

# KrosFlo® KR2i and KMPi TFF Systems

Data Sheet

## KrosFlo KR2i TFF System

The KrosFlo KR2i Tangential Flow Filtration (TFF) System is the ideal automated TFF pump system for processes up to 15 L with a minimum recirculation volume as low as 2 mL. Repligen Single-use TFF Systems offer value-added convenience over traditional cross-flow membrane systems with high quality, reproducible results.



### Components

1. KF Comm 2 Software
2. Digitally Controlled Peristaltic Pump
3. Pump Head
4. Automatic Back Pressure Valve (ABV)
5. Pressure Transducer
6. KrosFlo KR Jr Auxiliary Pump
7. Conical Reservoir with Holder
8. KrosFlo Auxiliary Scale
9. Konduit

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## KrosFlo KR2i TFF System Specifications

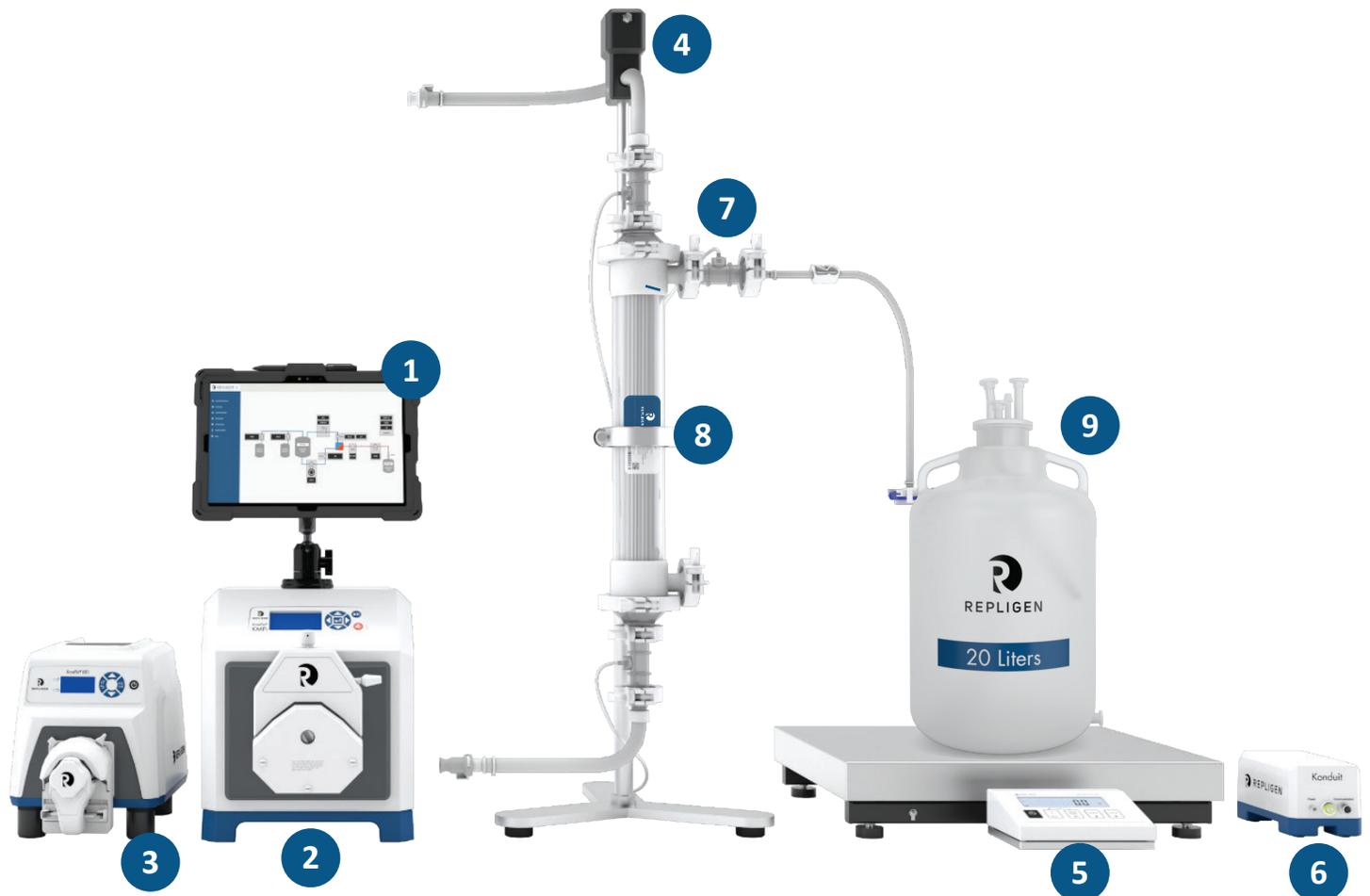
Description		KrosFlo KR2i TFF System	
Filter	Filter Mode	Hollow Fiber	Flat Sheet Cassettes
	Recommended Process Volume	2 mL - 10 L	12 mL - 15 L
	Filter Surface Area	13 cm <sup>2</sup> - 3700 cm <sup>2</sup>	100 cm <sup>2</sup> - 5000 cm <sup>2</sup>
Provided Equipment	System Footprint Size	Lab-Scale	
	Main Drive/Feed Pump and Stand	Easy-Load Pump Head – up to 2.3 LPM (600 RPM) Use with tubing sizes #13, #14, #16, #17, #18 and #25. Integrated stand for hollow fibers	
	System Scales	Two (2) Capacity up to 20,000 g, Readability 0.1 g 7.7" x 7.7" (17.8 cm x 17.8 cm) Platform	
	Tablet HMI	Licensed proprietary KF Comm 2 Data Acquisition Software	
	Automatic Back pressure Control Valve (ABV)	Controls user-set process pressure parameters	
	Pressure Transducers	Luer-style, polysulfone. Up to 3 single-use sensors Pressure range of -7 to 75 psi (-0.48 to 5.2 bar)	
	Tubing Management	PharmaPure, TPE, size #14 and #16	
	Auxiliary Component Octopus Cables	Allows for connectivity of auxiliary equipment and pressure sensors	
	Reservoirs	15 mL, 50 mL, 250 mL, 500 mL polypropylene conical containers, caps with ported inlets, conical holders	
	Stand	Integrated stand with Hollow fiber holder	
	Enclosures	IP33 rated plastic enclosure. Wipe down cleanable	

## KrosFlo KR2i TFF System Specifications

	Description	KrosFlo KR2i TFF System	
Options	UV, Conductivity and Temperature	The Konduit base model provides real-time Conductivity, UV (A280 or A260 Inputs) and Temperature integrated monitoring	
	System Scales (Optional)	Capacity up to 20,000 g, Readability 0.1 g 7.7" x 7.7" (17.8 cm x 17.8 cm) Platform Capacity up to 60,000 g, Readability 0.1 g 15.8" x 19.7" (40.1 cm x 50 cm) Platform	
	Auxiliary Pumps (Optional)	KrosFlo® Research I (KR1), 600 RPM, flowrates up to 2.3 LPM KrosFlo® Junior (KR1), 300 RPM, flowrates up to 0.3 LPM	
	High-Performance Pump Head (Optional)	High-Performance Pump Head, up to 2.9 LPM For use with tubing sizes #15, #24, #35 and #36 <b>Note: Pump will accept up to two (2) pump heads</b>	
	KF Comm2 and KFComm2C Software	Proprietary software for intuitive operation, real time tracking and data analysis Optional 21 CFR Part 11 compliance package	
Utilities	Operating temperature	0 - 40° C	
	Environmental requirements	0 - 40° C, Relative humidity 10 - 90%	
	Power	2.2A @ 115 V, or 1.1A @ 230 V (current, max) 90 to 260 Vrms @ 50/60 Hz (Universal Input)	
	Compliance	UL and CE Certified; EN61010-1 (EU Low Voltage Directive) and EN61326 (EU EMC Directive), RoHS	
Dimensions	Main Drive Dimensions	L 10.5 x W 8 x L 8 in (26.7 x 20.3 x 20.3 cm)	
	Main Drive weight	13 lbs (5.9 Kgs)	
Ordering	KR2i System Part Numbers	SYR2-U50	SYR2-U60
	Software	KF Comm 2	KF Comm 2C
	Scales	(2) 20 kg	(2) 20 kg
Service	Installation, Testing and Training	SV-IT-KR2-1 (1 day training)	
	Installation and Operation	SV-IT-KR2-IOQ-1 (Qualification IOQ)	

## KrosFlo KMPi TFF System

The KrosFlo KMPi Tangential Flow Filtration (TFF) System is the ideal Pilot-Scale automated TFF pump system for processing volumes ranging from 0.1 L up to 500 L, with minimum recirculation volumes of approximately 100 mL.



### Components

1. KF Comm 2 Software
2. KrosFlo KMPi Peristaltic Pump
3. KrosFlo KR1 Auxiliary Pump
4. Automatic Back Pressure Valve (ABV)
5. KrosFlo Auxiliary Scale
6. Konduit
7. Conductivity and/or UV Sensor
8. Repligen Hollow Fiber Filter
9. Reservoir

## KrosFlo KMPi TFF System Specifications

Description		KrosFlo KMPi TFF System	
Filter	Filter Mode	Hollow Fiber	Flat Sheet Cassettes
	Recommended Process Volume	0.1 L - 500 L	0.1 L - 500 L+
	Filter Surface Area	0.049 m <sup>2</sup> - 5.1 m <sup>2</sup>	0.3 m <sup>2</sup> - 2.5 m <sup>2</sup>
Provided Equipment	System Footprint Size	Lab-Scale	
	Main Drive/Feed Pump and Stand	Easy Load Pump Head-up to 11 LPM (650 RPM), flows up to 21 LPM with (2) pump heads Use with tubing sizes #26, #73 and #82	
	System Scales	One (1) scale included Capacity up to 60,000 g, Readability 0.1 g 15.8" x 19.7" (40.1 cm x 50cm) Platform	
	Tablet HMI	Licensed proprietary KF Comm 2 Data Acquisition Software	
	Automatic Back pressure Control Valve (ABV)	Controls user-set process pressure parameters	
	Pressure Transducers	TC connection, polysulfone Up to 3 single-use sensors Pressure range of -7 to 75 psi (-0.48 to 5.2 bar)	
	Tubing Management	PharmaPure, TPE, size #26 and #73	
	Auxiliary Component Octopus Cables	Allows for connectivity of auxiliary equipment and pressure sensors	
	Reservoirs	20 L polypropylene reservoir with 4-port cap and drain	
	Enclosures	IP33 rated plastic enclosure wipe down cleanable	

**KrosFlo KMPi TFF System Specifications**

	Description	KrosFlo KMPi TFF System	
<b>Options</b>	UV, Conductivity and Temperature	The Konduit base model provides real-time conductivity, UV (A280 or A260 Inputs) and temperature integrated monitoring	
	System Scales (Optional)	Auxiliary scales are available with capacity of 60 kg, 200 kg, 600 kg and 500 kg	
	Auxiliary Pumps (Optional)	KrosFlo KR1, 600 RPM and IP 650 RPM	
	High-Performance Pump Head (Optional)	Flowrates up to 17 LPM (recommended) Uses tubing sizes I/P* 70, I/P 88, I/P 89	
	KF Comm2 and KFComm2C Software	Proprietary software for intuitive operation, real time tracking and data analysis Optional 21 CFR Part 11 compliance package	
<b>Utilities</b>	Operating temperature	0 - 40° C	
	Environmental requirements	0 - 40° C, Relative humidity 10 - 90%	
	Power	2.2A @ 115 V, or 1.1A @ 230 V (current, max) 90 to 260 Vrms @ 50/60 Hz (Universal Input)	
	Compliance	UL and CE Certified; EN61010-1 (EU Low Voltage Directive) and EN61326 (EU EMC Directive), RoHS	
<b>Dimensions</b>	Main Drive Dimensions	L 17.5 x W 11 x H 13 in (44.5 x 23.0 x 33.0 cm)	
	Main Drive weight	40 lbs (18 kg)	
<b>Ordering</b>	KR2i System Part Numbers	SYM3-U30	SYM3-U40
	Software	KF Comm 2	KF Comm 2C
	Scales	(1) 60 kg	(1) 60 kg
<b>Service</b>	Installation, Testing and Training	SV-IT-KMP-1 (1 day training)	
	Installation and Operation	SV-IOQ-KMP-1 (Qualification IOQ)	

## Process Sequence Modes

### M Mode: Manual Mode

#### Automated Methods:

- C Mode: Concentration
- D Mode: Diafiltration
- C/D Mode: Concentration / Dialfiltration
- C/D/C Mode: Initial Concentration /Dialfiltration/ Final Concentration
- C/D/D/C Mode: Initial Concentration /Dialfiltration 1/Dialfiltration 2/ Final Concentration
- CFC Mode: Constant Feed Concentration
- CF/D/C Mode: Constant Feed / Dialfiltration / Final Concentration
- Control mode (Vacuum Mode)
- Flushing Mode
- Normalized Water Permeability Mode
- Cleaning Mode
- Flux Excursion Mode

#### Process Alarms & Interlocks:

KrosFlo TFF Systems provides the following alarm controls:

**Feed and Permeate Pressure:** The system will provide alarm and/or shut down when preset pressure specifications are reached or exceeded.

**Permeate Mass:** Permeate scale is used to determine permeate flow rate and accordingly control the pump speed/flow rate. The system will provide alarm and/or shut down when preset target weight specifications are reached or exceeded.

**Feed Mass:** (Upper and Lower) The system will provide alarm and/or shut down when preset target weight specifications are reached or exceeded.

**UV/Auxiliary:** The system will provide alarm and/or shut down when limits are reached or exceeded.

The KrosFlo TFF System is ideal for pilot scale, high pressure microfiltration and ultrafiltration applications due to its compact footprint and versatility.

Pump Mode	Feed Scale	Permeate Scale	Auxiliary Pump 1	Auxiliary Pump 2
M /Manual	X	X	O	O
C Mode	O	X	O	O
D Mode	O	X	X	O
C/D Mode	X	X	X	O
C/D/C Mode	X	X	X	O
C/D/D/C Mode	X	X	X	X
CFC Mode	X	X	X	O
CF/D/C Mode	X	X	X	X
C/D/C/D Mode	X	X	X	X

X = Required

O = Optional depending on permeate flow control requirements of the process

### Auxiliary Pumps

Up to two (2) 300 rpm, 600 rpm or 650 rpm auxiliary pumps can be added to the KrosFlo TFF System.

- **Dialfiltration Pump(s):** Replenishes loss feed reservoir volume during dialfiltration function
- **Continuous Feed Pump:** Feeds fluid from larger external vessel into the primary feed vessel during CF or CFC modes.
- **Permeate Pump:** Control permeation rate for MF applications; Auxiliary Pump 2 in most process modes.

## Auxiliary Pumps



Tubing Size and Type	Tubing Flow Range	KrosFlo KR Jr 300 RPM ACJR-U10-R	KrosFlo KR1 600 RPM AR1-U20-01R	I/P Series 650 RPM ACM3-U10
L/S 13	0.36 to 36 mL/min	✓	✓	
L/S 14	1.3 to 130 mL/min	✓	✓	
L/S 16	4.8 to 480 mL/min	✓	✓	
L/S 25	10 to 1000 mL/min	✓	✓	
L/S 17	17 to 1700 mL/min		✓	
L/S 18	23 to 2300 mL/min		✓	
L/S 15	10 to 1000 (11 to 1100) <sup>1</sup> mL/min		✓	
L/S 24	17 to 1700 (18 to 1800) <sup>1</sup> mL/min		✓	
L/S 35	23 to 2300 (26 to 2600) <sup>1</sup> mL/min		✓	
L/S 36	29 to 2900 (34 to 3400) <sup>1</sup> mL/min		✓	
I/P 26	0.12 to 4 LPM			✓
I/P 70	0.24 to 8 <sup>2</sup> LPM			✓
I/P 73	0.2 to 8 LPM			✓
I/P 82	0.4 to 13 LPM			✓
I/P 88	0.4 to 17 <sup>2</sup> LPM			✓
I/P 89	0.52 to 19 <sup>2</sup> LPM			✓

<sup>1</sup> High Performance pump head required to achieve flow rate value in ( ). Requires part number ACR2-H4I-01N or -01R.

<sup>2</sup> High Performance pump head required, part number ACM3-PHP-01N.

## Auxiliary Scales

These process scales are accurate, stable, rugged, and versatile—which makes it a dynamic instrument highly suitable for the varied application environments of TFF processes.



Description	KrosFlo Auxiliary Scale SCL-0020-SCLR	KrosFlo Auxiliary Scale SCL-0060-SCLR	KrosFlo Floor Scale SCL-0200-SCLR & SCL-0600-SCLR	
Maximum Capacity	20,000 g	60,000 g	200,000 g	600,000 g
Readability	0.1 g	1 g	10 g	20 g
Linearity	±0.3 g	Approximately ±2 g	±100 g	±300 g
Display	LCD (with back light)	LCD (with back light)	LCD (with back light)	
Keypad	5 keys	5 keys	5 keys	
Protection Class	IP 43	IP 43	IP 43	
Power Consumption	1.32VA	1.32VA	1.32VA	
Power Supply	Pump station (direct connection)	Pump station (direct connection)	Pump station (direct connection)	
Weighing Pan Dimensions	7.7" x 7.7" (19.5 x 19.5 cm)	15.8" x 19.7" (40.1 x 50 cm)	33" x 34" (84 x 86 cm)	
Weighing Device Dimensions	13" x 8" x 3.8" (35.0 x 20.3 x 35.0 cm)	21.5" x 24.25" x 8" (54.6 x 61.6 x 20.3 cm)	67" x 41" x 3" (170 x 104 x 8 cm)	

One process scale is required to automate the system.

- **Feed Scale:** Weighs feed reservoir to monitor Concentration and Dialfiltration functions
- **Permeate Scale (optional):**
  - Weighs permeate reservoir to monitor Concentration and Dialfiltration function
  - Permeate Scale interfaces with the system and converts change in mass over time to flux rate of the TFF process

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