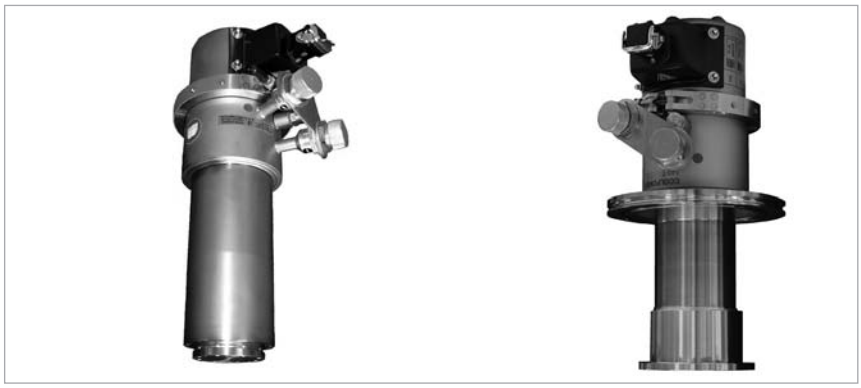
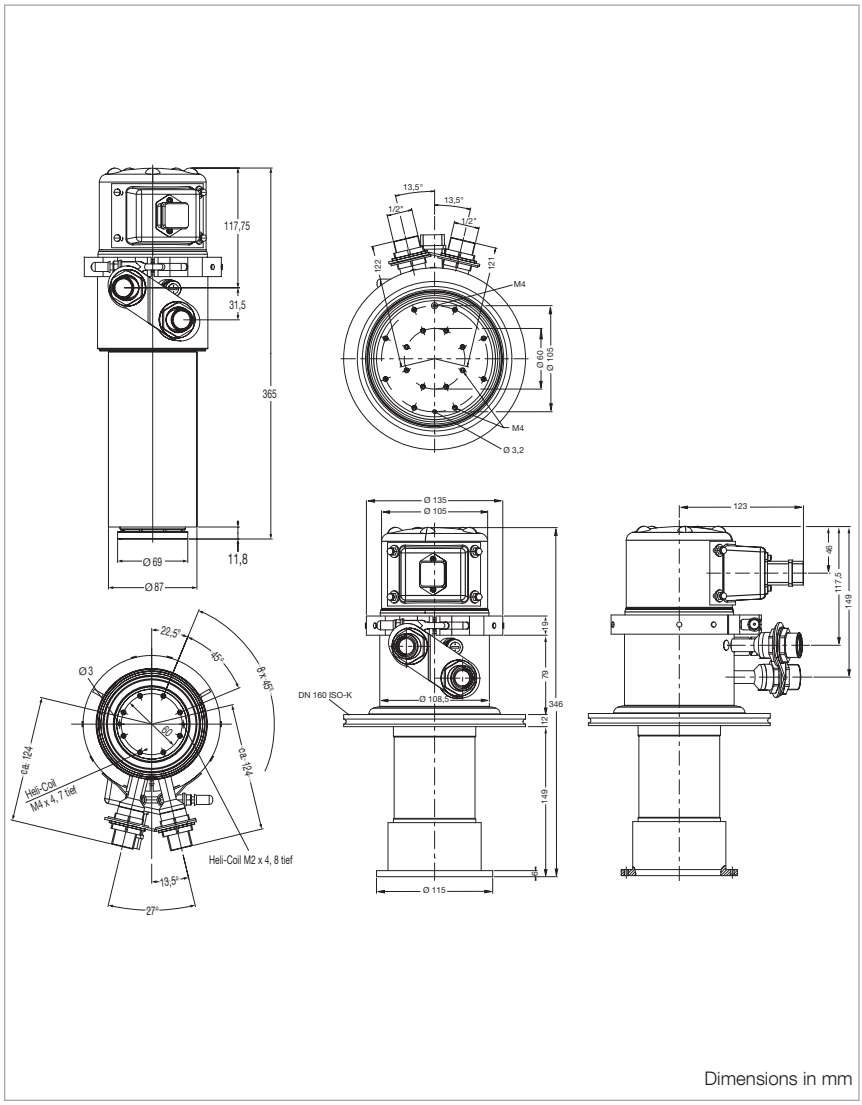
# Products Cryogenics

## Cold Heads, Pneumatically Driven
## Single-Stage Cold Heads
## COOLPOWER 50 and 140 T



Single-stage cold head's COOLPOWER 50 (left) and 140 T (right)




Dimensional drawing for the COOLPOWER 50 (left) and COOLPOWER 140 T (right)

### Advantages to the User

- For installation mostly in any orientation
- High refrigerating capacity
- No liquid refrigerants are required
- Very simple to operate
- Short cooldown time

### Typical Applications

- Cooling of samples, sensors and detectors
  - e. g. cooling of detectors in astronomy
- Cooling of HTS superconductors
- Cooling in magnetic equipment
- Cooling of surfaces for pumping of gases
- Cryogenic process gas cleaning
- Condensation, resublimation and freezing of gases

## Technical Data

| | | COOLPOWER 50 | COOLPOWER 140 T |
|---|---|---|---|
| Refrigeration capacity at 50/60 Hz [1] | | | |
| at 80 K, approx. | W | 50 | 140 |
| at 20 K, approx. | W | – | 20 |
| Lowest attainable temperature [1] | K | ≤ 26 | ≤ 15 |
| Cooldown time down | | | |
| to 20 K, approx. | min | – | 55 |
| to 80 K, approx. | min | 20 | – |
| Permissible ambient temperature | °C (°F) | +10 to +40 (+50 to +104) | +10 to +40 (+50 to +104) |
| He filling pressure at room temperature | barg | 16 | 16 |
| He connections | | | |
| Self-sealing screwed connections | | | |
| High pressure connection | | 1/2" [2] | 1/2" [2] |
| Low pressure connection | | 1/2" [2] | 1/2" [2] |
| Weight | kg (lbs) | 8 (17.7) | 12 (26.5) |

## Ordering Information

| | COOLPOWER 50 | | COOLPOWER 140 T | | |
|---|---|---|---|---|---|
| | Part No. | | Part No. | | |
| Cold head | | | | | |
| with DN 100 CF-R (rotatable) | **842050V0001** | – | – | – | – |
| with DN 160 CF-R (rotatable) | – | – | – | **842030V9004** | – |
| with DN 160 ISO-K | **842050V0002** | – | **842 030** | – | – |
| with weld-on pipe | – | **842050V0000** | – | – | **842030V0001** |
| Distance Flange - Cold stage mm | 149.5 | – | 148.5 | 111.4 | – |

### Accessories

| | | |
|---|---|---|
| Compressor unit (for operation of one cold head) | | |
| COOLPAK 2000, 230 V / 50 Hz | **840000V2000** | – |
| COOLPAK 2200, 208 V / 60 Hz | **840000V2200** | – |
| COOLPAK 6000 H, 400 V/50 Hz; 470 V / 60 Hz | – | **840000V6001** |
| COOLPAK 6200 H, 200 V/50 Hz; 200 V, 230 V / 60 Hz | – | **840000V6201** |
| Power supply cable | – | see Ordering Information for the compressor units COOLPAK |
| Set of flexlines | | |
| FL 4.5 (1/2", 1/2") (= 1 Set) | **892 87** | **892 87** |
| FL 9.0 (1/2", 1/2") (= 1 Set) | **892 88** | **892 88** |
| FL 18.0 HP (1/2") (= Single line high pressure) | **840 203** | **840 203** |
| FL 18.0 LP (1/2") (= Single line low pressure) | **840 204** | **840 204** |
| Connecting cable compressor – cold head | | |
| Power cord 4.5 m (15.75 ft) | **E 400000323** | **E 400000323** |
| Power cord 18 m (59.06 ft) | **840002964V0018** | **840002964V0018** |
| Extension cord 4.5 m (15.75 ft) | **893 74** | **893 74** |

### Options

| | | |
|---|---|---|
| Temperature measurement | | |
| Silicon diode | **844000V5** | **844000V5** |
| Low temperature measuring instrument | **844 110** | **844 110** |
| Measuring cable | see Ordering Information low temperature measuring instrument | see Ordering Information low temperature measuring instrument |

[1] The refrigerating capacities and temperatures stated apply only to vertical operation with the cold end at the bottom.

[2] Series 5400 from Aeroquip, coupling size "-8" (#8), or compatible types.

# Dual-Stage Cold Heads COOLPOWER 7/25 and 5/100

Dual-stage cold head COOLPOWER 7/25

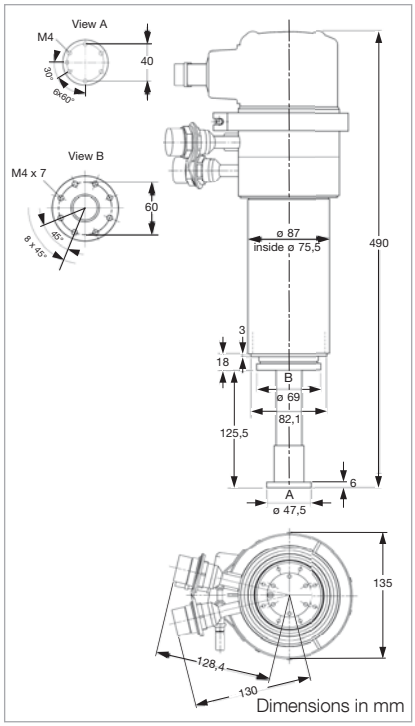
Dual-stage cold heads COOLPOWER 5/100

## Advantages to the User

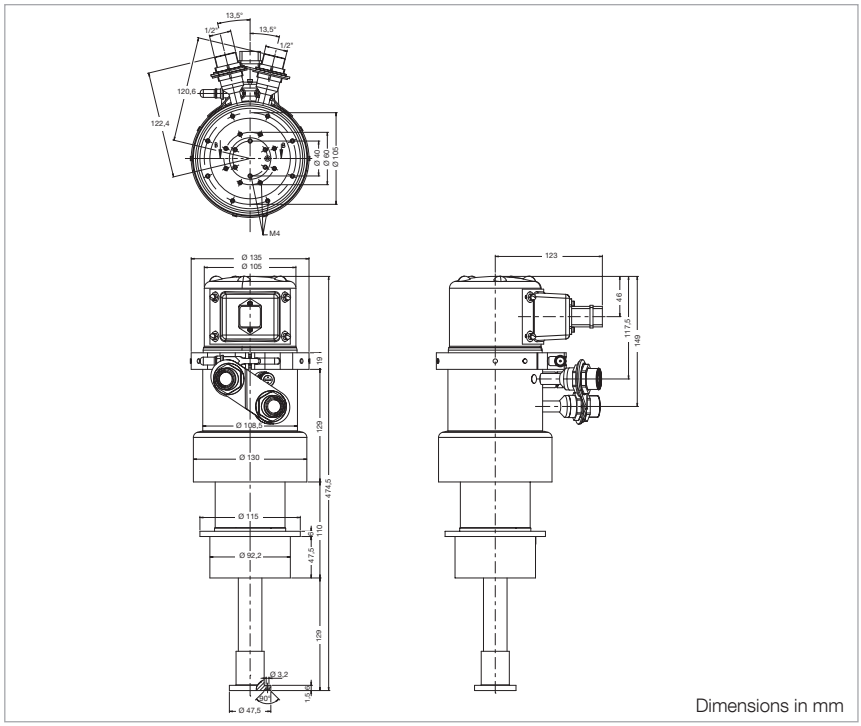
- For installation in any orientation
- High refrigerating capacity
- No liquid refrigerants are required
- Very simple to operate
- Short cooldown time

## Typical Applications

- Cooling of samples, sensors and detectors
  - Cooling of detectors in astronomy
  - Cooling of samples for spectroscopy
  - Cooling of samples for applications in medicine and R&D
- Cooling of HTS superconductors
- Cooling in magnetic equipment
- Cooling of surfaces for pumping of gases
- Cryogenic process gas cleaning
- Condensation, resublimation and freezing of gases




Dimensional drawing for the COOLPOWER 7/25




Dimensional drawing for the COOLPOWER 5/10

## Technical Data

| | | COOLPOWER 7/25 | COOLPOWER 5/100 |
|---|---|---|---|
| Refrigeration capacity at 50/60 Hz [1] | | | |
| 1st stage at 80 K, approx. | W | 25 | 100 |
| 2nd stage at 20 K, approx. | W | 7 | 6 |
| Lowest attainable temperature [1] | | | |
| 1st stage, approx. | K | ≤ 35 | ≤ 35 |
| 2nd stage, approx. | K | ≤ 10 | ≤ 10 |
| Cooldown time of the | | | |
| 2nd stage to 20 K, approx. | min | 35 | 25 |
| Permissible ambient temperature | °C (°F) | +5 to +40 (+41 to +104) | +5 to +40 (+41 to +104) |
| He filling pressure at room temperature | barg | 16 | 16 |
| He connections | | | |
| Self-sealing screwed connections | | | |
| High pressure connection | | 1/2" (#8 [2]) | 1/2" (#8 [2]) |
| Low pressure connection | | 1/2" (#8) | 1/2" (#8) |
| Weight, approx. | kg (lbs) | 10 (22,1) | 10,5 (23,2) |

## Ordering Information

| | COOLPOWER 7/25 Part No. | COOLPOWER 5/100 Part No. |
|---|---|---|
| Cold head | | |
| COOLPOWER 7/25 | | |
| - with weld-on pipe | **842 040** | – |
| - with Flange DN 160 ISO-K (Space Flange – 2. Stage = 250 mm) | **842 040V0002** | – |
| - with Flange DN 100 CF-R (rotatable) (Space Flange – 2. Stage = 275 mm) | **842 040V0005** | – |
| COOLPOWER 5/100 | | |
| - with weld-on pipe | – | **893 05** |
| - with Flange DN 160 ISO-K (Space Flange – 2. Stage = 277,5 mm) | – | **893 04** |
| - with Flange DN 100 CF-R (rotatable) (Space Flange – 2. Stage = 265,5 mm) | – | **842021V0001** |
| **Accessories** | | |
| Compressor unit (for operation of one cold head) | | |
| COOLPAK 2000, 230 V / 50 Hz | **840000V2000** | – |
| COOLPAK 2200, 208 V / 60 Hz | **840000V2200** | – |
| COOLPAK 6000 H 400 V/50 Hz; 470 V / 60 Hz | – | **840000V6001** |
| COOLPAK 6200 H 200 V/50 Hz; 200 V, 230 V / 60 Hz | – | **840000V6201** |
| Power supply cable | – | see Ordering Information for the compressor units COOLPAK |
| Set of flexlines | | |
| FL 4.5 (1/2", 1/2") (= 1 Set) | **892 87** | **892 87** |
| FL 9.0 (1/2", 1/2") (= 1 Set) | **892 88** | **892 88** |
| FL 18.0 HP (1/2") (= Single line high pressure) | **840 203** | **840 203** |
| FL 18.0 LP (1/2") (= Single line low pressure) | **840 204** | **840 204** |
| Connecting cable compressor – cold head | | |
| Power cord 4.5 m (15.75 ft) | **E 400000323** | **E 400000323** |
| Power cord 18 m (59.06 ft) | **840002964V0018** | **840002964V0018** |
| Extension cord 4.5 m (15.75 ft) | **893 74** | **893 74** |
| **Options** | | |
| Temperature measurement / control | | |
| Silicon diode | **844000V5** | **844000V5** |
| Low temperature measuring instrument | **844 110** | **844 110** |
| Measuring cable | see Ordering Information low temperature measuring instrument | see Ordering Information low temperature measuring instrument |

[1] The refrigerating capacities and temperatures stated apply only to vertical operation with the cold end at the bottom.

[2] Series 5400 from Aeroquip, coupling size "-8" (#8), or compatible types.

# Cold Heads, Mechanically Driven
# Single-Stage Cold Head COOLPOWER 250 MD
# Dual-Stage Cold Head COOLPOWER 10 MD

Single-stage Cold Head COOLPOWER 250 MD

Dual-stage Cold Head COOLPOWER 10 MD

## Advantages to the User

- Excellent cooling performance
- up to 250 W at 80 K by press-button operation [1) 2)] (COOLPOWER 250 MD)
- 18 W at 20 K by press-button operation (COOLPOWER 10 MD)
- High reliability
- Design optimized for MTBF 100,000 h
- Long and maintenance-free operation
- Low vibration due to directly driven displacer
- No liquid refrigerants are required
- Very simple to operate
- Short cooldown time
- Easy operation
- Plug & Cool – as usual for all Leybold GM coolers
- Simple variation of motor speed via the COOLPAK MD compressor unit

COOLPOWER 250 MD – one of the strongest single-stage GM cooler available on the market:

- High cooling capacity of > 175 W at 80 K
- Cooling capacity up to 250 W at 80 K possible [1) 2)]

COOLPOWER 10 MD - the strongest 10 K GM cooler available on the market:

- High 2nd stage cooling capacity of > 18 W at 20 K
- High 1st stage cooling capacity of > 25 W at 40 K and 110 W at 80 K

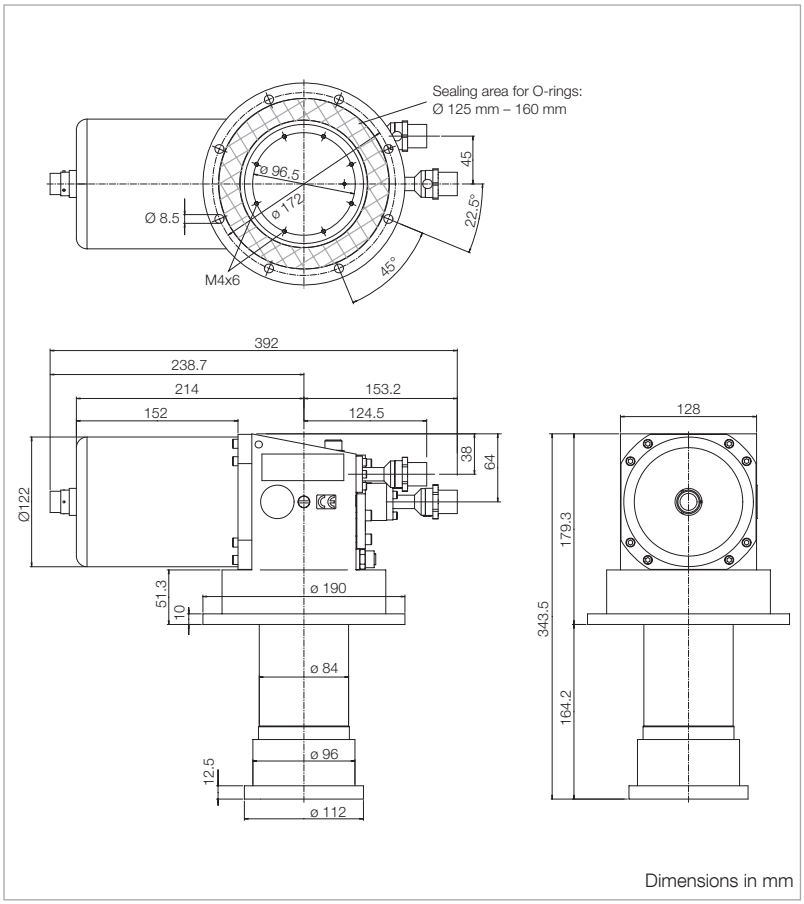
## Typical Applications

The COOLPOWER 250 MD is a mechanically driven single-stage Gifford McMahon (GM) cryo cooler and ideally suited for

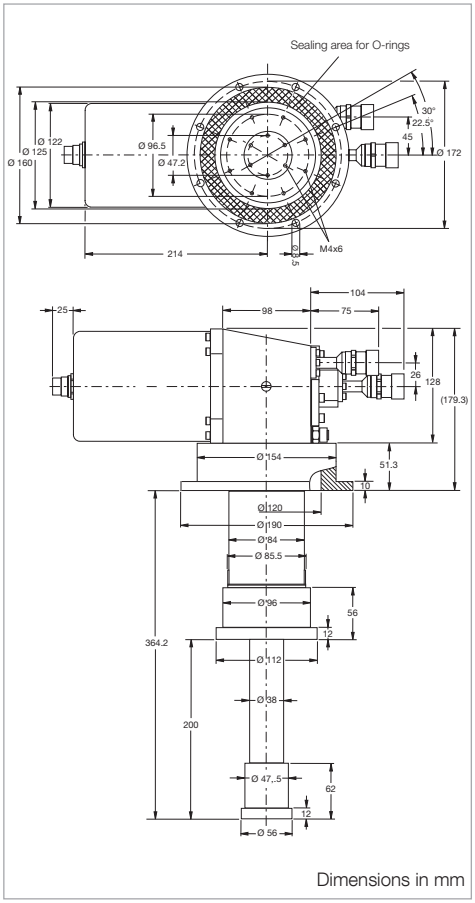
- Shield cooling of superconducting magnets in MRI
- Cooling of cryopanels in special Cryo pumps
- Cooling of larger samples and devices; especially
  - High temperature superconductor coils, wires and bulk materials
  - Recondensation of liquid refrigerants such as nitrogen and argon
  - Cleaning of gases
  - Samples for spectroscopic investigations in solid state and surface physics
  - Infrared and gamma detectors
- Calibration of sensors

The COOLPOWER 10 MD is a mechanically driven double-stage Gifford McMahon (GM) cryo cooler and ideally suited for

- Cooling of cryo probes in NMR spectrometers
- Shield cooling of superconducting magnets in MRI
- Cooling of cryopanels in special Cryo pumps and thus generation of high vacuum and ultra-high vacuum pressures
- Cooling of larger samples and devices; especially
  - High temperature superconductor coils, wires and bulk materials
  - Recondensation of liquid refrigerants such as $H_2$, Ne
  - Samples for spectroscopic investigations in solid state and surface physics
  - Infrared and gamma detectors
- Calibration of sensors




Dimensional drawing for the COOLPOWER 250 MD




Dimensional drawing for the COOLPOWER 10 MD

## Technical Data

| | | COOLPOWER 250 MD | COOLPOWER 10 MD |
|---|---|---|---|
| **Refrigeration capacity at 50/60 Hz** [1] | | | |
| 1st stage at 80 K, approx. | W | 175 [2] | 110 |
| 2st stage at 20 K, approx. | W | n/a | 18 |
| **Lowest attainable temperature** [1] | | | |
| 1st stage, approx. | K | ≤ 25 | ≤ 28 |
| 2nd stage, approx. | K | n/a | ≤ 8 |
| **Cooldown time of the** | | | |
| 1st stage to 80 K, approx. | min | 35 | n/a |
| 2nd stage to 20 K, approx. | min | n/a | 25 |
| **Permissible ambient temperature** | °C (°F) | +5 to +40 (+41 to +104) | |
| **He filling pressure at room temperature** | barg | $15_{-1}$ | |
| **He connections** | | | |
| Self-sealing screwed connections | | | |
| High pressure connection | | 1/2" (#8 [3]) | 1/2" (#8 [3]) |
| Low pressure connection | | 1/2" (#8) | 1/2" (#8) |
| **Weight, approx.** | kg (lbs) | 21 (46.3) | 22 (48.5) |

[1] The refrigerating capacities and temperatures stated apply to vertical operation with the cold end at the bottom and with cold head motor rotation speed 120 RPM, He system filling pressure 13 barg, compressor unit COOLPAK 6000 HMD / 6200 HMD and mit flexlines FL 9.0 HP – DN20 (840217) and FL 9.0 LP – DN32 (840218V0032).

[2] Higher refrigeration capacities of up to 250 W at 80 K (CP 250 MD) can be achieved with special parameters and accessories in consultation with our technical support team.

[3] Series 5400 "-8" from Aeroquip.

## Ordering Information

## COOLPOWER 250 MD

## COOLPOWER 10 MD

| | Part No. | Part No. |
|---|---|---|
| Cold head | | |
| COOLPOWER 250 MD | **842015V0001** | – |
| COOLPOWER 250 MD; DN 160 CF-R (rotatable) | **842015V0002** | – |
| COOLPOWER 10 MD | – | **842010** |
| COOLPOWER 10 MD; DN 160 CF-R (rotatable) | – | **842010V0002** |
| **Accessories** | | |
| Compressor unit | | |
| COOLPAK 6000 HMD, 400 V/3-ph. 50 Hz or 460 V/3-ph. 60 Hz ± 10% | **840000V6002** | **840000V6002** |
| COOLPAK 6200 HMD, 200 V/3-ph. 50 Hz or 200-230 V/3-ph. 60 Hz ± 10% | **840000V6202** | **840000V6202** |
| Power supply cable | see Ordering Information for the compressor unit COOLPAK | see Ordering Information for the compressor unit COOLPAK |
| Flexible pressure line (for operating mechanically driven cold heads) | | |
| 9 m (31.5 ft) (High-pressure) FL9 HP-DN 20 (8f/8f) | **840 217** | |
| 9 m (31.5 ft) (Low-pressure) FL9 LP-DN 32 (8f/8f) | **840218V0032** | |
| 20 m (75.0 ft) (High-pressure) FL20 HP-DN 20 (8f/8f) | **840230V2020** | |
| 20 m (75.0 ft) (Low-pressure) FL20 LP-DN 32 (8f/8f) | **840231V2032** | |
| Connection cable for the cold heads COOLPOWER 250 MD, 10 MD | | |
| 9,0 m | **842 110** | |
| 20,0 m | **842 112** | |

## Notes