

Ultra-Low Refrigerated Circulators



| F70-ME



| F81-ME

Applications

Freezing point determination, calibration at low temperatures, petroleum testing, ultra-low temperature control for cell cultivation

TopTech Series

for working temperatures from -90 °C to +100 °C with bath opening for internal/external applications

The Ultra-Low Refrigerated Circulators of the TopTech Series are equipped with a dual-stage cascade refrigeration system for continuous operation of internal and external temperature applications.

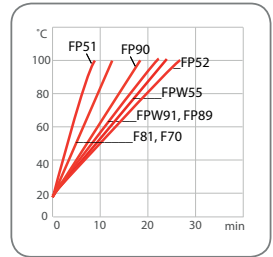
Models with ME circulator

- Heated bath cover plate to prevent condensation or ice build-up
- Pressure pump up to 0.45 bar, electronically adjustable in steps
- ACC Active Cooling Control across the entire temperature range
- Compact design

Note: FP models feature an energy-saving proportional cooling control.

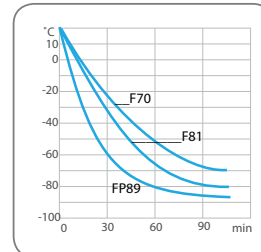
Heat-up time

Bath fluid: thermal



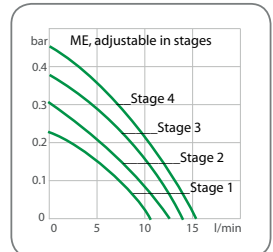
Cool-down time

Bath fluid: ethanol



Pump capacity

Bath fluid: water



| Order No. | Model | Working temperature range °C | Temp. stab. °C | Heat. cap. kW | Cooling capacity kW (Bath fluid: ethanol) | | | | | | Pump capacity | | Fill. vol. liters | Dimensions W x L x H cm |
|-----------|---------|------------------------------|----------------|---------------|---|------|------|------|------|--------|------------------|--------------|-------------------|-------------------------|
| | | | | | +20 | 0 | -20 | -40 | -60 | -80 °C | Flow rate / min. | Pressure bar | | |
| 9 162 670 | F70-ME | -70 ... +100 | ±0.02 | 1.3 | 0.34 | 0.22 | 0.17 | 0.13 | 0.07 | -- | 11-16 | 0.23-0.45 | 4.5 | 42 x 54 x 71 |
| 9 162 681 | F81-ME | -81 ... +100 | ±0.02 | 1.3 | 0.45 | 0.38 | 0.36 | 0.32 | 0.27 | 0.07 | 11-16 | 0.23-0.45 | 6.5 | 50 x 58 x 88 |
| 9 162 689 | FP89-ME | -90 ... +100 | ±0.02 | 1.3 | 1.0 | 0.92 | 0.88 | 0.75 | 0.58 | 0.20 | 11-16 | 0.23-0.45 | 8 | 55 x 60 x 90 |

Included in delivery: 2 barbed fittings each for tubing 8 mm and 12 mm ID (pump connections M16x1 male)



FP51-SL



FP89-HL



FPW90-SL

HighTech Series

for working temperatures from -91 °C to +200 °C with bath opening for internal/external applications

The Ultra-Low Refrigerated Circulators of the HighTech Series with HL or SL circulator feature powerful pressure and suction pumps. The instruments provide the entire variety of functions of the professional HighTech Series of circulators.

Models with HL, SL circulator

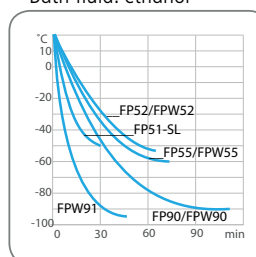
- Energy-saving proportional cooling control
- ACC Active Cooling Control across the entire temperature range
- Heated bath cover plate to prevent condensation or ice build-up
- Pressure and suction pump up to 1.1 bar pressure difference, electronically adjustable in steps
- SL models with a heating capacity of 3 kW for rapid heat-up

Bath opening

| Model | Bath opening / Bath depth W x L / D cm |
|------------------|---|
| F70 | 12 x 12 / 13 |
| FP51 | 18 x 12 / 20 |
| F81, FP89 | 13 x 15 / 16 |
| FP(W)52/55/90/91 | 28 x 23 / 22 |

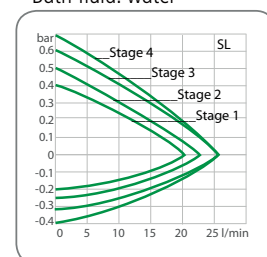
Cool-down time

Bath fluid: ethanol



Pump capacity

Bath fluid: water



| Order No. | Model | Working temperature range °C | Temp. stab. °C | Heat. cap. kW | Cooling capacity kW (Bath fluid: ethanol) | | | | | | Pump capacity | | | Fill. vol. liters | Dimensions W x L x H cm |
|---------------------|----------|------------------------------|----------------|---------------|---|------|------|------|------|--------|--------------------------------|---------|---------|-------------------|-------------------------|
| | | | | | +20 | 0 | -20 | -40 | -60 | -80 °C | Flow rate / Pressure / Suction | l/min. | bar | | |
| 9 352 751 | FP51-SL | -51 ... +200 | ±0.05 | 3 | 2.0 | 1.5 | 1.0 | 0.26 | -- | -- | 22-26 | 0.4-0.7 | 0.2-0.4 | 11 | 46 x 55 x 89 |
| 9 352 752 | FP52-SL | -60 ... +100 | ±0.05 | 3 | 3.0 | 2.8 | 1.6 | 0.65 | 0.1 | -- | 22-26 | 0.4-0.7 | 0.2-0.4 | 24 | 59 x 76 x 116 |
| 9 352 755 | FP55-SL | -60 ... +100 | ±0.05 | 3 | 5.2 | 4.1 | 2.2 | 0.70 | 0.13 | -- | 22-26 | 0.4-0.7 | 0.2-0.4 | 27 | 85 x 76 x 116 |
| 9 312 681 | F81-HL | -81 ... +100 | ±0.02 | 1.3 | 0.45 | 0.38 | 0.36 | 0.32 | 0.27 | 0.07 | 22-26 | 0.4-0.7 | 0.2-0.4 | 6.5 | 50 x 58 x 89 |
| 9 312 689 | FP89-HL | -90 ... +100 | ±0.02 | 1.3 | 1.0 | 0.92 | 0.88 | 0.75 | 0.58 | 0.20 | 22-26 | 0.4-0.7 | 0.2-0.4 | 8 | 55 x 60 x 92 |
| 9 352 790 | FP90-SL | -90 ... +100 | ±0.05 | 3 | 1.8 | 1.7 | 1.6 | 1.35 | 0.75 | 0.15 | 22-26 | 0.4-0.7 | 0.2-0.4 | 22 | 59 x 76 x 116 |
| water-cooled models | | | | | | | | | | | | | | | |
| 9 352 753 | FPW52-SL | -60 ... +100 | ±0.05 | 3 | 3.0 | 2.8 | 1.6 | 0.65 | 0.1 | -- | 22-26 | 0.4-0.7 | 0.2-0.4 | 24 | 59 x 76 x 116 |
| 9 352 756 | FPW55-SL | -60 ... +100 | ±0.05 | 3 | 5.5 | 4.1 | 2.2 | 1.0 | 0.13 | -- | 22-26 | 0.4-0.7 | 0.2-0.4 | 27 | 59 x 76 x 116 |
| 9 352 791 | FPW90-SL | -90 ... +100 | ±0.05 | 3 | 1.8 | 1.7 | 1.6 | 1.35 | 0.75 | 0.15 | 22-26 | 0.4-0.7 | 0.2-0.4 | 22 | 59 x 76 x 116 |
| 9 352 793 | FPW91-SL | -91 ... +100 | ±0.2 | 3 | 4.5 | 4.1 | 3.7 | 3.1 | 2.0 | 0.75 | 22-26 | 0.4-0.7 | 0.2-0.4 | 22 | 85 x 76 x 116 |

Included in delivery: 2 barbed fittings each for tubing 8 mm and 12 mm ID (pump connections M16x1 male)

Ultra-Low Refrigerated Circulators



| FP55-SL



| FP90-SL

HighTech Series

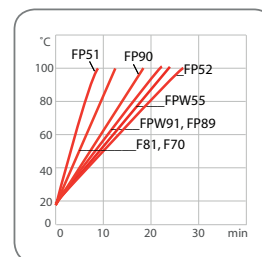
for working temperatures from -95 °C to +150 °C with filling port upgradeable with additional heating and pump capacity for external control only

Ultra-Low Refrigerated Circulators with SL circulator impress with their high heating, cooling and pump capacities for external temperature control applications.

- Cooling capacities up to 5.5 kW, heating capacity of 3 kW
- Insulated filling port (70 mm Ø)
- Heated bath cover plate to prevent condensation or ice build-up
- Upgradeable with booster heater and booster pump
- FPW Series provide cooling water connections
- Pressure and suction pump up to 1.1 bar pressure difference, electronically adjustable in steps

Note: FP models feature an energy-saving proportional cooling control.

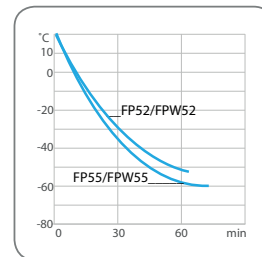
Heat-up time
Bath fluid: thermal



Filling port with insulated cover



Cool-down time
Bath fluid: ethanol



| Order No. | Model | Working temperature range °C | Temp. stab. °C | Heat. cap. kW | Cooling capacity kW (Bath fluid: ethanol) | | | | | Pump capacity | | | Fill. vol. liters | Dimensions W x L x H cm |
|---------------------|----------|------------------------------|----------------|---------------|---|-----|-----|------|--------|-----------------|----------------|---------------|-------------------|-------------------------|
| | | | | | +20 | 0 | -20 | -40 | -60 °C | Flow rate /min. | Pressure / bar | Suction / bar | | |
| 9 352 752N | FP52-SL | -60 ... +100 | ±0.05 | 3 | 3.0 | 2.8 | 1.6 | 0.65 | 0.1 | 22-26 | 0.4-0.7 | 0.2-0.4 | 24 | 59 x 76 x 116 |
| 9 352 755N | FP55-SL | -60 ... +100 | ±0.05 | 3 | 5.2 | 4.1 | 2.2 | 0.7 | 0.13 | 22-26 | 0.4-0.7 | 0.2-0.4 | 27 | 85 x 76 x 116 |
| 9 352 752N150 | FP52-SL | -60 ... +150 | ±0.05 | 3 | 3.0 | 2.8 | 1.6 | 0.65 | 0.1 | 22-26 | 0.4-0.7 | 0.2-0.4 | 24 | 59 x 76 x 116 |
| 9 352 755N150 | FP55-SL | -60 ... +150 | ±0.05 | 3 | 5.2 | 4.1 | 2.2 | 0.7 | 0.13 | 22-26 | 0.4-0.7 | 0.2-0.4 | 27 | 85 x 76 x 116 |
| water-cooled models | | | | | | | | | | | | | | |
| 9 352 753N | FPW52-SL | -60 ... +100 | ±0.05 | 3 | 3.0 | 2.8 | 1.6 | 0.65 | 0.1 | 22-26 | 0.4-0.7 | 0.2-0.4 | 24 | 59 x 76 x 116 |
| 9 352 756N | FPW55-SL | -60 ... +100 | ±0.05 | 3 | 5.5 | 4.1 | 2.2 | 1.0 | 0.13 | 22-26 | 0.4-0.7 | 0.2-0.4 | 27 | 59 x 76 x 116 |
| 9 352 753N150 | FPW52-SL | -60 ... +150 | ±0.05 | 3 | 3.0 | 2.8 | 1.6 | 0.65 | 0.1 | 22-26 | 0.4-0.7 | 0.2-0.4 | 24 | 59 x 76 x 116 |
| 9 352 756N150 | FPW55-SL | -60 ... +150 | ±0.05 | 3 | 5.5 | 4.1 | 2.2 | 1.0 | 0.13 | 22-26 | 0.4-0.7 | 0.2-0.4 | 27 | 59 x 76 x 116 |

Included in delivery: 2 barbed fittings each for tubing 8 and 12 mm ID (pump connections M16x1 male)

FPW models: Cooling water connections G 3/4" male with barbed fittings for tubing 1/2" ID



FPW91-SL

For external applications only

Applications

Jacketed, reactors, miniplant installations, kilo labs, process development

Upgradeable for even more heating and pump capacity

All models on this double-page are upgradeable (except for F95-SL and FW95-SL).

HST booster heater ①

adds 6 kW of heating capacity for a total of 9 kW

HSP booster pump ②

increases pump capacity to 30 l/min or 3 bar max. (reduces cooling capacity by 0.4 kW)

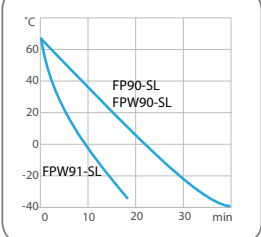
Upgradeable

- ① with booster heater and
- ② booster pump



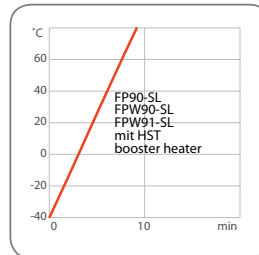
Cool-down time

Bath fluid: thermal



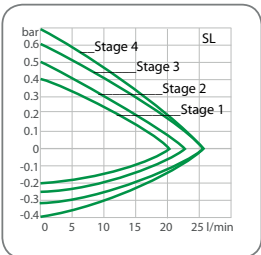
Heat-up time

Bath fluid: thermal



Pump capacity

Bath fluid: water



| Order No. | Model | Working temperature range °C | Temp. stab. °C | Heat. cap. kW | Cooling capacity kW (Bath fluid: ethanol) | | | | | Pump capacity (Flow rate / Pressure / Suction) | | | Fill. vol. liters | Dimensions W x L x H cm | |
|---------------------|----------|------------------------------|----------------|---------------|---|-----|-----|------|------|--|--------|---------|-------------------|-------------------------|---------------|
| | | | | | +20 | 0 | -20 | -40 | -60 | -80 °C | l/min. | bar | | | bar |
| 9 352 790N | FP90-SL | -90 ... +100 | ±0.05 | 3 | 1.8 | 1.7 | 1.6 | 1.35 | 0.75 | 0.15 | 22-26 | 0.4-0.7 | 0.2-0.4 | 22 | 59 x 76 x 116 |
| 9 352 795N | F95-SL | -95 ... 0 | ±0.05 | 3 | -- | 1.7 | 1.5 | 1.3 | 1.1 | 0.36 | 22-26 | 0.4-0.7 | 0.2-0.4 | 22 | 59 x 76 x 116 |
| 9 352 790N150 | FP90-SL | -90 ... +150 | ±0.05 | 3 | 1.8 | 1.7 | 1.6 | 1.35 | 0.75 | 0.15 | 22-26 | 0.4-0.7 | 0.2-0.4 | 22 | 59 x 76 x 116 |
| water-cooled models | | | | | | | | | | | | | | | |
| 9 352 791N | FPW90-SL | -90 ... +100 | ±0.05 | 3 | 1.8 | 1.7 | 1.6 | 1.35 | 0.75 | 0.15 | 22-26 | 0.4-0.7 | 0.2-0.4 | 22 | 59 x 76 x 116 |
| 9 352 793N | FPW91-SL | -91 ... +100 | ±0.2 | 3 | 4.5 | 4.1 | 3.7 | 3.1 | 2.0 | 0.75 | 22-26 | 0.4-0.7 | 0.2-0.4 | 22 | 85 x 76 x 116 |
| 9 352 796N | FW95-SL | -95 ... 0 | ±0.05 | 3 | -- | 1.7 | 1.5 | 1.3 | 1.1 | 0.36 | 22-26 | 0.4-0.7 | 0.2-0.4 | 22 | 59 x 76 x 116 |
| 9 352 791N150 | FPW90-SL | -90 ... +150 | ±0.05 | 3 | 1.8 | 1.7 | 1.6 | 1.35 | 0.75 | 0.15 | 22-26 | 0.4-0.7 | 0.2-0.4 | 22 | 59 x 76 x 116 |

Included in delivery: 2 barbed fittings each for tubing 8 and 12 mm ID (pump connections M16x1 male)

FPW models: Cooling water connections G 3/4" male with barbed fittings for tubing 1/2" ID