lbs) WITHOUT Chiller Panel

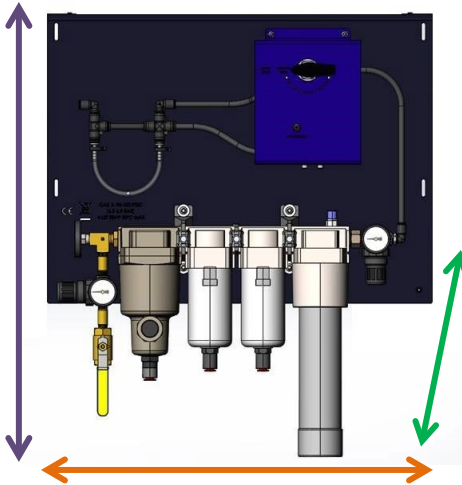
Weight: 128 kg (282 lbs) WITH Chiller Panel



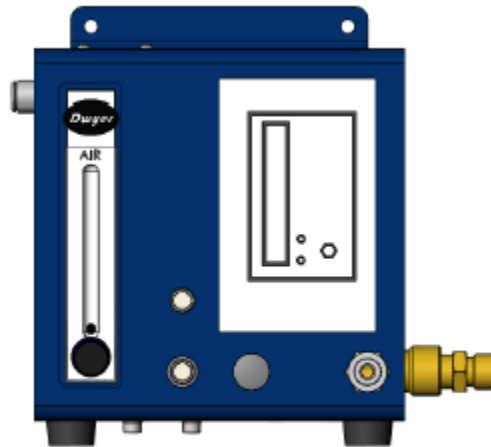
# ACS Chiller Panel



## CHILLER PANEL



**HR/DHR ETC and DMA 850 Combined  
Chiller Panel  
P/N 405400.901**



**ETC Lo-Temp Manifold for ACS  
P/N 545056.901**

Height: 64 cm (25 in)

Width: 56 cm (22 in)

Depth: 38.1 cm (15 in)

Weight: 7.25 (16 lbs)

# ACS/Chiller Panel Utility Requirements



## AIR CHILLER SYSTEM REQUIREMENTS

### Requirements



- 50 Hz: 207–252 VAC (refer to the serial number plate on the rear of the unit. The ACS is line frequency specific.)
- 60 Hz: 216–252 VAC (refer to the serial number plate on the rear of the unit. The ACS is line frequency specific.)
- 8A, 9A, 9.1A, or 11A (refer to the serial number plate on the rear of the unit)
- US sites require an L6-20 single-phase outlet



NEMA L6-20 plug



- Gas:
  - Air or nitrogen
  - Pressure: 6.9 bar (100 psig)
  - Flow rate: 200 SLPM
  - Temperature: 20–30°C
  - Dew point: -40°C (-40°F) **NOTE:** Dew point is specified at operating pressure. Supplying dryer air at a lower dew point will extend continuous operation.



- Lab Environment (must be below 25°C):
  - 21°C–24°C = Ideal
- Leave 20 cm (8 in) of space in the front and back of the ACS for ventilation



Circulator



Power



Cooling



Gas



LN<sub>2</sub>



Fluid



Light



Hardware



Software



Temp



Lab



Customer

# ETC Low Temp Cooling Accessory



## ETC REQUIREMENTS



### Requirements



Customer-supplied bulk low-pressure liquid nitrogen tank (50–250 liters) with a 23 psig relief valve.



Circulator



Power



Cooling



Gas



LN<sub>2</sub>



Fluid



Light



Hardware



Software



Temp



Lab



Customer



# Julabo Circulator

Used with the Magneto Rheology Accessory



## JULABO DD-600F MEASUREMENTS



Height: 64 cm (25 in)

Width: 3.5 cm (12 in)

Depth: 43 cm (17 in)

Weight: 34 kg (74 lbs)

## Requirements



- 115 VAC at 60 Hz (14 A)
- 230 VAC at 50 Hz (12 A)
- 15 A with receptacle and plug



- See table below

Bath Fluid	Temperature Range	Accessory Used
Koolance	-5 to 65°C	Magneto-Rheology Accessory
	-----	Starch Pasting Cell
Julabo H10	80°C to 170°C	



For the Extended Temperature Module, the temperature range -10°C–170°C must use the Julabo H10 fluid to reach 170°C.



Circulator



Power



Cooling



Gas



LN<sub>2</sub>



Fluid



Light



Hardware



Software



Temp



Lab



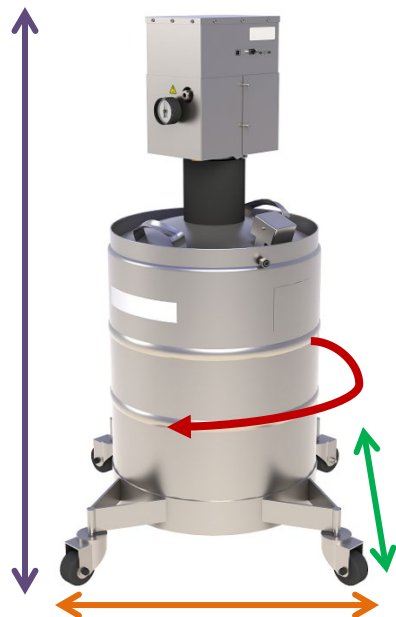
Customer

# Gas Cooling Accessory (GCA) V3

Used with Electrically Heated Plates



## GCA V3 MEASUREMENTS



Dewar diameter: 46 cm (18 in)

Height: 112 cm (44 in)

Width: 46 cm (18 in)

Depth: 79 cm (31 in)

Weight EMPTY: 47 kg (104 lbs)

Weight FULL: 88 kg (194 lbs)

Transfer line: 1.8 m (6 ft)



## GCA V3 REQUIREMENTS

### Requirements



- 100–240 VAC at 0.9 kVa, 47–63 Hz
- Approved for operation on a 20 A branch circuit with protective conductor (ground)



- Bulk low-pressure liquid nitrogen tank to refill the 50 L GCA dewar
- Pressure: 90 kPa gauge (13 psig) relief valve on tank  
345 kPa gauge (50 psig) on fill line
- Use low pressure supply tank only. Recommended filling pressure is 140 to 170 kPa gauge (20 to 25 psig)



Circulator



Power



Cooling



Gas



LN<sub>2</sub>



Fluid



Light



Hardware



Software



Temp



Lab



Customer

# Relative Humidity (RH) Accessory



## HUMIDITY GENERATOR MEASUREMENTS



Height: 36.8 cm (14.5 in)

Width: 30.5 cm (12 in)

Depth: 50.8 cm (20 in)

Weight EMPTY: 27 kg (60 lbs)

### Requirements



- 90–260 VAC, 45–65 Hz



- Dry nitrogen must be available to the dryer supplied with the Relative Humidity option
- Pressure: 207–827 kPa (30–120 psig)



- Distilled water



Circulator



Power



Cooling



Gas



LN<sub>2</sub>



Fluid



Light



Hardware



Software



Temp



Lab



Customer

# TCube Edge Model 5A Circulator

Used with Magneto Rheology Accessory



## TCUBE EDGE CIRCULATOR MEASUREMENTS



Height: 28 cm (11 in)

Width: 33 cm (13 in)

Depth: 28 cm (11 in)

Weight: 11.3 kg (25 lbs)

## Requirements



- 100–240 VAC at 50/60 Hz (3.5 A)
- Neutral to ground < 1 volt
- 8.5 A at 100 VAC, 3.5 A at 240 VAC



Koolance (supplied with TCube)



Circulator



Power



Cooling



Gas



LN<sub>2</sub>



Fluid



Light



Hardware



Software



Temp



Lab



Customer

# Gas Flow Requirements



## GAS FLOW REQUIREMENTS FOR HR/DHR AND ACCESSORY COMBINED

HR/DHR accessory combined (instrument and accessory) compressed air flow rates:

Accessory	Flow Rate
Air Cooling System (ACS)	200 slpm
Dielectric Accessory	2 L/min
Electrically Heated Cylinder (EHC)	52 L/min
Electrically Heated Plate	80 L/min with crash cooling and motor cooling
Environmental Test Chamber (ETC) Viewer	17 L/min
Gas Cooling Accessory (GCA)	2 L/min
Immobilization Cell	2 L/min
Magneto Rheology	2 L/min
Modular Microscope Accessory (MMA)	2 L/min
Peltier (all types)	2 L/min
Pressure Cell	2 L/min
Relative Humidity (RH) Accessory	3 L/min nitrogen gas
Single Angle Light Scattering (SALS)	2 L/min
Starch Pasting Cell	3 L/min
Submersion Cell	2 L/min
UV LED	2 L/min
UV Light Guide	2 L/min



# Site Preparation Checklist



## Discovery Hybrid Rheometer (HR 10/20/30 & DHR 1/2/3) Accessories

Accessory (check all that apply):

- ☐ ACS and ETC Chiller Panel
- ☐ Dielectric Accessory
- ☐ EHC
- ☐ EHP
- ☐ ETC Viewer
- ☐ GCA V3
- ☐ Immobilization Cell
- ☐ Julabo DD-600F Circulator
- ☐ MMA
- ☐ Magneto Rheology Accessory
- ☐ Pressure Cell

- ☐ Peltier Plate
  - ☐ Advanced Peltier Plate
  - ☐ High-Temperature Advanced Peltier Plate
  - ☐ Dual Stage Peltier Plate
  - ☐ Upper Peltier Plate
  - ☐ Lower Peltier Plate
- ☐ RH Accessory
- ☐ Starch Pasting Cell
- ☐ SALS
- ☐ TCube Circulator
- ☐ UV Light Guide
- ☐ UVLED

I hereby acknowledge that all utility requirements for the accessories checked above have been met per this document and that they will be ready at the agreed time of installation.

**If all utility requirements are not met at the agreed time of installation, additional charges may be incurred for a return Service trip.**

\_\_\_\_\_  
Customer DD / MM / YYYY

\_\_\_\_\_  
Company City State Country

Please send a signed copy of the completed checklist to your local Service representative.

# TA Instruments Offices

For information on our latest products, contact information, and more, see our website at:  
<http://www.tainstruments.com>.

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