PRODUCT CATALOGUE

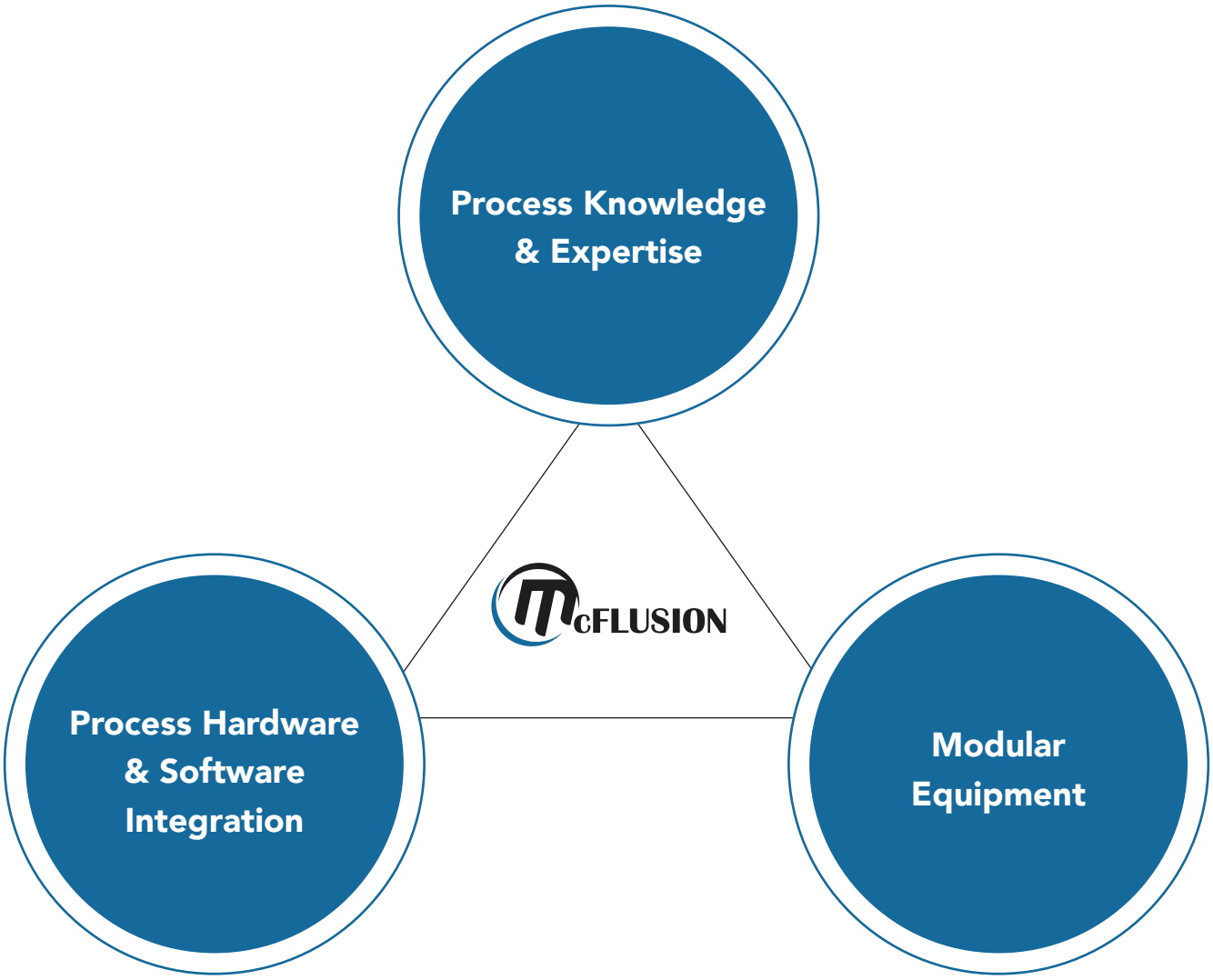
Process & Equipment Solutions for Cleaning (CIP/COP) and Sanitization
to the Pharmaceutical and Medical Device Industries

Table of contents

The McFlusion Difference

Process comes first...always!

Analyze and establish critical process cleaning parameters (TACCT) for effective removal of product residuals from the manufacturing equipment



Process Integration

Ensure successful implementation and use:

- Cleaning adapters and spray devices
- Software integration & controls

Modular process cleaning (CIP/COP) equipment

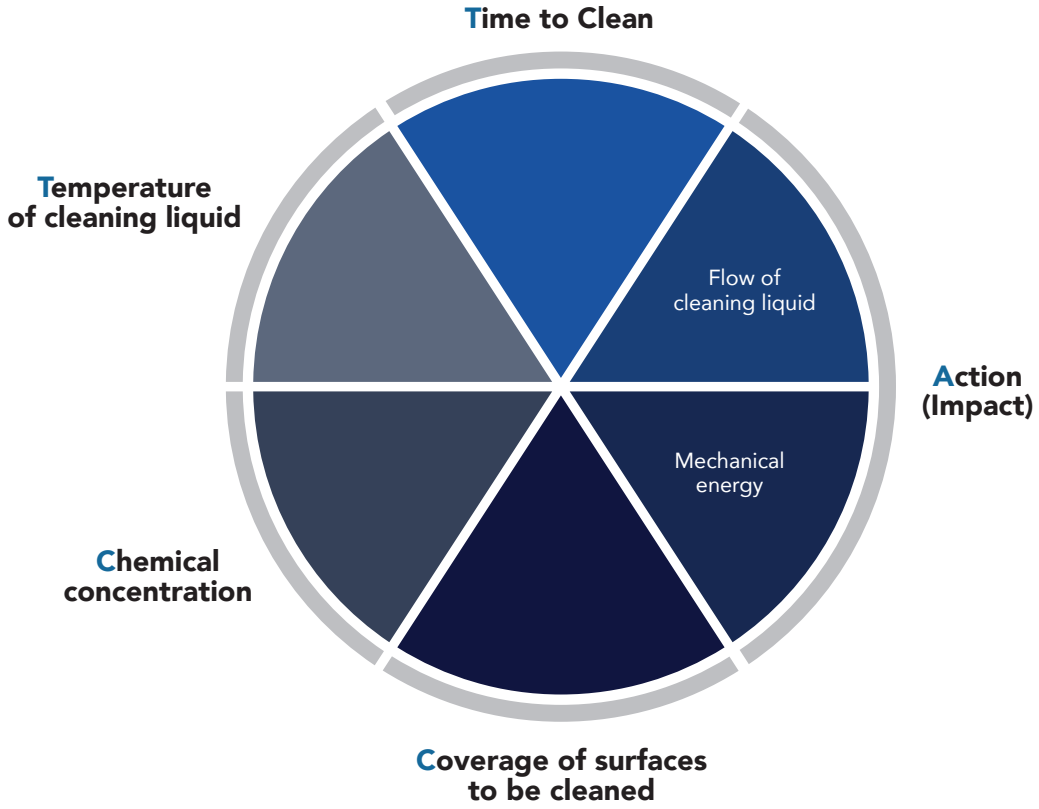
Meet and surpass process cleaning requirements:

- Portable CIP units
- CIP systems
- Specialty parts washers (COP)

Portable CIP units [MEC+]

McFlusion's portable CIP units [MEC+] are specifically designed for Cleaning-In-Place (CIP) and sanitization of process equipment in the pharmaceutical oral (solid/liquid) dosage forms, chemical API, and OLC (ointment, liquids, creams) industry segments.

The MEC+ program includes three modular portable CIP units, MEC25+, MEC35+ and MEC45+, that are developed for full TACCT cleaning performance & flexibility – securing highly effective, consistent and lean operations.



These high performing and flexible units are mainly applied for decentralized cleaning of process equipment and are – in particular - suited for difficult-to-clean products and hard-to-clean applications, such as:

- Fluid bed dryer
- Blenders
- Hi/low shear mixers
- Coating pans
- Spray drying equipment
- Cyclones
- Reactors
- IBCs and more...

Portable CIP units [MEC+]

Blenders

Fluid Bend Dryers

Spray Dryers

Part Washers (COP)

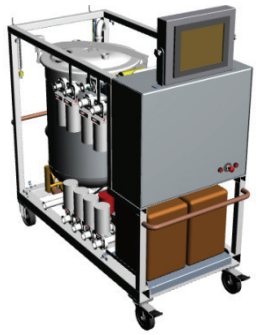
Low & High Shear Mixers

Mixing tanks and reactors

Packaging and filling lines

Tanks and pipe lines

Portable CIP units [MEC25+]

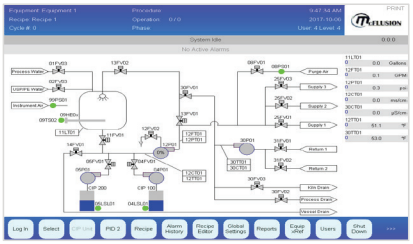


- Compact, open, frame in AISI 304 stainless steel with four (4) wheels
  - Easy to maneuver
  - Easy to service
- Modular hardware and software platform – multiple configurations.
- Wetted parts and components in AISI316L stainless steel.
- Full TACCT cleaning performance and flexibility
  - Adjustable pressures
  - Adjustable flow rates
  - Adjustable temperatures
  - Adjustable concentrations
- Full instrumentation package, including level, pressure, flow, temperature and conductivity (low and high)
- Integrated electrical panel with AB Compact Logix PLC and PC based touch screen HMI
- Full recipe editor, alarm handling and cycle reporting to PDF

Technical Data	Unit	MC25+
Buffer tank	Gallon	40
Supply pressure	PSI	<150
Supply flow	GPM	<45
Temperature, 2 x 10 kW	°F	<200
Chemistry	mS/cm	<200

Controls:	
Allen Bradley compact Logix PLC	Yes
12" PC touch screen HMI	Yes
Allen Bradley software	Yes
McFlusion Process Builder Design ™	Yes
McFlusion AutoTune ™	Yes

Size:		
Dimensions (LxWxH)	Inch	53 x 26 x 50 (62)
Weight, dry	Lbs	650



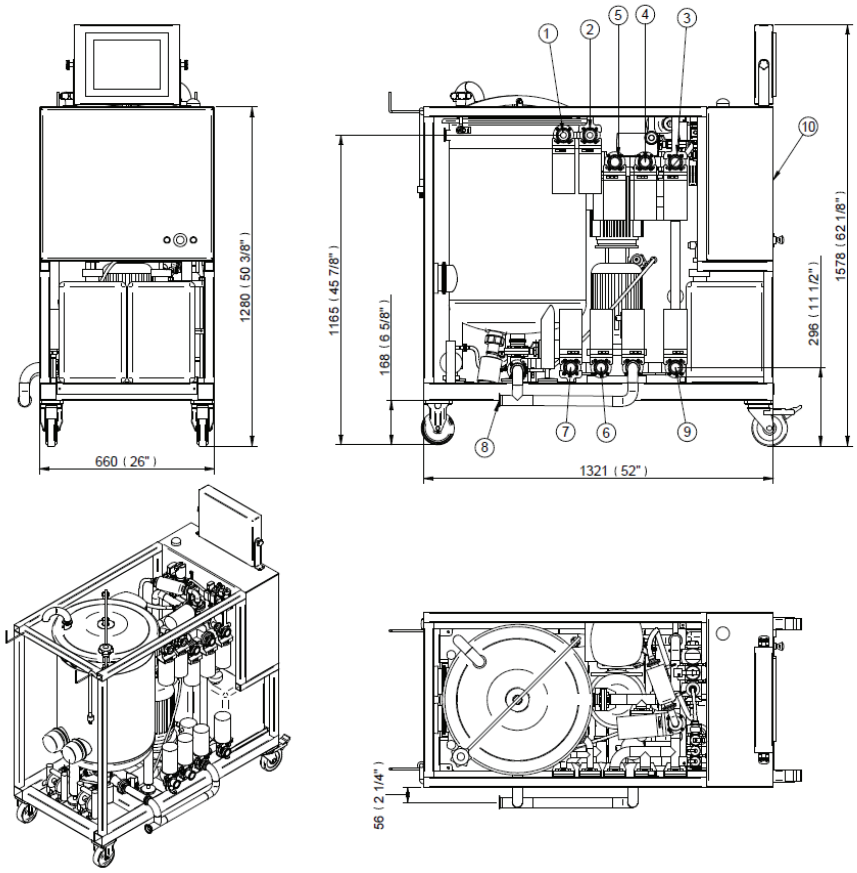
HMI interface: P&ID

- Real time component status
- Real time instrument readings

Item Number	Description	Accessories	Standard Unit Configurations and Automation Levels
UP6001	CIP unit (MEC25+)	Starting on page 46	Starting on page 49

General layout & tie-in schematic

(shown without optional side covers and lid)



#	Designation	Connection	Sizing	Expected setup
1	Water #1	1½" Tri clamp	1" (25 mm)	< 20 gpm @ 20 psi
2	Water #2	1½" Tri clamp	1" (25 mm)	< 20 gpm @ 20 psi
3	CIP supply 1	1½" Tri clamp	1½" (38 mm)	< 45 gpm @ 150 psi
4	CIP supply 2	1½" Tri clamp	1½" (38 mm)	< 45 gpm @ 150 psi
5	**Optional:** CIP supply 3	1½" Tri clamp	1½" (38 mm)	< 45 gpm @ 150 psi
6	CIP return 1	1½" Tri clamp	1½" (38 mm)	< 45 gpm @ 150 psi
7	**Optional:** CIP return 2	1½" Tri clamp	1½" (38 mm)	< 45 gpm @ 150 psi
8	Process drain	1½" Tri clamp	1½" (38 mm)	< 45 gpm @ 150 psi
9	Optional: Kiln drain	1½" Tri clamp	1½" (38 mm)	< 45 gpm @ 150 psi
10	Electrical	Plug	40 amp	3x480V, ground, 60 Hz, 40 Amps
11	Compressed air	¾" NPT or TC	1" (25 mm)	Nominal cfm @ 90 psi < 30 cfm @ < 30 psi (purge

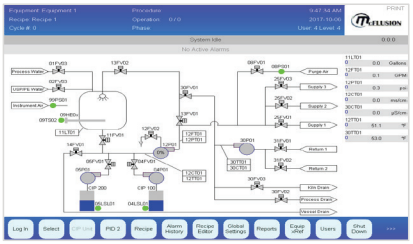
Portable CIP units [MEC35+]

- Compact, open, frame in AISI 304 stainless steel with four (4) wheels
  - Easy to maneuver
  - Easy to service
- Modular hardware and software platform – multiple configurations.
- Wetted parts and components in AISI316L stainless steel.
- Full TACCT cleaning performance and flexibility
  - Adjustable pressures
  - Adjustable flow rates
  - Adjustable temperatures
  - Adjustable concentrations
- Full instrumentation package, including level, pressure, flow, temperature and conductivity (low and high)
- Integrated electrical panel with AB Compact Logix PLC and PC based touch screen HMI
  - Full recipe editor, alarm handling and cycle reporting to PDF

Technical Data	Unit	MC35+
Buffer tank	Gallon	100
Supply pressure	PSI	<150
Supply flow	GPM	<75
Temperature, 3 x 10 kW	°F	<200
Chemistry	mS/cm	<200

Controls:	
Allen Bradley compact Logix PLC	Yes
12" PC touch screen HMI	Yes
Allen Bradley software	Yes
McFlusion Process Builder Design ™	Yes
McFlusion AutoTune ™	Yes

Size:		
Dimensions (LxWxH)	Inch	63 x 33 x 58 (71)
Weight, dry	Lbs	900



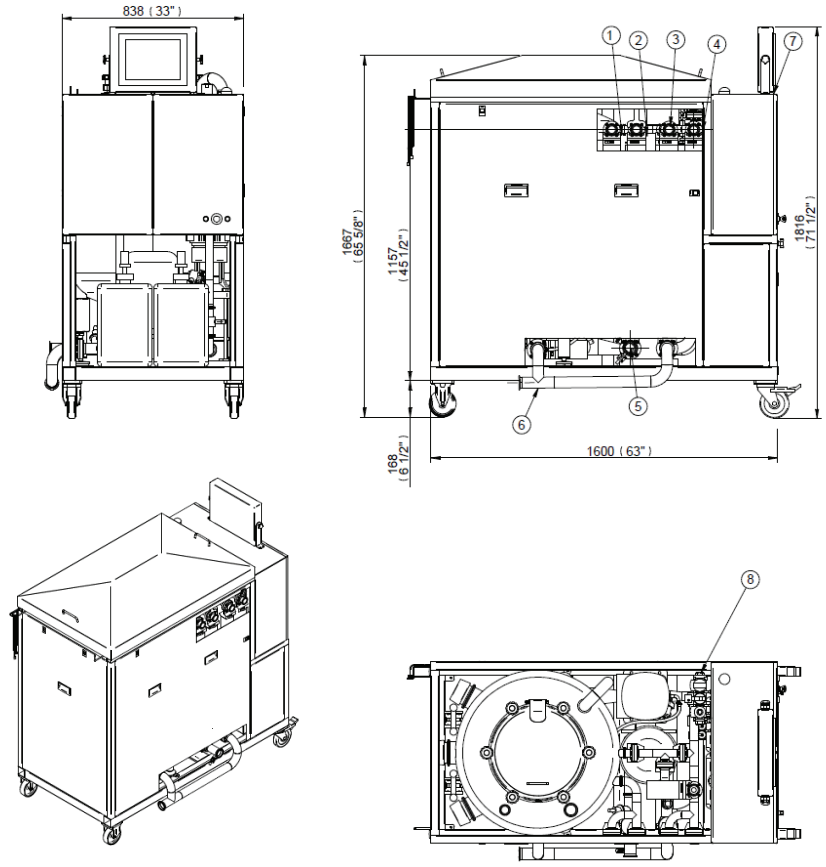
HMI interface: P&ID

- Real time component status
- Real time instrument readings

Item Number	Description	Accessories	Standard Unit Configurations and Automation Levels
UP6002	CIP unit (MEC35+)	Starting on page 46	Starting on page 49

General layout & tie-in schematic

(shown with optional side covers and lid)



#	Designation	Connection	Sizing	Expected setup
1	Water #1	1½" Tri clamp	1" (25 mm)	< 30 gpm @ 20 psi
2	Water #2	1½" Tri clamp	1" (25 mm)	< 30 gpm @ 20 psi
3	CIP supply 1	1½" Tri clamp	1½" (38 mm)	< 75 gpm @ 150 psi
4	CIP supply 2	1½" Tri clamp	1½" (38 mm)	< 75 gpm @ 150 psi
N/A	**Optional:** CIP supply 3	1½" Tri clamp	1½" (38 mm)	< 75 gpm @ 150 psi
5	CIP return 1	1½" Tri clamp	1½" (50 mm)	< 75 gpm @ 35 psi
N/A	**Optional:** CIP return 2	1½" Tri clamp	1½" (50 mm)	< 75 gpm @ 35 psi
6	Process drain	1½" Tri clamp	1½" (50 mm)	< 75 gpm @ 20 psi
N/A	Optional: Kiln drain	1½" Tri clamp	1½" (50 mm)	< 75 gpm @ 35 psi
7	Electrical	Plug	60 Amps	3x480V, ground, 60 Hz, 60 Amps
8	Compressed air	¾" NPT or TC	1" (25 mm)	Nominal cfm @ 90 psi < 30 cfm @ < 30 psi (purge)

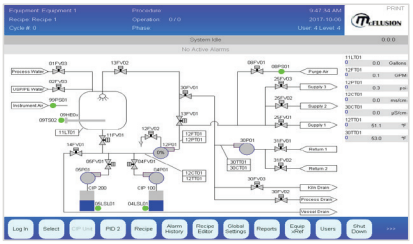
Portable CIP units [MEC45+]

- Compact, open, frame in AISI 304 stainless steel with four (4) wheels
  - Easy to maneuver
  - Easy to service
- Modular hardware and software platform – multiple configurations.
- Wetted parts and components in AISI316L stainless steel.
- Full TACCT cleaning performance and flexibility
  - Adjustable pressures
  - Adjustable flow rates
  - Adjustable temperatures
  - Adjustable concentrations
- Full instrumentation package, including level, pressure, flow, temperature and conductivity (low and high)
- Integrated electrical panel with AB Compact Logix PLC and PC based touch screen HMI
  - Full recipe editor, alarm handling and cycle reporting to PDF

Technical Data	Unit	MC45+
Buffer tank	Gallon	100
Supply pressure	PSI	<175
Supply flow	GPM	<130
Temperature, 3x 10 kW	°F	<200
Chemistry	mS/cm	<200

Controls:	
Allen Bradley compact Logix PLC	Yes
12" PC touch screen HMI	Yes
Allen Bradley software	Yes
McFlusion Process Builder Design ™	Yes
McFlusion AutoTune ™	Yes

Size:		
Dimensions (LxWxH)	Inch	63 x 33 x 58 (71)
Weight, dry	Lbs	1100



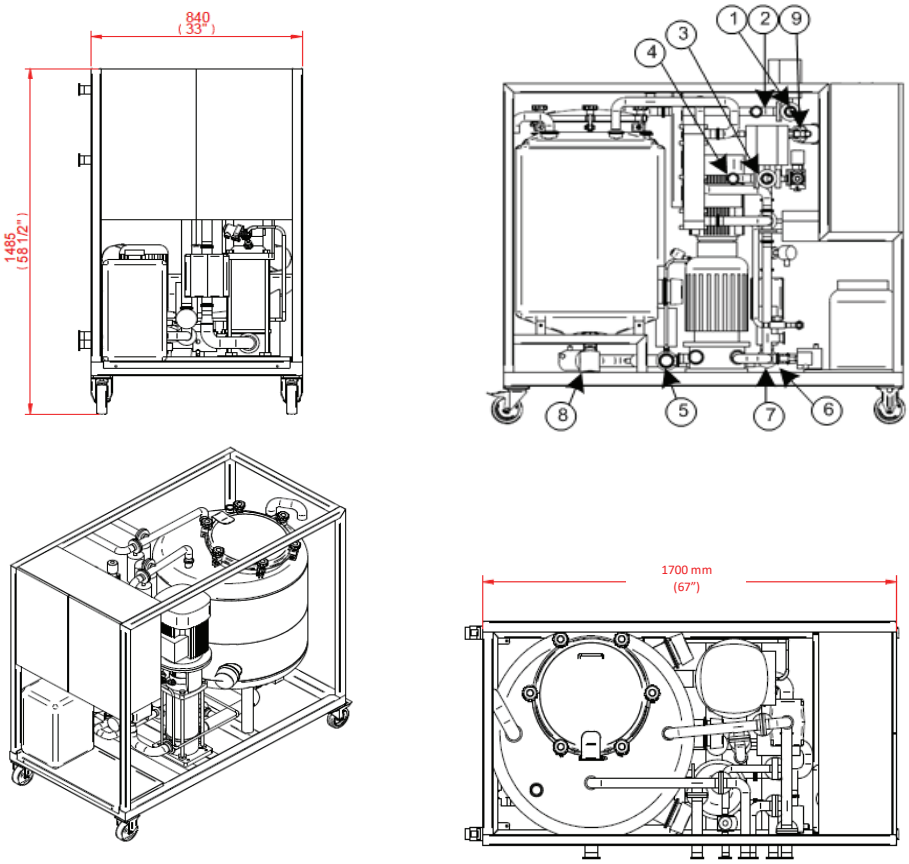
HMI interface: P&ID

- Real time component status
- Real time instrument readings

Item Number	Description	Accessories	Standard Unit Configurations and Automation Levels
UP6003	CIP unit (MEC45+)	Starting on page 46	Starting on page 49

General layout & tie-in schematic

(shown without optional side covers and lid)



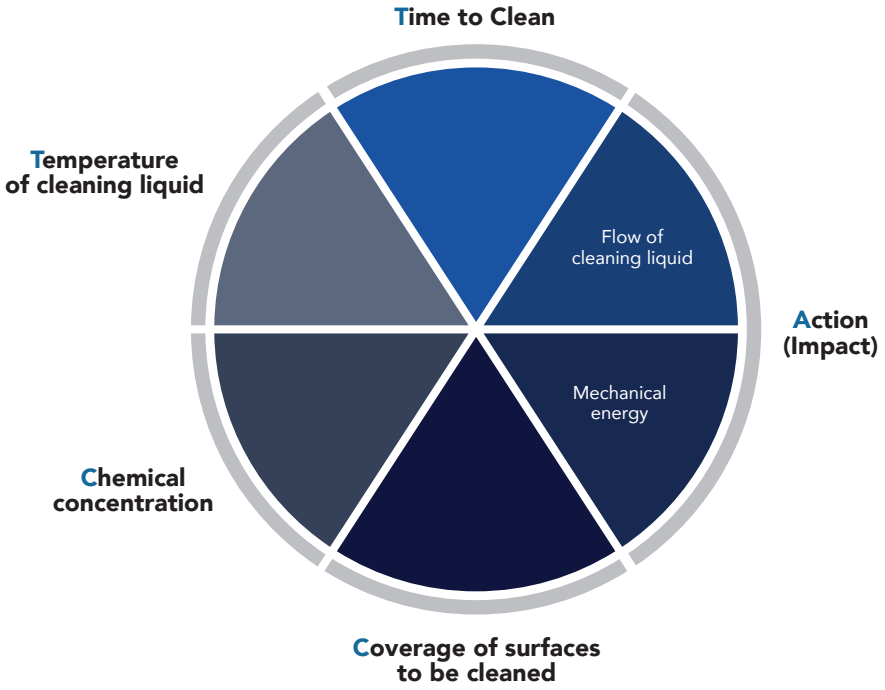
#	Designation	Connection	Sizing	Expected setup
1	Water #1	1½" Tri clamp	1" (25 mm)	< 30 gpm @ 20 psi
2	Water #2	1½" Tri clamp	1" (25 mm)	< 30 gpm @ 20 psi
3	CIP supply 1	2" Tri clamp	2" (50 mm)	< 130 gpm @ 175 psi
4	CIP supply 2	2" Tri clamp	2" (50 mm)	< 130 gpm @ 175 psi
N/A	**Optional:** CIP supply 3	2" Tri clamp	2" (50 mm)	< 80 gpm @ 35 psi
5	CIP return 1	2" Tri clamp	2" (50 mm)	< 80 gpm @ 35 psi
N/A	**Optional:** CIP return 2	2" Tri clamp	2" (50 mm)	< 80 gpm @ 35 psi
6	Process drain	2" Tri clamp	2" (50 mm)	< 80 gpm @ 20 psi
7	Optional: Kiln drain	2" Tri clamp	2" (50 mm)	< 80 gpm @ 20 psi
8	Gravity drain	1½" Tri clamp	1" (25 mm)	< 40 gpm @ 20 psi
9	Compressed air	¾" NPT or TC	1" (25 mm)	Nominal cfm @ 90 psi < 30 cfm @ < 30 psi (purge)
10	Electrical	Plug	60 Amps	3x480V, ground, 60 Hz, 60 Amps

CIP systems [MEC+FX]

McFlusion's CIP systems [MEC+FX] are specifically designed for process cleaning (CIP) and sanitization (hot water, chemical, ozone) of larger and often complex equipment within the pharmaceutical oral (solid/liquid) dosage forms, chemical API, and OLC (ointment, liquids, creams) industry segments.

These high performing and flexible CIP systems are based upon our modular, configurable, technology platform – prepared for full integration with the process equipment and facility systems.

The CIP systems [MEC+FX] provide full TACCT cleaning performance & flexibility – securing highly effective, consistent and lean operations.



The CIP systems [MEC+FX] are applied for decentralized and centralized cleaning of process equipment and are – in particular - suited for difficult-to-clean products and hard-to-clean applications, such as:

- Packaging lines
- Filling equipment w/transfer lines
- Spray drying equipment
- Cyclones
- Fluid bed dryers
- Blenders
- Hi/low shear mixers
- Coating pans
- Reactors
- IBCs and more...

CIP systems [MEC+FX]

Blenders

Fluid Bend Dryers

Spray Dryers

Part Washers (COP)

Low & High Shear Mixers

Mixing tanks and reactors

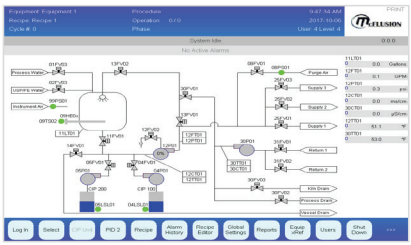
Packaging and filling lines

Tanks and pipe lines

CIP System [MEC+FX1]

- Compact frame in AISI 304 stainless steel with six (6) adjustable feet
  - Remote or integrated CIP return pump
  - Remote or integrated HMI station
- Modular hardware and software platform – multiple configurations.
- Wetted parts and components in AISI316L SS, sanitary butterfly valves, etc.
- Full TACCT cleaning performance and flexibility
  - Adjustable pressures
  - Adjustable flow rates
  - Adjustable temperatures
  - Adjustable concentrations
- Full instrumentation package, including level, pressure, flow, temperature and conductivity (low and high)
- Integrated electrical panel with AB Compact Logix PLC w/integrated or remote HMI station
  - Full recipe editor, alarm handling and cycle reporting to PDF
  - Prepared for full integration with process equipment & facility systems

Technical Data	Unit	MEC+FX1
Buffer tank	Gallon	150
Supply pressure	PSI	<125
Supply flow	GPM	<80
Temperature, steam jacket	°F	<300
Chemistry	mS/cm	<200



HMI interface: P&ID

- Real time component status
- Real time instrument readings

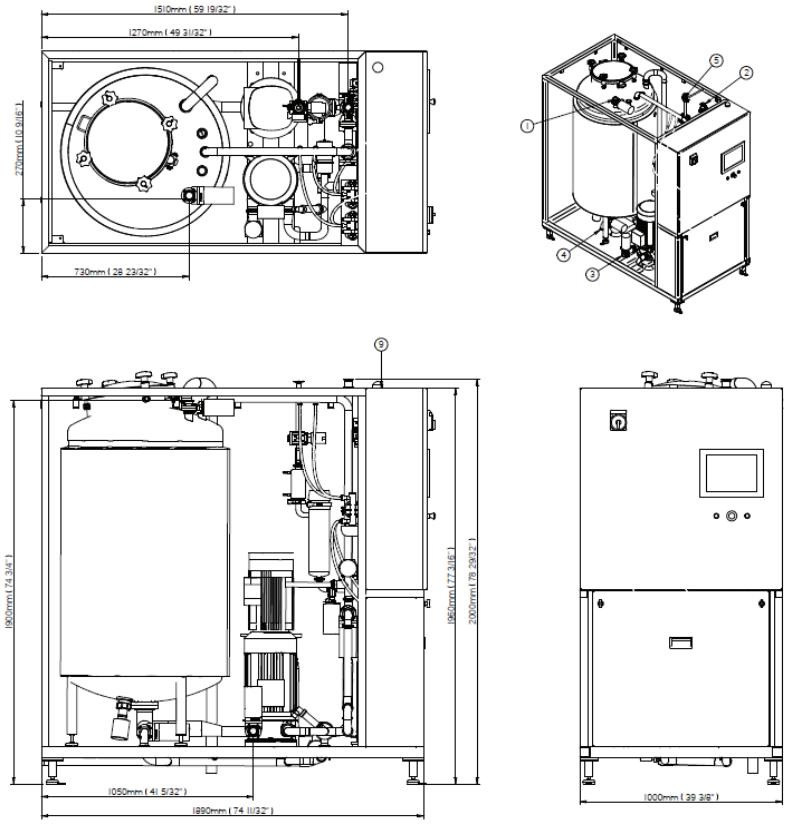
Controls:	
Allen Bradley compact Logix PLC	Yes
12" PC touch screen HMI	Yes
Allen Bradley software	Yes
McFlusion Process Builder Design ™	Yes
McFlusion AutoTune ™	Yes

Size:		
Dimensions (LxWxH)	Inch	80 x 40 x 80
Weight, dry	Lbs	1500

Item Number	Description	Accessories	Standard Unit Configurations and Automation Levels
UP6004	CIP System MEC+FX1	Starting on page 46	Starting on page 49

General layout & tie-in schematic

(shown with integrated HMI)



#	Designation	Connection	Sizing	Expected setup
1	Water #1	1½" Tri clamp	1" (25 mm)	< 30 gpm @ 20 psi
2	**Optional:** Water #2 (not shown)	1½" Tri clamp	1" (25 mm)	< 30 gpm @ 20 psi
3	Compressed air	1½" Tri clamp	3/8" pipe/hose	Nominal cfm @ 90 psi
4	**Optional:** Clean stream (heating)	1½" Tri clamp	1" (25 mm)	< 150 lbs @ < 40 psi
5	Compressed clean air	¾" Tri clamp	¾" (18 mm)	< 30 cfm @ < 40 psi (purge)
6	CIP supply 1	1½" Tri clamp	1½" (38 mm)	< 80 gpm @ < 125 psi
7	CIP supply 2	1½" Tri clamp	1½" (38 mm)	< 80 gpm @ < 125 psi
8	CIP return	1½" Tri clamp	1½" (38 mm)	< 80 gpm @ 35 psi
9	Process Drain	1½" Tri clamp	1½" (38 mm)	< 80 gpm @ 35 psi
10	Gravity drain	1½" Tri clamp	1½" (38 mm)	< 40 gpm @ 20 psi
11	Electrical	Plug	60 Amps	3x480V, ground, 60 Hz, 45 Amps

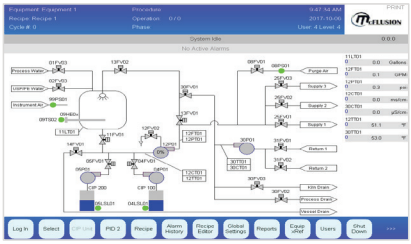
CIP System [MEC+FX2]

- Compact frame in AISI 304 stainless steel with six (6) adjustable feet
  - Remote or integrated CIP return pump
  - Remote or integrated HMI station
- Modular hardware and software platform – multiple configurations.
- Wetted parts and components in AISI316L SS, sanitary butterfly valves, etc.
- Full TACCT cleaning performance and flexibility
  - Adjustable pressures
  - Adjustable flow rates
  - Adjustable temperatures
  - Adjustable concentrations
- Full instrumentation package, including level, pressure, flow, temperature and conductivity (low and high)
- Integrated electrical panel with AB Compact Logix PLC w/integrated or remote HMI station
  - Full recipe editor, alarm handling and cycle reporting to PDF
  - Prepared for full integration with process equipment & facility systems

Technical Data	Unit	MEC+FX2
Buffer tank	Gallon	250
Supply pressure	PSI	<175
Supply flow	GPM	<120
Temperature, Steam jacket	°F	<300
Chemistry	mS/cm	<200

Controls:	
Allen Bradley compact Logix PLC	Yes
12" PC touch screen HMI	Yes
Allen Bradley software	Yes
McFlusion Process Builder Design ™	Yes
McFlusion AutoTune ™	Yes

Size:		
Dimensions (LxWxH)	Inch	80 x 40 x 80
Weight, dry	Lbs	1750

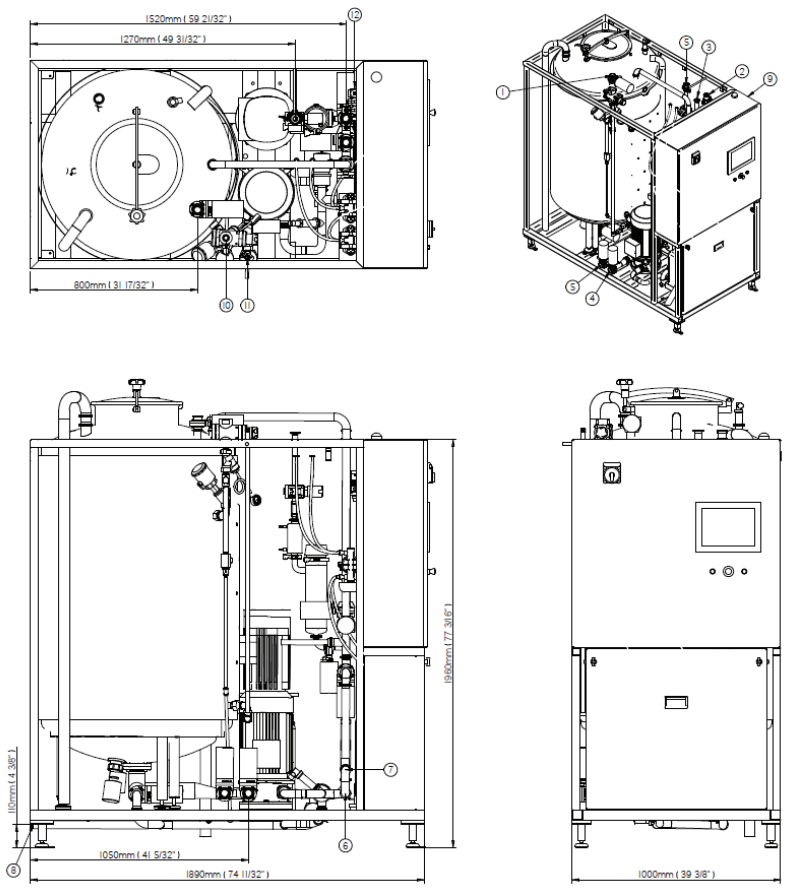


HMI interface: P&ID

- Real time component status
- Real time instrument readings

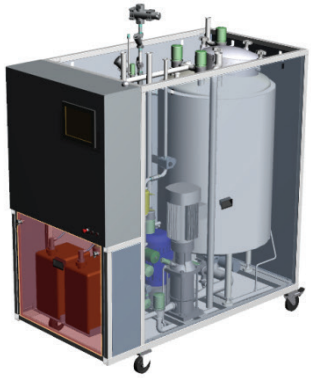
Item Number	Description	Accessories	Standard Unit Configurations and Automation Levels
UP6005	CIP System MEC+FX2	Starting on page 46	Starting on page 49

General layout & tie-in schematic



#	Designation	Connection	Sizing	Expected setup
1	Water #1	1½" Tri clamp	1½" (38 mm)	< 50 gpm @ 30 psi
2	CIP supply 1	1½" Tri clamp	1½" (38 mm)	< 120 gpm @ 175 psi
3	CIP supply 2	1½" Tri clamp	1½" (38 mm)	< 120 gpm @ 175 psi
4	CIP return 1	1½" Tri clamp	1½" (38 mm)	< 120 gpm @ 35 psi
5	CIP return 2	1½" Tri clamp	1½" (38 mm)	< 120 gpm @ 35 psi
6	**Optional:** Ozone in	1½" Tri clamp	1½" (38 mm)	< 70 gpm @ 40 psi
7	**Optional:** Ozone out	1½" Tri clamp	1½" (38 mm)	< 70 gpm @ 40 psi
8	Drain	1½" Tri clamp	1½" (38 mm)	< 120 gpm @ 35 psi
9	Electrical	Plug	60 Amps	3x480V, ground, 60 Hz, 60 Amps
10	Steam in	1" NPT	½" (12 mm)	
11	Condensate out	½" NPT	60 Amps	
11	Compressed air	1" Tri clamp	1" (25 mm)	Nominal cfm @ 90 psi < 45 cfm @ < 40 psi (purge)

CIP System [MEC+CSV1]

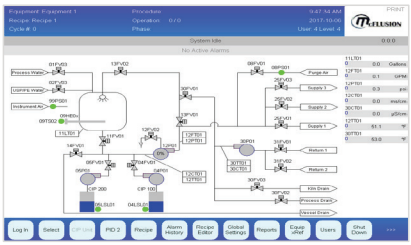


- Compact frame in AISI 304 stainless steel with six (6) adjustable feet
  - Remote or integrated CIP return pump
  - Remote or integrated HMI station
- Modular hardware and software platform – multiple configurations.
- Wetted parts and components in AISI316L SS, sanitary diaphragm & butterfly valves.
- Full TACCT cleaning performance and flexibility
  - Adjustable pressures
  - Adjustable flow rates
  - Adjustable temperatures
  - Adjustable concentrations
- Full instrumentation package, including level, pressure, flow, temperature and conductivity (low and high)
- Integrated electrical panel with AB Compact Logix PLC w/integrated or remote HMI station
  - Full recipe editor, alarm handling and cycle reporting to PDF
  - Prepared for full integration with process equipment & facility systems

Technical Data	Unit	MEC+CSV1
Buffer tank	Gallon	150
Supply pressure	PSI	<175
Supply flow	GPM	<80
Temperature, Steam jacket	°F	<300
Chemistry	mS/cm	<200

Controls:	
Allen Bradley compact Logix PLC	Yes
12" PC touch screen HMI	Yes
Allen Bradley software	Yes
McFlusion Process Builder Design ™	Yes
McFlusion AutoTune ™	Yes

Size:		
Dimensions (LxWxH)	Inch	80 x 40 x 84
Weight, dry	Lbs	1750

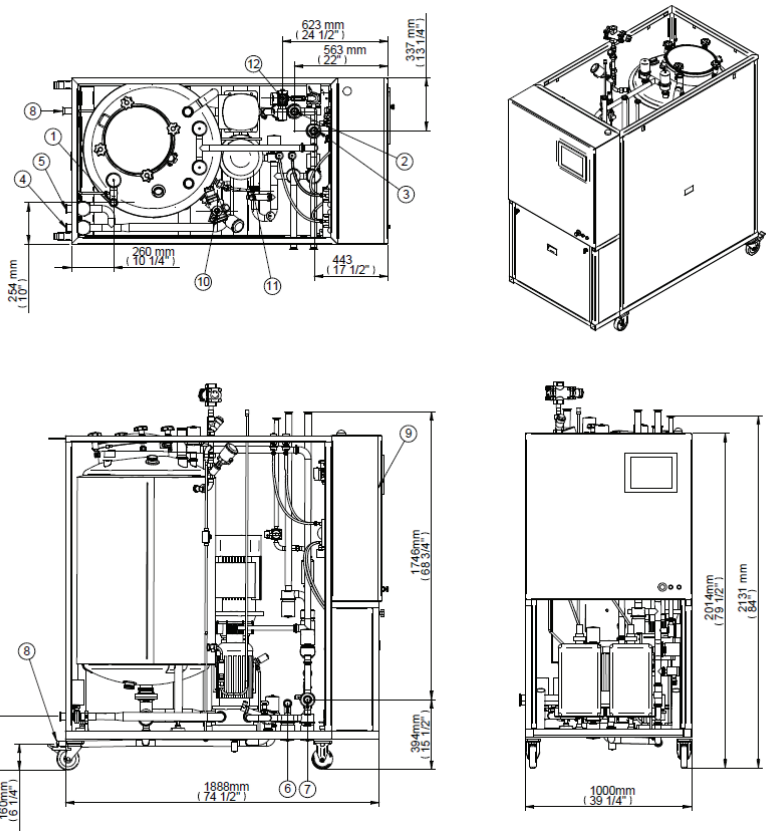


HMI interface: P&ID

- Real time component status
- Real time instrument readings

Item Number	Description	Accessories	Standard Unit Configurations and Automation Levels
UP6006	CIP System (MEC+CSV1)	Starting on page 46	Starting on page 49

General layout & tie-in schematic



#	Designation	Connection	Sizing	Expected setup
1	Water #1	1½" Tri clamp	1½" (38 mm)	< 50 gpm @ 30 psi
2	CIP supply 1	1½" Tri clamp	1½" (38 mm)	< 80 gpm @ 175 psi
3	CIP supply 2	1½" Tri clamp	1½" (38 mm)	< 80 gpm @ 175 psi
4	CIP return 1	1½" Tri clamp	1½" (38 mm)	< 80 gpm @ 35 psi
5	CIP return 2	1½" Tri clamp	1½" (38 mm)	< 80 gpm @ 35 psi
6	**Optional:** Ozone in	1½" Tri clamp	1½" (38 mm)	< 70 gpm @ 40 psi
7	**Optional:** Ozone out	1½" Tri clamp	1½" (38 mm)	< 70 gpm @ 40 psi
8	Drain	1½" Tri clamp	1½" (38 mm)	< 80 gpm @ 35 psi
9	Electrical	Plug	60 Amps	3x480V, ground, 60 Hz, 60 Amps
10	Steam in	1" NPT	1" (25 mm)	300 lbs/hr @ 35 psi
11	Condensate out	½" NPT	½" (12 mm)	
11	Compressed air	1" Tri clamp	1" (25 mm)	Nominal cfm @ 90 psi < 45 cfm @ < 40 psi (purge)

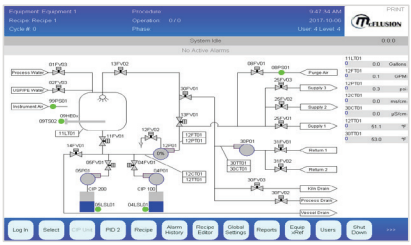
CIP System [MEC+CSV2]

- Compact frame in AISI 304 stainless steel with six (6) adjustable feet
  - Remote or integrated CIP return pump
  - Remote or integrated HMI station
- Modular hardware and software platform – multiple configurations.
- Wetted parts and components in AISI316L SS, sanitary diaphragm & butterfly valves.
- Full TACCT cleaning performance and flexibility
  - Adjustable pressures
  - Adjustable flow rates
  - Adjustable temperatures
  - Adjustable concentrations
- Full instrumentation package, including level, pressure, flow, temperature and conductivity (low and high)
- Integrated electrical panel with AB Compact Logix PLC w/integrated or remote HMI station
  - Full recipe editor, alarm handling and cycle reporting to PDF
  - Prepared for full integration with process equipment & facility systems

Technical Data	Unit	MEC+CSV2
Buffer tank	Gallon	250
Supply pressure	PSI	<175
Supply flow	GPM	<120
Temperature, Steam jacket	°F	<300
Chemistry	mS/cm	<200

Controls:	
Allen Bradley compact Logix PLC	Yes
12" PC touch screen HMI	Yes
Allen Bradley software	Yes
McFlusion Process Builder Design ™	Yes
McFlusion AutoTune ™	Yes

Size:		
Dimensions (LxWxH)	Inch	80 x 40 x 90
Weight, dry	Lbs	1950

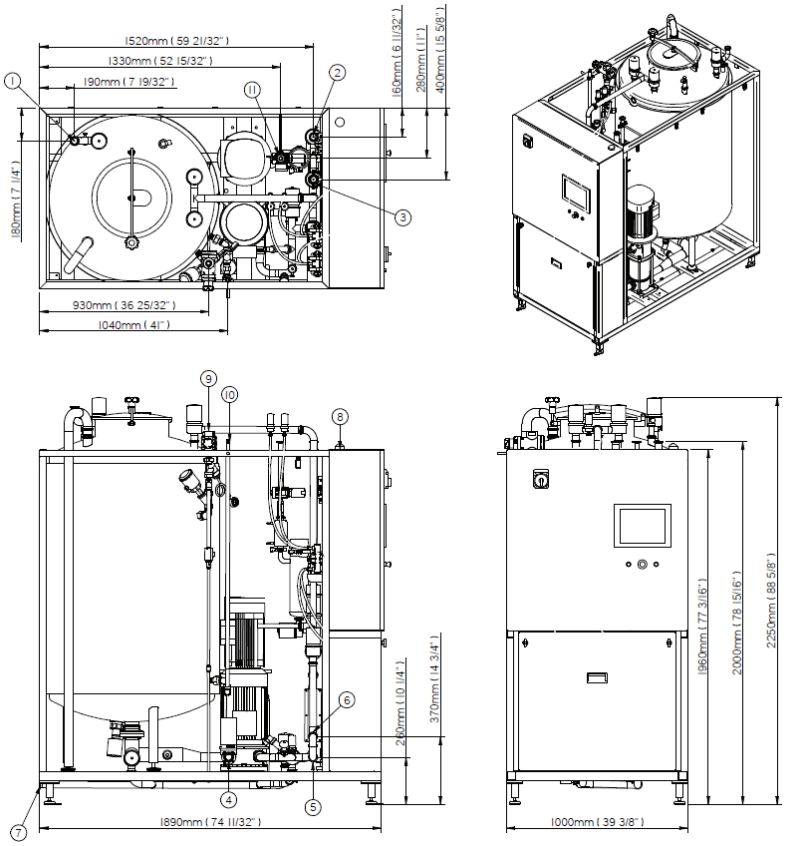


HMI interface: P&ID

- Real time component status
- Real time instrument readings

Item Number	Description	Accessories	Standard Unit Configurations and Automation Levels
UP6007	CIP System (MEC+CSV2)	Starting on page 46	Starting on page 49

General layout & tie-in schematic

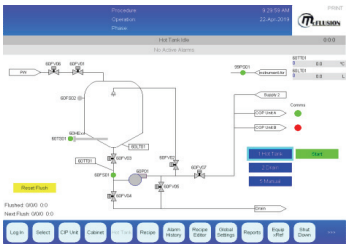


#	Designation	Connection	Sizing	Expected setup
1	Water #1	1½" Tri clamp	1½" (38 mm)	< 50 gpm @ 30 psi
2	CIP supply 1	1½" Tri clamp	1½" (38 mm)	< 120 gpm @ 175 psi
3	CIP supply 2	1½" Tri clamp	1½" (38 mm)	< 120 gpm @ 175 psi
4	CIP return 1	1½" Tri clamp	1½" (38 mm)	< 120 gpm @ 35 psi
5	CIP return 2	1½" Tri clamp	1½" (38 mm)	< 120 gpm @ 35 psi
6	**Optional:** Ozone in	1½" Tri clamp	1½" (38 mm)	< 70 gpm @ 40 psi
7	**Optional:** Ozone out	1½" Tri clamp	1½" (38 mm)	< 70 gpm @ 40 psi
8	Drain	1½" Tri clamp	1½" (38 mm)	< 120 gpm @ 35 psi
9	Electrical	Plug	60 Amps	3x480V, ground, 60 Hz, 60 Amps
10	Steam in	1" NPT	1" (25 mm)	300 lbs/hr @ 35 psi
11	Condensate out	½" NPT	½" (12 mm)	
11	Compressed air	1" Tri clamp	1" (25 mm)	Nominal cfm @ 90 psi < 45 cfm @ < 40 psi (purge)

Stand-alone Hot Water Tank System [MEC+]

- Compact platform in AISI 304 stainless steel with four (4) adjustable feet
- 250 gallon atmospheric buffer vessel
- Level and temperature control & monitoring
- Integrated heating module (electric or steam)
- Integrated circulation and transfer pump
- Wetted parts and components in AISI316L SS, sanitary butterfly valves, etc.
- Electrical panel with AB Compact Logix PLC w/full integration to McFlusion CIP equipment
- Hot Water Tank can be used as shared resource for multiple CIP systems
- System is designed for full internal cleaning and sanitization and is equipped with purge functionality.

Technical Data	Unit	HWT - MEC+
Flow	GPM	<45
Buffer Tank	Gallon	250
Supply pressure	PSI	<45
Temperature, Electric (option: steam jacket)	°F	<200



Controls:	
Allen Bradley compact Logix PLC	Yes
Allen Bradley software	Yes
Integrated and controlled by CIP equipment	Yes
McFlusion Process Builder Design ™	Yes
Purge functionality	Optional

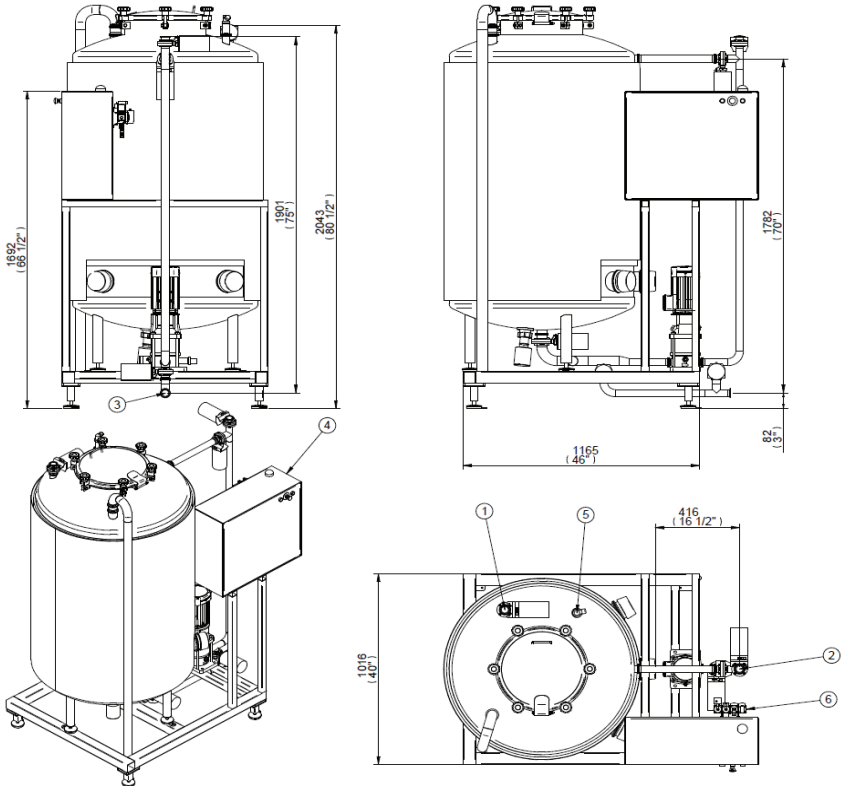
HMI interface: P&ID

- Real time component status
- Real time instrument readings

Size:		
Dimensions (LxWxH)	Inch	63 x 40 x 85
Weight, dry	Lbs	750

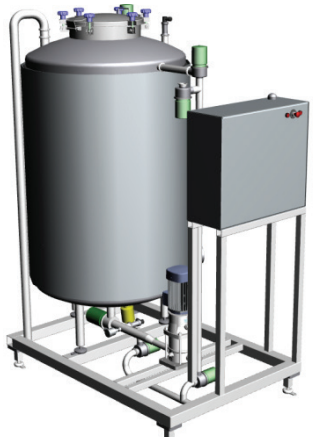
Item Number	Description	Accessories	Standard Unit Configurations and Automation Levels
UP6008	250 gallon hot water system	Starting on page 46	Starting on page 49

General layout & tie-in schematic



#	Designation	Connection	Sizing	Expected setup
1	Water #1	1½" Tri clamp	1½" (38 mm)	< 50 gpm @ 30 psi
2	Supply / transfer	1½" Tri clamp	1½" (38 mm)	< 45 gpm @ 35 psi
3	Drain	1½" Tri clamp	1½" (38 mm)	< 30 gpm @ 20 psi
4	Electrical	Plug	60 Amps	3x480V, ground, 60 Hz, 60 Amps
5	High level switch	1½" Tri clamp	1" (25 mm)	N/A
6	Compressed air	¼" NPT	½" (4 mm)	Nominal cfm @ 90 psi

Stand-alone Hot Water Tank System [MEC+CSV]

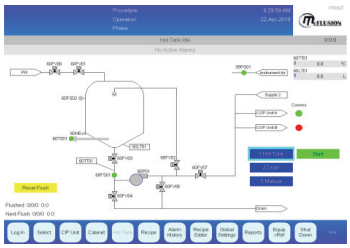


- Compact platform in AISI 304 stainless steel with four (4) adjustable feet
- 250 gallon atmospheric buffer vessel
  - Optional vent filter arrangement w/rupture disc, etc.
- Level and temperature control & monitoring
- Integrated heating module (electric or steam)
- Integrated circulation and transfer pump
- Wetted parts and components in AISI316L SS, diaphragm valves, etc.
- Electrical panel with AB Compact Logix PLC w/full integration to McFlusion CIP equipment
- Hot Water Tank can be used as shared resource for multiple CIP systems
- System is designed for full internal cleaning, sanitization and purge. System is prepared for integration with Ozone skid.

Technical Data	Unit	HWT - MEC+CSV
Buffer Tank	Gallon	250
Supply pressure	PSI	<45
Temperature, Electric (option: steam jacket)	°F	<200

Controls:	
Allen Bradley compact Logix PLC	Yes
Allen Bradley software	Yes
Integrated and controlled by CIP equipment	Yes
McFlusion Process Builder Design ™	Yes
Purge functionality	Yes
Ozone	Optional

Size:		
Dimensions (LxWxH)	Inch	63 x 40 x 85
Weight, dry	Lbs	850

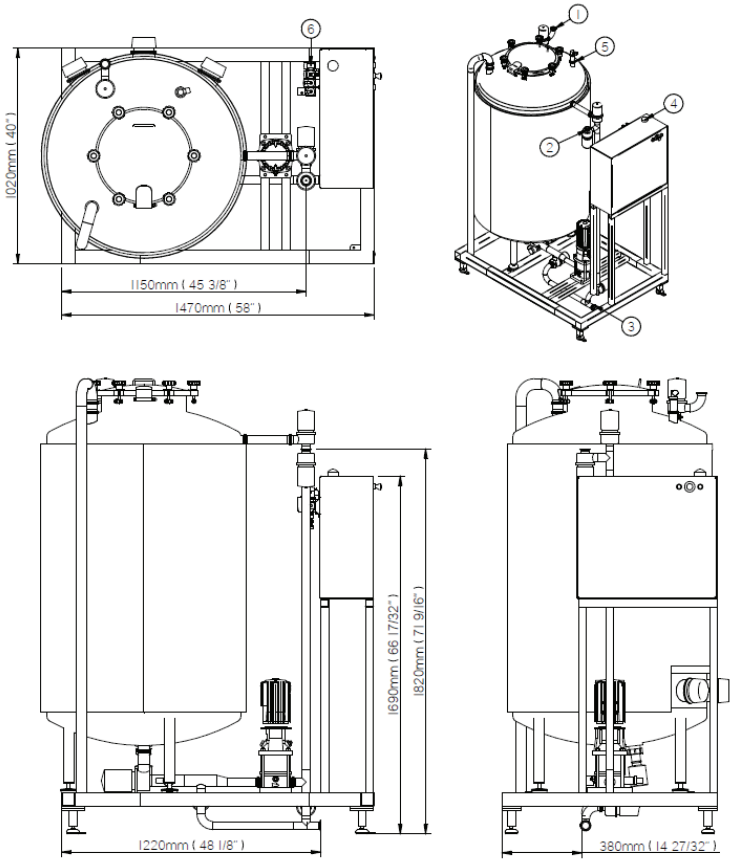


HMI interface: P&ID

- Real time component status
- Real time instrument readings

Item Number	Description	Accessories	Standard Unit Configurations and Automation Levels
UP6008	250 gallon hot water system	Starting on page 46	Starting on page 49

General layout & tie-in schematic



#	Designation	Connection	Sizing	Expected setup
1	Water #1	1½" Tri clamp	1½" (38 mm)	< 50 gpm @ 30 psi
2	Supply / transfer	1½" Tri clamp	1½" (38 mm)	< 45 gpm @ 35 psi
3	Drain	1½" Tri clamp	1½" (38 mm)	< 30 gpm @ 20 psi
4	Electrical	Plug	60 Amps	3x480V, ground, 60 Hz, 60 Amps
5	High level switch	1½" Tri clamp	1" (25 mm)	N/A
6	Compressed air	¼" NPT	½" (4 mm)	Nominal cfm @ 90 psi

150 and 250 Gallon Add-on Buffer Tanks for CIP systems [MEC+]

- Compact platform in AISI 304 stainless steel with four (4) adjustable feet
- 150 gallon or 250 gallon atmospheric buffer vessel
- Level and temperature control & monitoring
- Integrated heating module (electric or steam)
- Integrated circulation and transfer pump
- Wetted parts and components in AISI316L SS, sanitary butterfly valves, etc.
- Electrical panel with remote I/Os for full integration to McFlusion CIP equipment
- System is designed for full internal cleaning, sanitization and purge.

Technical Data	Unit	150 Gallon Buffer tank [MEC+]	250 Gallon Buffer tank [MEC+]
Buffer Tank	Gallon	150	250
Supply pressure	PSI	<45	<45
Temperature, Electric (option: steam jacket)	°F	<200	<200

Controls:			
Integrated and controlled by CIP equipment		Yes	Yes
McFlusion Process Builder Design ™		Yes	Yes

Size:			
Dimensions (LxWxH)	Inch	63 x 40 x 85	63 x 40 x 85
Weight, dry	Lbs	750	850

Item Number	Description	Accessories	Standard Unit Configurations and Automation Levels
MP7000	150 gallon add-on buffer tank	Starting on page 46	Starting on page 49
MP7001	250 gallon add-on buffer tank		

150 and 250 Gallon Add-on Buffer Tanks for CIP systems [MEC+CSV]

- Compact platform in AISI 304 stainless steel with four (4) adjustable feet
- 150 gallon or 250 gallon atmospheric buffer vessel
  - Optional vent filter arrangement with rupture disc, etc.
- Level and temperature control & monitoring
- Integrated heating module (electric or steam)
- Integrated circulation and transfer pump
- Wetted parts and components in AISI316L SS, sanitary diaphragm valves, etc.
- Electrical panel with remote I/Os for full integration to McFlusion CIP equipment
- System is designed for full internal cleaning, sanitization and purge. System is prepare for integration with Ozone skid.

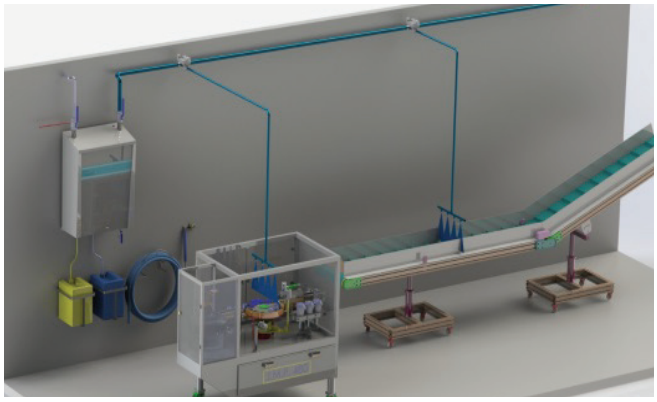
Technical Data	Unit	150 Gallon Buffer tank [MEC+CSV]	250 Gallon Buffer tank [MEC+CSV]
Buffer Tank	Gallon	150	250
Supply pressure	PSI	<45	<45
Temperature, Electric (option: steam jacket)	°F	<200	<200

Controls:			
Integrated and controlled by CIP equipment	Yes		
McFlusion Process Builder Design ™	Yes		
Integration with Ozone system	Optional		

Size:			
Dimensions (LxWxH)	Inch	63 x 40 x 85	63 x 40 x 85
Weight, dry	Lbs	750	850

Item Number	Description	Accessories	Standard Unit Configurations and Automation Levels
MP7002	150 gallon add-on buffer tank	Starting on page 46	Starting on page 49
MP7003	250 gallon add-on buffer tank		

Automated Single Pass [ASP+]



The Automated Single Pass [ASP+] equipment is specifically designed for cleaning (CIP) and sanitization (hot water, chemical, ozone) of closed and open manufacturing equipment within the pharmaceutical oral (solid/liquid) dosage forms, chemical API, and OLC (ointment, liquids, creams) industry segments.

The ASP+ equipment executes Cleaning-In-Place (CIP) of process equipment in single-pass-to-drain without any re-circulation of rinse and/or CIP solutions. The ASP+ equipment is tank- and heater-less relying on the facility systems for water at the specified flow rate and temperature.

The ASP+ equipment consists of a main (or booster) station with a single or multiple (point-of-use) satellites that facilitate boosted pressure (up to 225 psi) water and/or CIP solution to the installed spray devices in the process equipment.

Each ASP+ Satellite features a 3-in-1 chemical block – enabling injection of up to 3 chemicals in one and the same block with just one outlet.

The ASP+ equipment is equipped with an electrical panel with AB Compact Logix PLC and 12" touch screen Operator panel and full recipe editor.

The ASP+ equipment can be configured for decentralized or centralized (plant wide) installations.

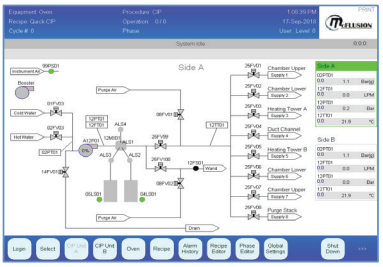
The ASP+ equipment is suited for cleaning of various manufacturing equipment, such as:

- Packaging lines
- Filling (bottling) equipment
- Conveyors
- Mixing tanks
- IBCs and more...

Automated Single Pass [ASP+] Main Station

- Compact floor or wall-mounted box in AISI 304 stainless steel
- Integrated supply pump w/frequency inverter
  - Dynamic outlet pressure – up to 75 gpm / up to 225 psi
- 3-in-1 Chemical block – allowing injection of up to three (3) different chemicals
- Pressure and flow control, temperature monitoring.
- Wetted parts and components in AISI316L SS, sanitary butterfly valves, etc.
- Electrical panel with AB Compact Logix PLC w/12" touch screen operator panel
- Full recipe editor w/McFlusion AutoTune™

Technical Data	Unit	ASP+Main Station
Water		
Pump pressure at 45 PSI inlet pressure	PSI	225
Min./max. inlet pressure	PSI	30/150
Max. water consumption	GPM	75
Max. temperature	°F	175
Pipe dimension inlet	Inch	1.5" tri clamp
Pipe dimension outlet	Inch	1.5" tri clamp



HMI interface: P&ID

- Real time component status
- Real time instrument readings

Controls:		
Allen Bradley compact Logix PLC	Yes	
Allen Bradley software	Yes	

Power supply:		
Standard voltage	V	380-500
Frequency	Hz	50-60
Max. power consumption	kW (HP)	6.0 (8.0)

Size:		
Dimensions (LxWxH)	Inch	31"x47"x18.5"
Weight	Lbs	322

Item Number	Description	Accessories	Standard Unit Configurations and Automation Levels
UP6030	ASP+ Main Station	Starting on page 46	Starting on page 49

Automated Single Pass [ASP+] Satellite(s)

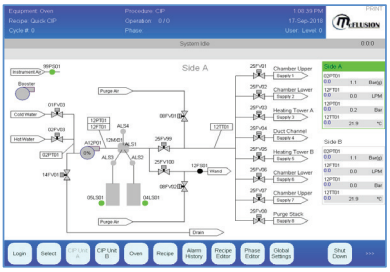
- Compact wall-mounted box in AISI 304 stainless steel
- Designed to received boosted pressure water from main station
  - Min/max inlet pressure: 30/225 psi
- 3-in-1 Chemical block – allowing injection of up to three (3) different chemicals
- Wetted parts and components in AISI316L SS, sanitary butterfly valves, etc.
- Integrated with and controlled by ASP+ main station.
  - Optional: Allen Bradley PLC and software as well as 12" touch screen operator panel

Technical Data	Unit	ASP+Satellite
Water		
Min./max. inlet pressure	PSI	30/225
Max. water consumption	GPM	75
Max. temperature	°F	160
Pipe dimension inlet	Inch	1.5" tri clamp
Pipe dimension outlet	Inch	1.5" tri clamp

Controls:	
Controlled by ASP+ Main Station	Yes
Allen Bradley PLC and software	Optional

Power supply:		
Standard voltage	V	120/230
Frequency	Hz	50-60
Max. power consumption	kW (HP)	0.3 (0.4)

Size:		
Dimensions (LxWxH)	Inch	20"x37.5"x16"
Weight	Lbs	104



HMI interface: P&ID

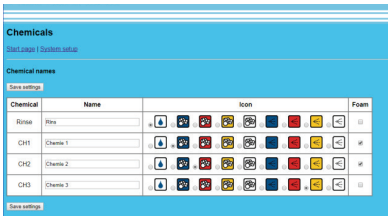
- Real time component status
- Real time instrument readings

Item Number	Description	Accessories	Standard Unit Configurations and Automation Levels
UP6031	ASP+ Satellite	Starting on page 46	Starting on page 49
UP6032	ASP+ Satellite w/PLC & HMI		

Portable Automated Single Pass [ASP+] Unit

- Portable, compact, unit in AISI 304 stainless steel
- Integrated supply pump w/frequency inverter
  - Dynamic outlet pressure – up to 75 gpm / up to 225 psi
- 3-in-1 Chemical block – allowing injection of up to two (2) different chemicals
- Pressure and flow control, temperature monitoring.
- Wetted parts and components in AISI316L SS, sanitary butterfly valves, etc.
- Innovative Control unit for automatic CIP with individual control of process equipment valves
  - 16 different recipes – editable from panel or via Phone, IPad or PC over WIFI

Technical Data	Unit	ASP+Satellite
Water		
Pump pressure at 45 PSI inlet pressure	PSI	225
Min./max. inlet pressure	PSI	30/150
Max. water consumption	GPM	75
Max. temperature	°F	175
Pipe dimension inlet	Inch	2" tri clamp
Pipe dimension outlet	Inch	2" tri clamp



Control interface: Recipe setup

- Real time instrument readings

Controls:		
Allen Bradley compact Logix PLC	Yes	
Allen Bradley software	Yes	

Power supply:		
Standard voltage	V	380-500
Frequency	Hz	50-60
Max. power consumption	kW (HP)	6.0 (8.0)

Size:		
Dimensions (LxWxH)	Inch	31"x47"x18.5"
Weight	Lbs	322

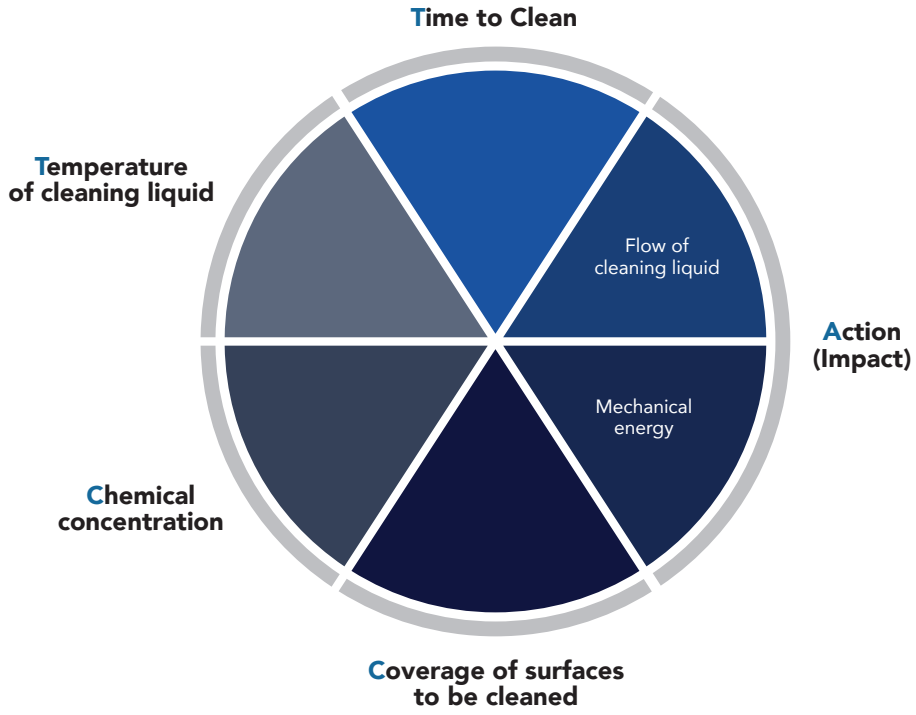
Item Number	Description	Accessories	Standard Unit Configurations and Automation Levels
MP7004	Portable ASP+ unit	Starting on page 46	Starting on page 49

Specialty Parts Washers [MEC+]

McFlusion designs and manufactures specialty Parts Washers and Cleaning Racks for Cleaning-Out-of-Place (COP), sanitization and drying of disassembled parts, larger componentry and vessels (bin, drums, tanks) within the pharmaceutical oral (solid/liquid) dosage forms, chemical API, and OLC (ointment, liquids, creams) industry segments.

The specialty parts washers and cleaning racks are based upon a modular technology platform that includes a washing cabinet, cleaning and drying units as well as portable racks. The portable racks are customized for specific disassembled parts & componentry.

The parts washers provide full TACCT cleaning performance & flexibility – securing highly effective, consistent and lean operations.



The parts washers are – in particular - suited for difficult-to-clean products and hard-to-clean parts/componentry, such as :

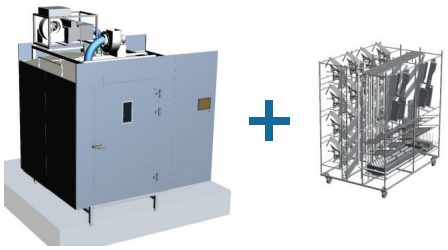
- Packaging lines
- Filling equipment
- Spray drying equipment
- Coating pans
- Blenders
- IBCs
- Drums & binsand more...

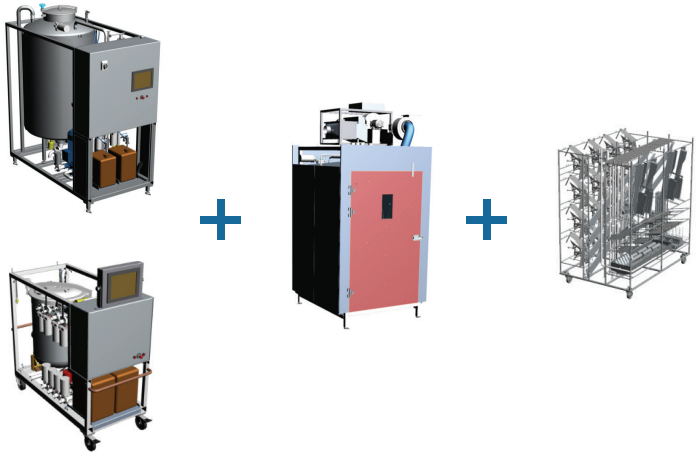
Specialty Parts Washers [MEC+]

McFlusion's modular program for specialty Parts Washers includes the following main configurations:

Complete Specialty Parts (COP) Washer System

- Single or double door washing cabinet for portable parts racks or stand-alone larger equipment (IBCs, totes, etc.)
- Process cleaning system (integrated)
- Forced air drying module (integrated)
- Portable custom racks for disassembled parts and componentry



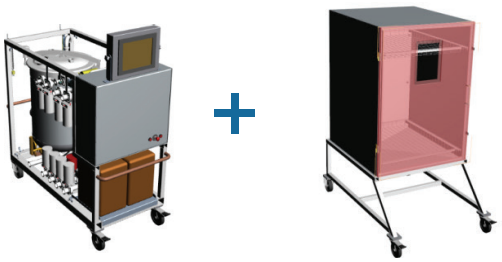


Modular Specialty Parts (COP) Washer System

- Single or double door washing cabinet for portable parts racks or stand-alone larger equipment (IBCs, totes, etc.)
- Stand-alone, portable or fixed, process cleaning system
- Stand-alone, portable or fixed (integrated), forced air drying module
- Portable custom racks for disassembled parts and componentry

Modular Specialty Parts (COP) Washer System

- Portable or fixed single door washing cabinetfor smaller parts
- Stand-alone, portable or fixed, process cleaning unit
- Stand-alone, portable or fixed, forced air drying module
- Single or multiple custom shelves



Specialty Parts Washer [MEC+PW-1]

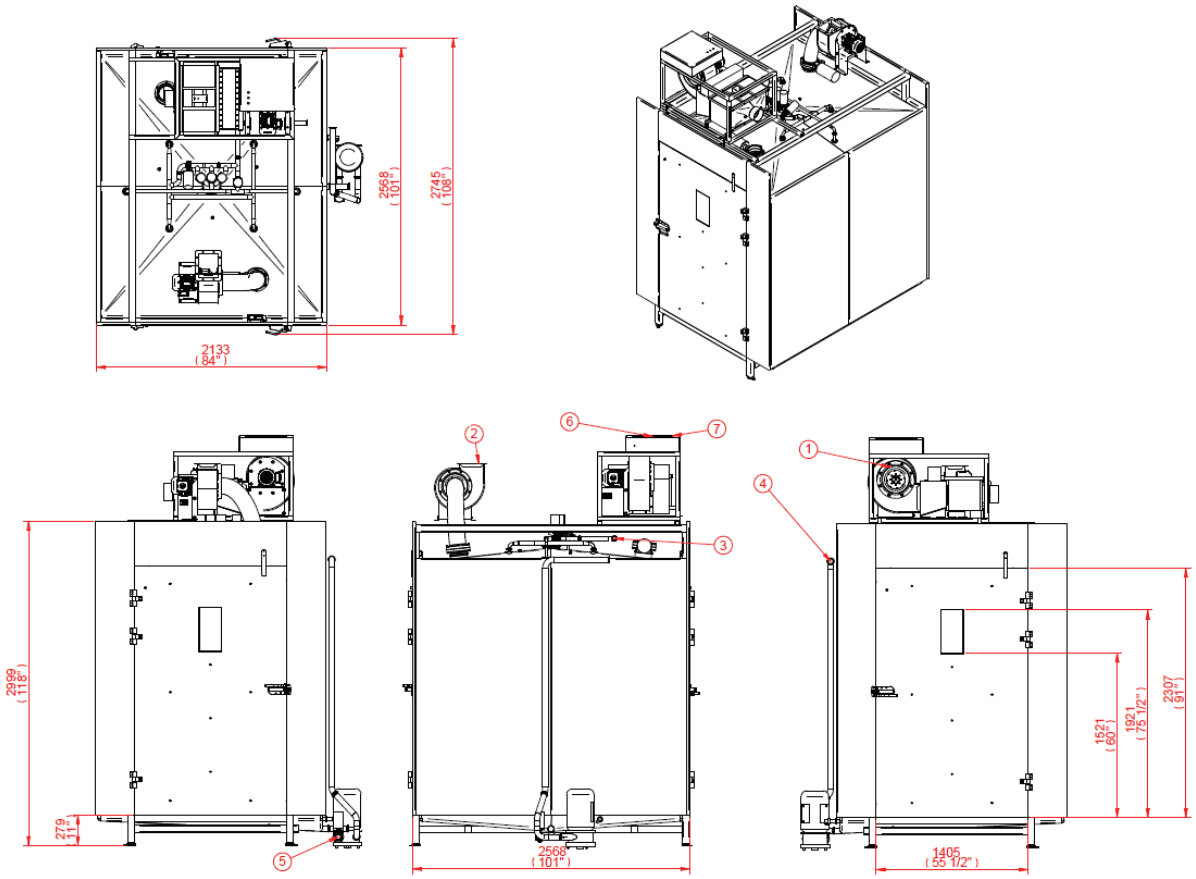
- Multi-purpose washing cabinet for disassembled parts, portable IBCs, hoppers and other process equipment.
- Single or double door washing cabinet in AISI 316 stainless steel with four (4) adjustable feet
- Perforated (drainable) floor with guide rails for process equipment
- Configurable piping and spray device setup with multiple cleaning zones
- Sloped drain pan w/single low point for true single-pass-to-drain rinses and/or re-circulation.
- Full integration with McFlusion CIP systems w/ full TACCT cleaning performance and flexibility
  - Adjustable pressures
  - Adjustable flow rates
  - Adjustable temperatures
  - Adjustable concentrations
- Optional: High capacity forced air drying module w/exhaust fan
- Optional: portable parts racks for disassembled parts

Technical Data	Unit	MEC+PW-1
Outer Dimensions (LxWxH)	Inch	73 x 70 x 110
Chamber dimensions (LxWxH)	Inch	68 x 65 x 100
Pan (LxWxH)	Inch	68 x 65 x 15
Door size (WxH)	Inch	55 x 90
Weight	Lbs	2450

Ceiling & wall mounted rotary spray arms	Yes
Portable parts rack, multi-zones	Yes
Forced air drying module	Optional
Exhaust fan	Optional
Full integration with McFlusion CIP	Yes

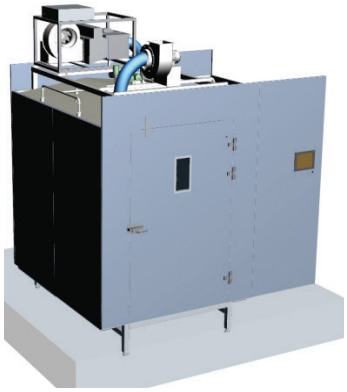
Item Number	Description	Accessories	Standard Unit Configurations and Automation Levels
UP6050	Parts Washer [MEC+PW1]	Starting on page 46	Starting on page 49

General layout & tie-in schematic



#	Designation	Connection	Sizing	Expected setup
1	Dryer Inlet	6.0" Tri clamp	6" Duct	N/A
2	Exhaust Outlet	6.0" Tri clamp	6" Duct	N/A
3	CIP Supply	1½" Tri clamp	1½" /38 mm sanitary tube	< 75 gpm @ <150 psi
4	CIP Return	2.0" Tri clamp	2.0" /51 mm sanitary tube	< 45 gpm @ 20 psi
5	Cabinet Drain	2.0" Tri clamp	2.0" /51 mm sanitary tube	< 45 gpm @ 20 psi
6	Electrical from CIP	3x480V, ground	30 amps rated cable	N/A
7	Pneumatic/Low Voltage Cable	Electrical Multicable	1" Conduit PVC	N/A

Specialty Parts Washer [MEC+PW-2]



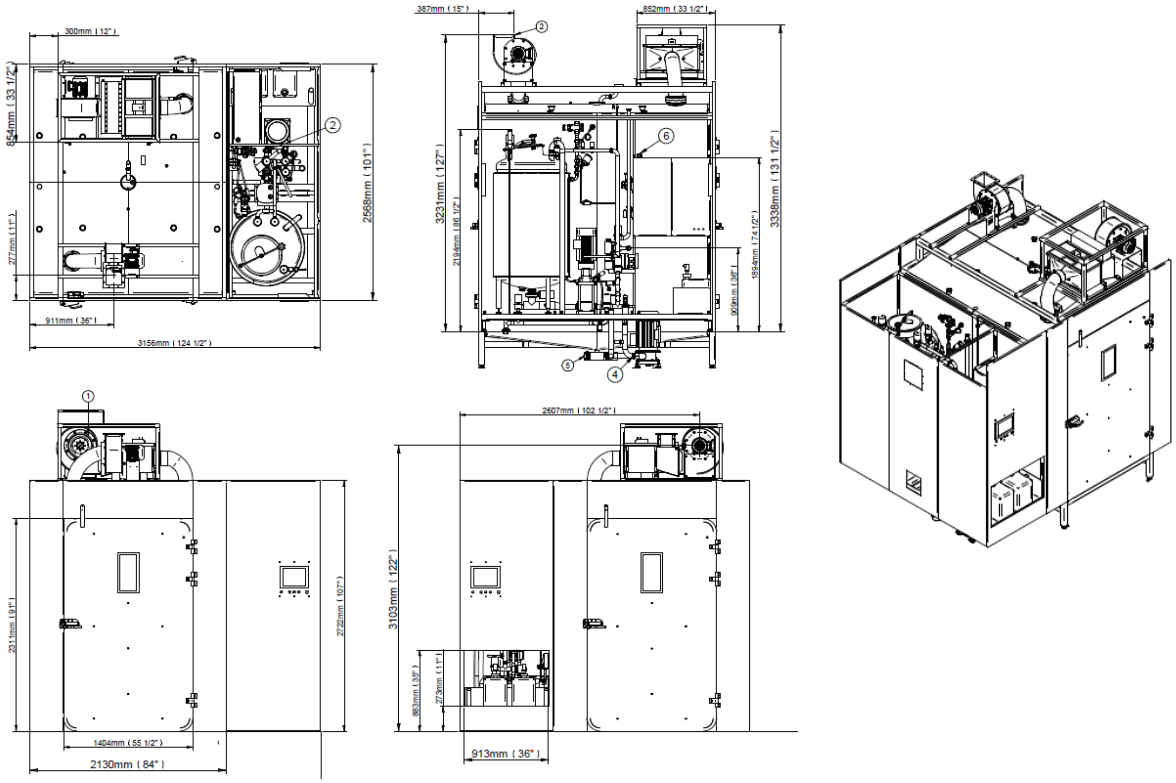
- Multi-purpose washing cabinet for disassembled parts, portable IBCs, hoppers and other process equipment.
- Single or double door washing cabinet in AISI 316 stainless steel with four (4) adjustable feet
- Perforated (drainable) floor with guide rails for process equipment
- Configurable piping and spray device setup with multiple cleaning zones
- Sloped drain pan w/single low point for true single-pass-to-drain rinses and/or re-circulation.
- Full integration with McFlusion CIP systems w/ full TACCT cleaning performance and flexibility
  - Adjustable pressures
  - Adjustable flow rates
  - Adjustable temperatures
  - Adjustable concentrations
- Optional: High capacity forced air drying module w/exhaust fan
- Optional: portable parts racks for disassembled parts

Technical Data	Unit	MEC+PW-2
Outer Dimensions (LxWxH)	Inch	101x 84 x 110
Chamber dimensions (LxWxH)	Inch	96 x 80 x 100
Pan (LxWxH)	Inch	96x 80 x 15
Door size (WxH)	Inch	55 x 90
Weight	Lbs	2650

Ceiling & wall mounted rotary spray arms	Yes
Portable parts rack, multi-zones	Yes
Forced air drying module	Optional
Exhaust fan	Optional
Full integration with McFlusion CIP	Yes

Item Number	Description	Accessories	Standard Unit Configurations and Automation Levels
UP6051	Parts Washer [MEC+PW-2]	Starting on page 46	Starting on page 49

General layout & tie-in schematic



#	Designation	Connection	Sizing	Expected setup
1	Dryer Inlet	6.0" Tri clamp	6" Duct	N/A
2	Exhaust Outlet	6.0" Tri clamp	6" Duct	N/A
3	CIP Supply	1½" Tri clamp	1½" /38 mm sanitary tube	< 75 gpm @ <150 psi
4	CIP Return	2.0" Tri clamp	2.0" /51 mm sanitary tube	< 45 gpm @ 20 psi
5	Cabinet Drain	2.0" Tri clamp	2.0" /51 mm sanitary tube	< 45 gpm @ 20 psi
6	Electrical from CIP	3x480V, ground	30 amps rated cable	N/A
7	Pneumatic/Low Voltage Cable	Electrical Multicable	1" Conduit PVC	N/A

Specialty Parts Washer [MEC+PW-3]

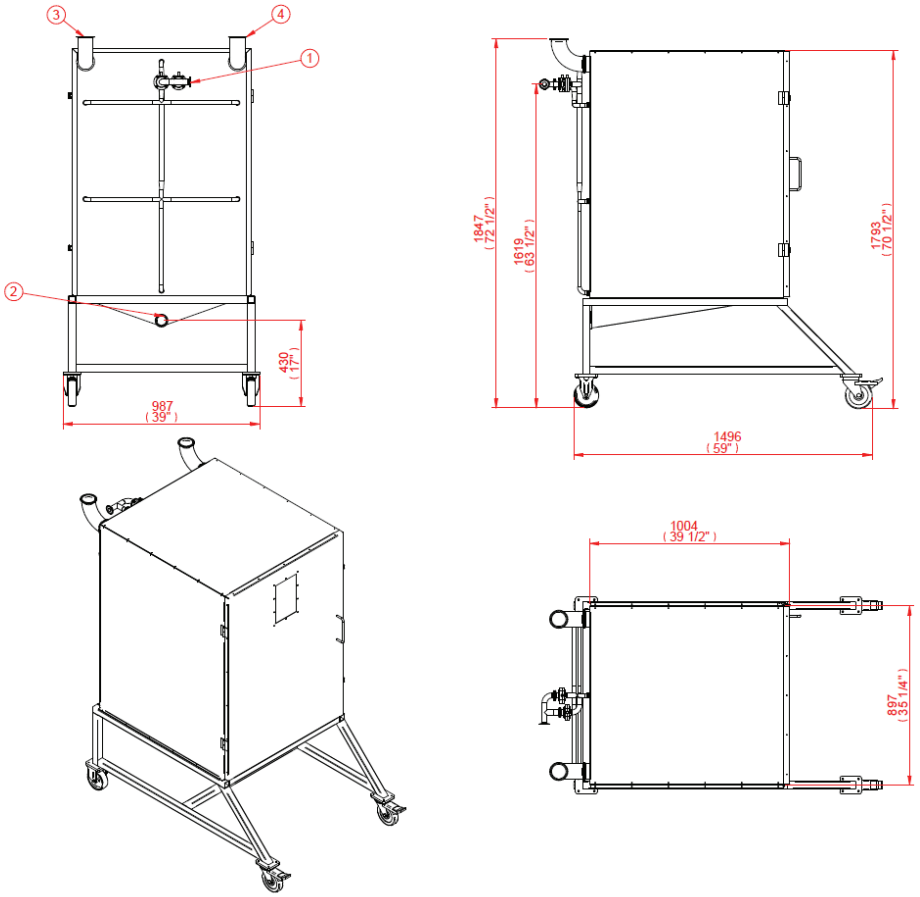
- Multi-purpose washing cabinet for disassembled parts
- Single door washing cabinet in AISI 316 stainless steel with four (4) wheels
- Perforated (drainable) floor with guide rails for pull-out drawer
- Configurable piping and spray device setup with multiple cleaning zones
- Sloped drain pan w/single low point for true single-pass-to-drain rinses and/or re-circulation.
- Full integration with McFlusion CIP systems w/ full TACCT cleaning performance and flexibility
  - Adjustable pressures
  - Adjustable flow rates
  - Adjustable temperatures
  - Adjustable concentrations

Technical Data	Unit	MEC+PW-2
Outer Dimensions (LxWxH)	Inch	40 (59) x 36 x 70
Chamber dimensions (LxWxH)	Inch	35 x 35 x 48
Pan (LxWxH)	Inch	35 x 35 x 12
Door size (WxH)	Inch	35 x 48
Weight	Lbs	375

Ceiling & wall mount rotary spray arms	Yes
Forced air drying module	Optional
Exhaust fan	Optional
Full integration with McFlusion CIP	Yes

Item Number	Description	Accessories	Standard Unit Configurations and Automation Levels
UP6052	Portable Parts Washer	Starting on page 46	Starting on page 49

General layout & tie-in schematic



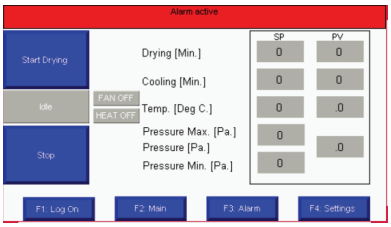
#	Designation	Connection	Sizing	Expected setup
1	Water in (from CIP)	1" Tri-clamp	1" (25 mm)	< 45 gpm @ < 110 psi
2	Drain	2" Tri clamp	2" (51 mm)	< 45gpm @ 20 psi
3	Air in (from facility)	3" Tri-clamp	3" (76 mm)	TBD
4	Exhaust (to facility)	3" Tri-clamp	3" (76 mm)	TBD

Forced Air Drying Module (portable or fixed)

- Compact, open, frame in AISI 304 stainless steel with four (4) wheels
  - Easy to maneuver
  - Easy to service
- Modular hardware and software platform – multiple configurations.
- 1.5 HP fan (blower): 1150 cfm @ 5" S.P.
- Pre-filter and HEPA filter (99.997 % efficiency)
  - Differential pressure monitoring, HEPA
- 24 kW electrical heater
- Temperature transmitter
- Integrated electrical panel with AB 850 series PLC and 4" Panel View
  - Settings for drying temperature, time and alarm limits

Technical Data	Unit	MEC+PW-2
Fan	CFM	1150 cfm @ 5" S.P
Pre-filter, MERV	CFM	1060
HEPA filter, efficiency	CFM	890 > 99.997%
Supply flow	CFM	>890
Temperature, 24 kW	°F	<200

Allen Bradley 850 series PLC	Yes
4" touch screen HMI	Yes
Allen Bradley software	Yes

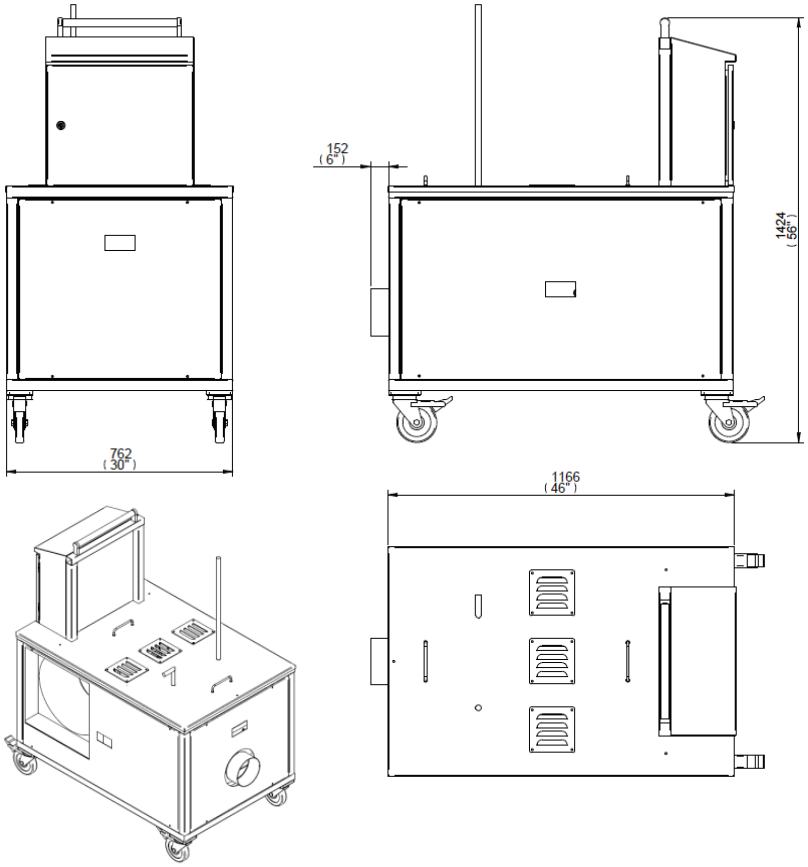


HMI interface: Recipe

Item Number	Description	Accessories	Standard Unit Configurations and Automation Levels
UP6053	Forced air drying unit	Starting on page 46	Starting on page 49

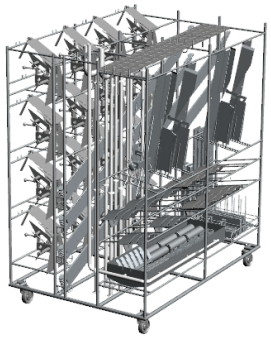
General layout & tie-in schematic

(shown with optional side covers and lid)



#	Designation	Connection	Sizing	Expected setup
1	Inlet (room air)		6"	< 875 scfm
2	Outlet		6"	> 875 scfm @ 5" S.P.
3	Electrical	Plug	40 amp	3x480V, ground, 60 Hz, 30 Amps

Portable Cleaning Rack [MEC+CR-1]



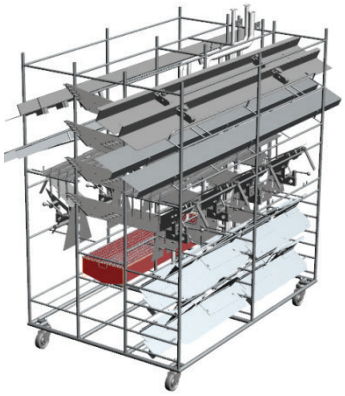
- Compact, open, frame in AISI 316 stainless – constructed in round tube/ rods for full clean-ability and drainage
  - Four (4) wheels, antistatic
- Multi-level rack system to maximize parts load
  - Rack loadable from all four (4) sides
- Custom racks & shelves
  - Racks - including brackets, flow-thru boxes, etc. - are developed in 2D/3D with full parts load and cleaning simulation
- Single point TC connections for up to three (3) different flow paths (cleaning zones)
- Distribution piping in ASIS 316 stainless steel for multiple zones
  - Integrated static spray nozzles and rotary spray arms
- Racks are self-cleaning and drain-able (gravity and purge)
- Cleaning, sanitization and purge process with individual control of each flow path (cleaning zone) is controlled by McFlusion recipe editor with AutoTune™ (patent pending) functionality

Technical Data	Unit	Rack
Dimensions (l x w x h)	Inch	41 x 43 x < 75
Weight, empty	lbs	App. 250
Material of construction	N/A	AISI316LEPDM, PTFE
Temperature	°F	<200
Chemistry	N/A	Compatible with standard chemicals

Configuration	
Single to multiple layer	Yes
Multiple zones (1-3)	Yes
Static spray nozzles	Yes
Rotary spray arms	Yes

Item Number	Description
MP7011	Portable Cleaning Rack

Portable Cleaning Rack [MEC+CR-2]



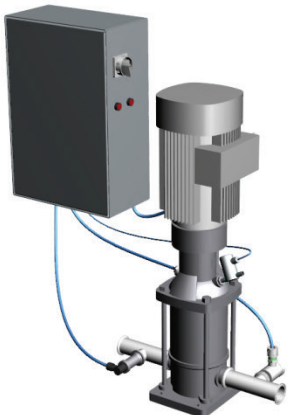
- Compact, open, frame in AISI 316 stainless – constructed in round tube/ rods for full clean-ability and drainage
  - Four (4) wheels, antistatic
- Multi-level rack system to maximize parts load
  - Rack loadable from all four (4) sides
- Custom racks & shelves
- Racks - including brackets, flow-thru boxes, etc. - are developed in 2D/3D with full parts load and cleaning simulation
- Single point TC connections for up to three (3) different flow paths (cleaning zones)
- Distribution piping in ASIS 316 stainless steel for multiple zones
  - Integrated static spray nozzles and rotary spray arms
- Racks are self-cleaning and drain-able (gravity and purge)
- Cleaning, sanitization and purge process with individual control of each flow path (cleaning zone) is controlled by McFlusion recipe editor with AutoTune™ (patent pending) functionality

Technical Data	Unit	Rack
Dimensions (l x w x h)	Inch	41 x 60 x < 75
Weight, empty	lbs	App. 275
Material of construction	N/A	AISI316LEPDM, PTFE
Temperature	°F	<200
Chemistry	N/A	Compatible with standard chemicals

Configuration	
Single to multiple layer	Yes
Multiple zones (1-3)	Yes
Static spray nozzles	Yes
Rotary spray arms	Yes

Item Number	Description
MP7012	Portable Cleaning Rack

CIP Heartbeat Pumps

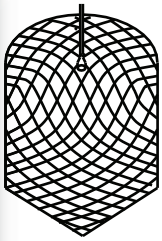


Traditional Cleaning-In-Place (CIP) systems are – as standard – designed with single stage centrifugal pumps with flow control that often is the root cause of overly time-consuming, resource demanding and failure prone cleaning processes.

We have successfully developed and implemented a program of CIP Heartbeat Pumps (patent pending) that will achieve the best possible CIP supply performance and flexibility.

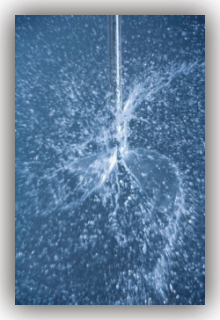
Item Number	Description
MP0601	CHB Pump 45 - w/ PT, FT, TT, air vent, built-in frequency inverter
MP0602	CHB Pump 70 - w/ PT, FT, TT, air vent, built-in frequency inverter
MP0603	CHB Pump 130 - w/ PT, FT, TT, air vent, built-in frequency inverter
MP0610	Rockwell RS Logix 5000 plc software platform for CIP Heartbeat without PLC
MP0611	AB Compact Logic 1769 plc software platform for CIP Heartbeat

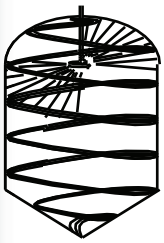
Accessories



High Impact Rotary Spray Devices

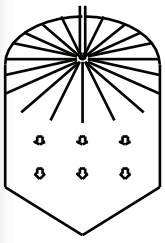
Item Number	Description
O-M1005.1	3X-Jet Head, type 25.110, 4 nozzles
O-M1005.2	3X-Jet Head, type 32.110, 4 nozzles
O-M1005.3	3X-Jet Head, type 40.110, 4 nozzles
M1038	3X-Jet Head, type 45.75, 4 nozzles
M1033	3X-Jet Head, type 11.75, 4 nozzles
M1036	3X-Jet Head, type 18.75, 4 nozzles
M1037	3X-Jet Head, type 21.75, 4 nozzles





Medium Impact Rotary Spray Devices

Item Number	Description
M1017.xx	2X-Rotate, type 20.120
M1016.xx	2X-Rotate, type 15.75
M1015.xx	2X-Rotate, type 10.60
M1004.xx	2X-Rotate, type 7-40.30
M1080	2.5X-Rotate, type 22.75
M1081	2.5X-Rotate, type 65.75
M1082	2.5X-Rotate, type 10.75
M1083	2.5X-Rotate, type 25.75
M1084	2.5X-Rotate, type 38.75
M1085	2.5X-Rotate, type 46.75



Low Impact Static Spray Devices

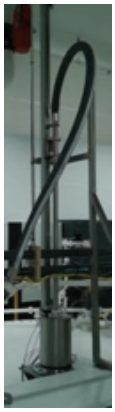
Item Number	Description
M1034	Sani 70 gpm @ 25 psi
M1031.xx	Sani 30 gpm @ 25 psi (360, 180, 270)

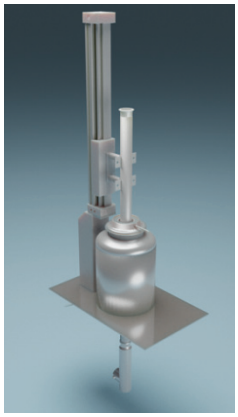
Accessories

Retractable cylinders with spray device for Parts Washers and other applications

We have an extended program design of retractable spray devices for usage in our Parts Washers and for stand-alone installations, such as existing vessels and other process equipment.
Our retractable cylinders are available with up to 7’ travel length - and we have also closing mechanism for stand-alone devices to create a closed and sanitary barrier between the process equipment and the spary device in retracted mode.

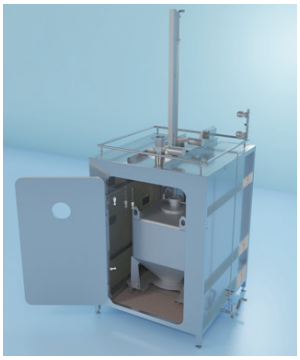
Please ask for details on this product program!

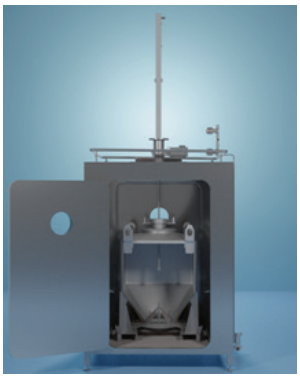




Stand-alone Retractable device

- Up to 7’ travel length
- Two types of locking mechanisms
- Can be installed vertically or horizontally
- Complete with servomotor and/or proximity switch control

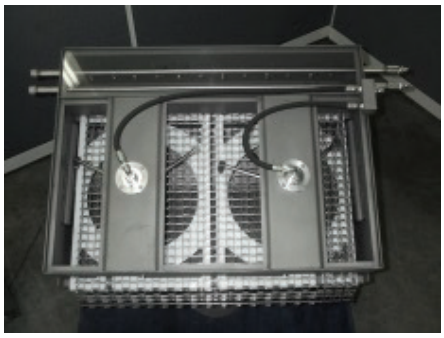




Retractable devices for IBC Washers

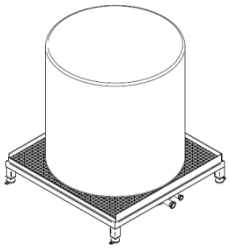
- Up to 7’ travel length
- Complete with servomotor and/or proximity switch control
- Automatic opening of IBC bottom valves from ServoLift, ChargePoint or others

Accessories



Specialty Cleaning Devices

Item Number	Description
M1070	Conveyor Cleaner, type 1 20-30" wide w/2 arms and 2-4 nozzles
M1071	Conveyor Cleaner, type 2 35-45" wide w/2arms and 2-4 nozzles
M1072	Rotating Cleaning arm device, type 1 20-36" wide w/2 arms and 8 nozzles (app 8 gpm @ 75 psi)



Cleaning Adapters

Item Number	Description
M1073	Drum cleaning platform
M1074	Retractable 6' adapter (without cleaning device)
M1075	Retractable 6' adapter (without cleaning device)
M1061.xx	Collection of adapters for process equipment (custom)
O-M1001.1x	CIP Adapter w/ double tri-clamp connectors and threads
O-M1002.1x	CIP Adapter w/ double tri-clamp connectors, adjustable length and threads

Flexible hose packages

Item Number	Description
MP0525	Hose package (15 ft) for CIP unit [MEC25+] 2 x Supply; 1 x Return; 1 x Water; 1 x Drain, 1 x Air
MP0526	Hose package (15 ft) for CIP unit [MEC35+] 2 x Supply; 1 x Return; 1 x Water; 1 x Drain, 1 x Air
MP0527	Hose package (15 ft) for CIP unit [MEC45+] 2 x Supply; 1 x Return; 1 x Water; 1 x Drain, 1 x Air

Spare parts

Item Number	Description
MP0550	Spare parts package for CIP unit [MEC25+]
MP0551	Spare parts package for CIP unit [MEC35+ and/or MEC45+]

Standard Configurations for CIP Systems [MEC+ and CSV]

The CIP units and systems [MEC+] are based on a modular hardware platform – allowing each system to be configured in multiple different ways, as listed below (other options are available upon request)

Side covers

Item Number	Description
MP8001.1-1	Unit side covers and detergent insert w/door, MEC25+
MP8001.1-2	Unit side covers and detergent insert w/door, MEC35+
MP8001.1-3	Unit side covers and detergent insert w/door, MEC45+

Steam heating

Item Number	Description
MP8003.1-3	Steam jacket, buffer tank for MEC25, 35 and 45+

Additional (3rd) CIP supply

Item Number	Description
MP8006.1-1	3rd CIP supply, 1½", including pipe, valve and controls
MP8006.1-2	3rd CIP supply, 2", including pipe, valve and controls

Additional (2nd) CIP return

Item Number	Description
MP8007.1-1	2nd CIP return, 1½", including pipe, valve and controls
MP8007.1-2	2nd CIP return, 2", including pipe, valve and controls

Additional (2nd) Drain

Item Number	Description
MP8008.1-1	2nd drain, 1½", including pipe, valve and controls
MP8008.1-1	2nd drain, 2", including pipe, valve and controls

Standard Automation Platform for CIP systems [MEC+ and CSV]

All McFlusion process cleaning (CIP/COP), sanitization and sterilization (SIP) equipment are equipped with a control panel for all automation hardware, i.e. pneumatic, electrical and automation installations.

The baseline automation platform is based upon an AB Compact Logix PLC, programmed in RS Logix 5000, with a 12" PC based touch screen operator panel, running RS Factory Talk View, with full recipe editor, alarm handling and cycle reporting to PDF (USB).

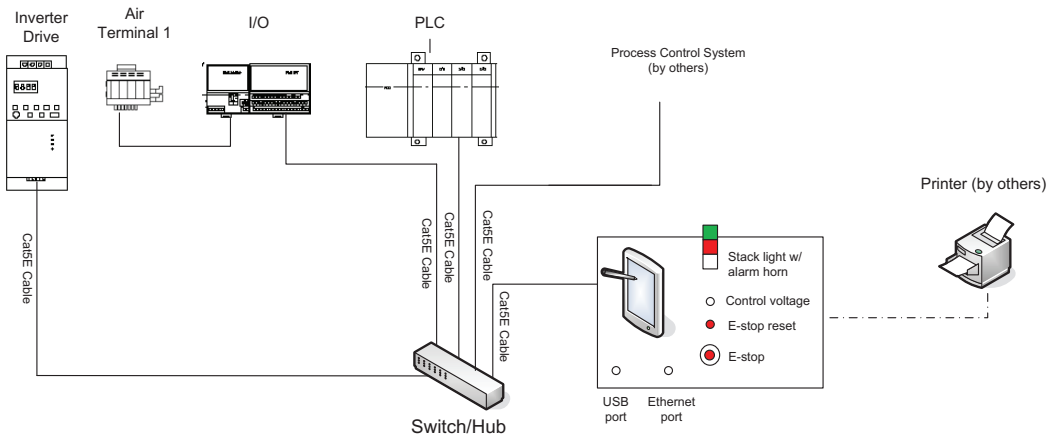
This automation platform includes McFlusion AutoTune software™ (patent pending) that accurately controls and monitors flow paths for cleaning, sanitization and sterilization w/high and high-high and low and low-low warnings and alarms for pressure and flow, etc.

In addition, the automation platform is prepared for the add-on McFlusion Process Builder Design™ (patent pending) that communicates and integrates all relevant componentry on the process equipment to ensure that cleaning and/or sterilization processes are not only easily and correctly set up and configured but also allows accurate adjustment (e.g. during cycle development) and monitoring (e.g. during validation and daily operation).

From the automation hardware perspective, the CIP system's main panel includes the following main components:

- Allen Bradley Compact Logix PLC unit;
- 12" PC based touch screen operator panel, running RS Factory Talk View (LDAP enabled);
- Allen Bradley I/O modules;
- Pneumatic control (valve) modules;
- Frequency inverter;
- Ethernet switch
  - Communication between hardware uses industrial Ethernet, CAT5 cables;
- Cycle Reporting to PDF – saved on USB stick, PC based operator panel or sent to site server ;
- Stack-light, alarm horn and E-stop (hard-wired);
- Ethernet and USB ports;

Example:
Automation Hardware (network) setup



Process Builder Design (PBD)™

For all our Process cleaning (CIP) equipment we have an add-on CIP Process integration platform for all process equipment that we are cleaning.

We will control the CIP/SIP sequences from the CIP plc – and integrate with the process equipment plc through a simple I/O mapping between the plc's – without changing the process equipment plc software. Any interlocks or other conditions for the process equipment will remain unchanged.

As such – we can create an efficient cleaning process with full data and process supervision of all elements of the process equipment we are cleaning.

And – we will develop and validate the CIP process in a fraction of time that is otherwise needed.

Ask for our "Process Builder Design" software platform to be included in any cleaning project.

Item Number	Description
MP9005	DCS TECH
MP9006	DCS GMP

GMP Data and Reports are - as standard - stored on the same computer that holds the technical data, viewer and reports.
As an option separate computers can be used for GMP and Technical data.

Data Collection System (DCS)

All our process cleaning (CIP/COP) equipment are available and can be delivered with the optional 2-tier Data Collection System (DCS).

Tier 1 – "DCS TECH" collects process technical data that can be applied for process analytics , trouble shooting, cleaning validation activities, etc.

Tier 2 – "DCS GMP" adds collection of GMP data for audit trail, historian and reporting.

Tier 1
Data Collection System (DCS) - TECH

DCS-TECH key features:

- Data collection from PLC every second, 24/7
- Raw data saved in Excel – structured in 24 hour files
- Process Viewer with Playback Tool for full raw data and event data (in Excel)
- Graphical Viewer for Analogue data (in Excel)
- Equipment Performance Report in PDF
- Alarm Reports in PDF
- Pro-active maintenance Reports in PDF

Tier 2
Data Collection System (DCS) - GMP

DCS-GMP key features:

- Data for GMP Reports stored in separate SQL database

Reports are generated for:

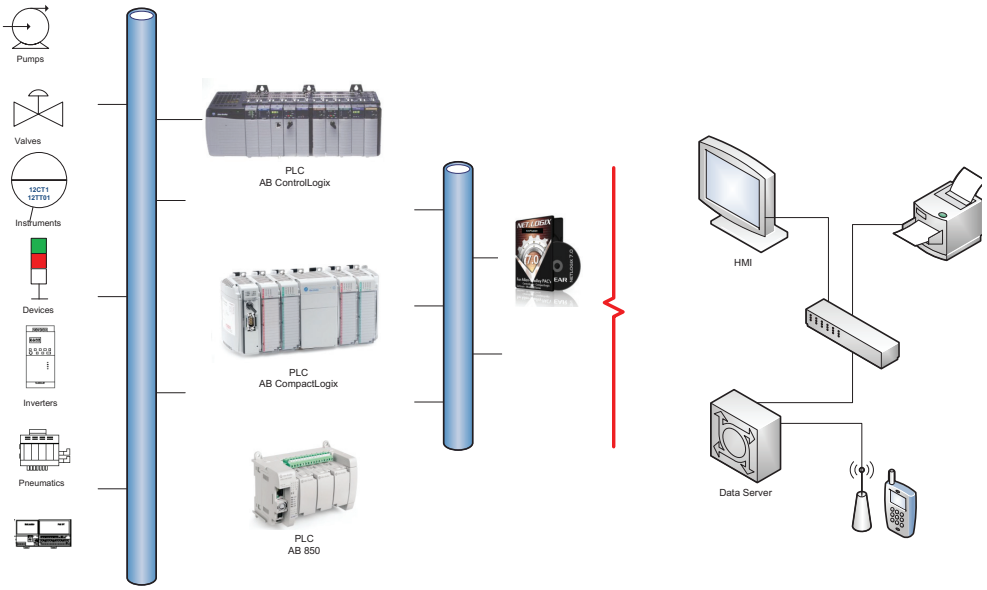
- Users
  - Log in/log out, new users, user account changes before/ after with time stamp
- CIP recipes
  - New recipes, recipe changes (old vs new comparison with yellow highlights to indicate changes)
- Global System parameters & timers
  - Shared timers and settings (old vs new comparison with yellow highlights to indicate changes)
- Alarm history events
  - Alarms activated/acknowledge with time stamp
- CIP Cycle reports – historic comparison

Item Number	Description
MP9005	DCS TECH
MP9006	DCS GMP

GMP Data and Reports are - as standard - stored on the same computer that holds the technical data, viewer and reports. As an option separate computers can be used for GMP and Technical data.

Data Collection System (DCS)

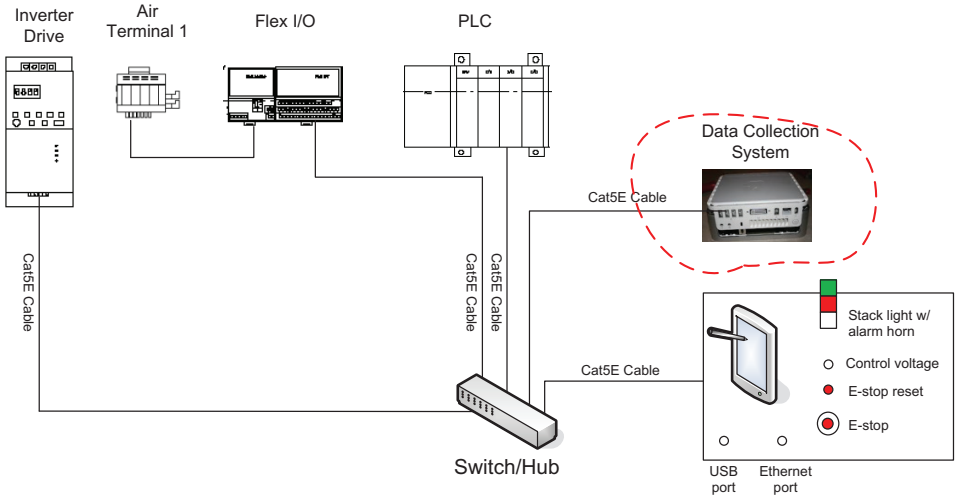
The DCS hardware platform is based on a stand-alone Win10 Pro computer that will be installed permanently in the electrical panel of the CIP equipment, where it will be set up to pull data from the PLC by means of Ethernet.



The Win10 Pro Computer will have the following basic software installed:

- Communication software (.NET OPC) to connect the DCS software to the Allen Bradley Compact Logix PLC
- Data Collection Server and Client software – developed in C# – using MS Excel as an ODBC database for viewing and reporting of process technical data. A SQL database is used for all GMP defined data and reports:
- Windows RDP communication to computer to eliminate the need for and use of keyboard, monitor and mouse

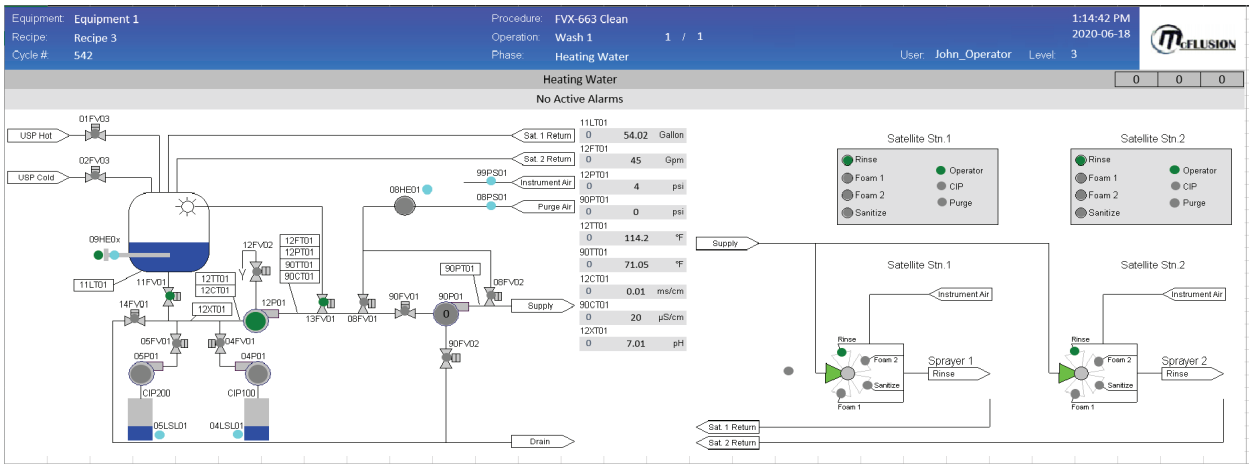
The schematic below shows an example of the automation hardware (network) setup with DCS.



Data Collection System (DCS) TECH

Data Collection System (DCS) – TECH

The DCS-TECH collects technical data and is equipped with our process analytics and trouble-shooting tool that uses an interactive Process Flow Diagram of the CIP as well as process equipment with visual component status – based upon events.



Technical data from the CIP equipment's PLC is collected every second, 24/7, which is saved, structured and presented in various reports – using the Win10 computer.

- The DCS software will collect the following data:
  - All analog and digital values will be logged every second This includes instrument readings, pumps, electrical heaters and valves.
  - User log in/log out events and alarm history will be logged.

The DCS-TECH system will automatically generate a pre-determined file, comprising the above data in ODBC compliant, black box (unstructured data) format for every 24 hours.

The visualization of each component in the process analytics and trouble-shooting software tool is based upon all - or sorted events - to make it possible to focus on specific process information and issues.

Software tool for process trending graphics are also included.

The DCS-TECH system will automatically generate and save the following reports in PDF format:

- Performance reports
- Alarm reports
- Pro-active maintenance

Note:
This tool also allows McFlusion Process engineers to access and analyze the data from a remote location on an as-needed basis (requires service contract)

Data Collection System (DCS) GMP

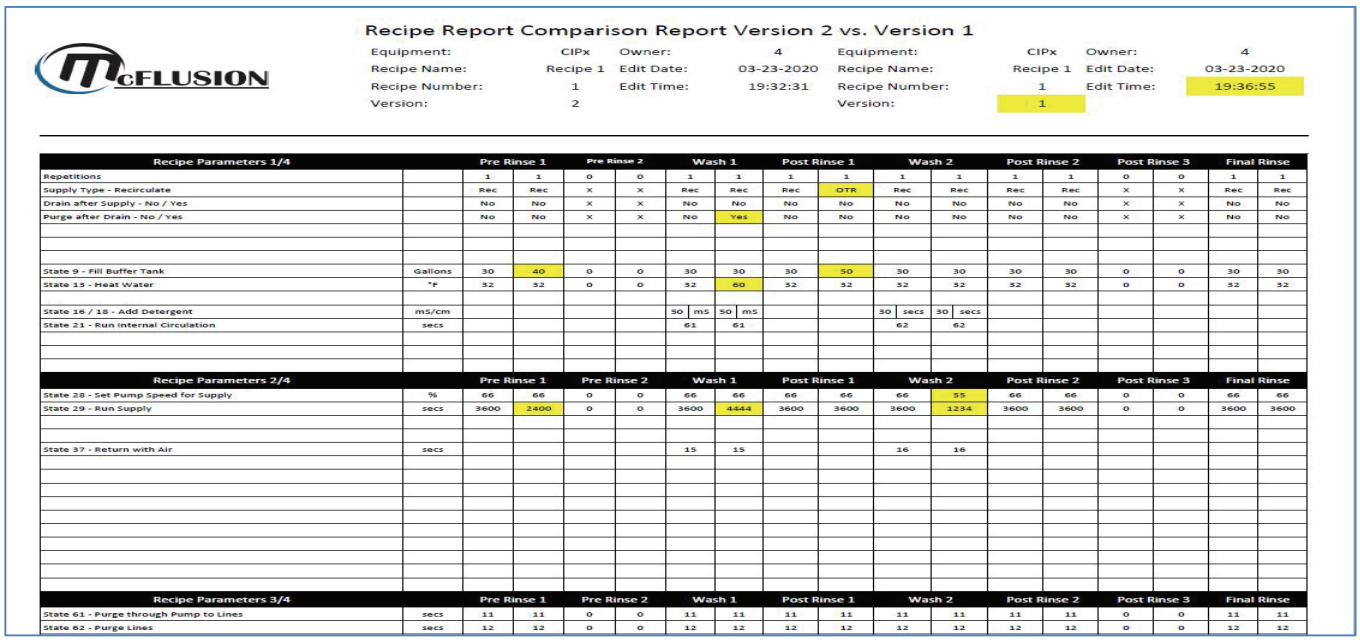
DCS-GMP Software for Audit Trail / CIP Cycle Historian

The data collection system (DCS-GMP) software for audit trail / CIP cycle historian will collect all GMP 21CFR Part 11 and Cleaning Validation relevant data.

The computer will collect all data and automatically save a file in a SQL database , white box (structured data) format every event and activity based.

The audit trail / historian data includes:

- Users
  - Log in/log out, new users, user account changes before/after with time stamp
- CIP recipes
  - New recipes, recipe changes before/after with comparison with yellow highlights between versions)
- Global System parameters & timers
  - Shared timers and settings (before and after with comparison with yellow highlights between versions)
- Alarm history events
  - Alarms activated/acknowledge with time stamp
- CIP Cycle reports – historic comparison



Recipe Report Comparison Report Version 2 vs. Version 1

Equipment:	CIPx	Owner:	4	Equipment:	CIPx
Recipe Name:	Recipe 1	Edit Date:	03-23-2020	Recipe Name:	Recipe 1
Recipe Number:	1	Edit Time:	19:32:31	Recipe Number:	1
Version:	2			Version:	1

Recipe Parameters 1/4		Pre Rinse 1		Pre Rinse 2		Wash 1		Post Rinse 1		Wash 2		Post Rinse 2		Post Rinse 3		Final Rinse	
Repetitions		1	1	0	0	1	1	1	1	1	1	1	1	0	0	1	1
Supply Type - Recirculate		Rec	Rec	X	X	Rec	Rec	Rec	OTR	Rec	Rec	Rec	Rec	X	X	Rec	Rec
Drain after Supply - No / Yes		No	No	X	X	No	No	No	No	No	No	No	No	X	X	No	No
Purge after Drain - No / Yes		No	No	X	X	No	Yes	No	No	No	No	No	No	X	X	No	No
State 9 - Fill Buffer Tank	Gallons	30	40	0	0	30	30	30	50	30	30	30	30	0	0	30	30
State 13 - Heat Water	°F	32	32	0	0	32	60	32	32	32	32	32	32	0	0	32	32
State 16 / 18 - Add Detergent	mS/cm					50 mS	50 mS			30 secs	30 secs						
State 21 - Run Internal Circulation	secs					61	61			62	62						
Recipe Parameters 2/4		Pre Rinse 1		Pre Rinse 2		Wash 1		Post Rinse 1		Wash 2		Post Rinse 2		Post Rinse 3		Final Rinse	
State 28 - Set Pump Speed for Supply	%	66	66	0	0	66	66	66	66	66	55	66	66	0	0	66	66
State 29 - Run Supply	secs	3600	2400	0	0	3600	4444	3600	3600	3600	1234	3600	3600	0	0	3600	3600
State 37 - Return with Air	secs					15	15			16	16						
Recipe Parameters 3/4		Pre Rinse 1		Pre Rinse 2		Wash 1		Post Rinse 1		Wash 2		Post Rinse 2		Post Rinse 3		Final Rinse	
State 61 - Purge through Pump to Lines	secs	11	11	0	0	11	11	11	11	11	11	11	11	0	0	11	11
State 62 - Purge Lines	secs	12	12	0	0	12	12	12	12	12	12	12	12	0	0	12	12

Quality System

McFlusion (Project) Quality System

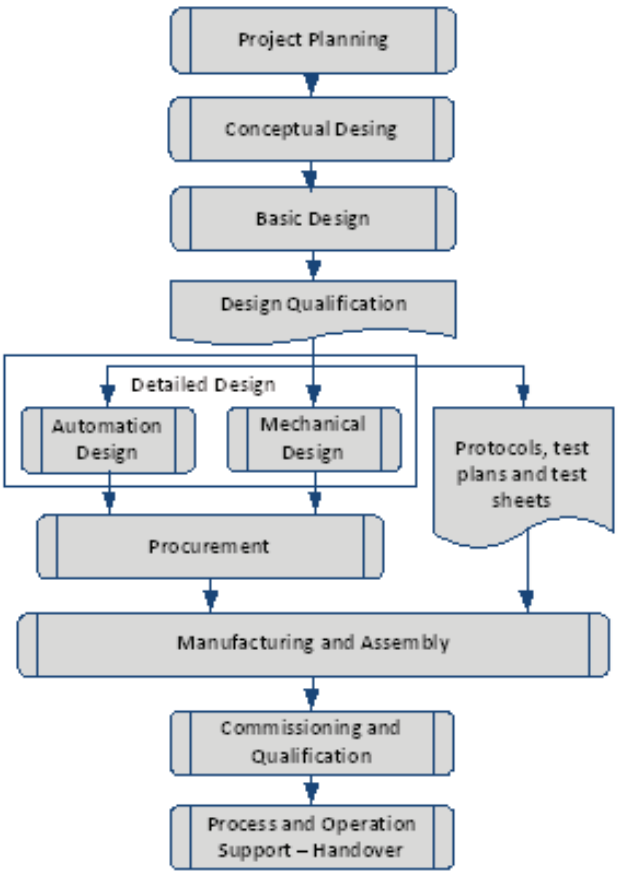
McFlusion uses a Quality Manual, which is based upon cGMP requirements, to define quality activities – thereby that all our deliverables meet our internal quality standards and requirements as well as the specific requirements stipulated by our clients.

Our Quality Manual is structured in sections, which are divided into subsections. This structure allows the selection of activities that are relevant for the specific project.

After receipt of the PO, we will prepare a basic design package – comprising of P&ID, Layout drawing, component list, Software and Hardware Design Specification (SHDS) and a Project (Quality) Milestone Plan – that will be submitted to the client for review and approval.

The Project (Quality) Milestone Plan typically follows the sections
(project phases), as listed below:

- Project and project planning in general
- Conceptual design (not required for standard equipment)
- Basic design
- DQ (design qualification and approval)
- Detailed design
- Protocols, test plans and sheets
- Procurement
- Manufacturing
- Assembly
- Commissioning and qualification
- Process and operation support - handover



Detailed information about McFlusion's Quality Manual will be provided upon request.

Documentation

System documentation package:

- P&ID
- Layout drawing
- Lead sheet
- Component list
- Software & Hardware Design Specification (SHDS) including attachments:

Electrical design (key diagrams)

  - PLC I/O list;
  - Report;
  - Alarm list;
  - User Interfaces;
  - Process Builder Design;
  - Instrument & Device settings;
- User manual;
- Service and maintenance lists;
- Spare parts lists;
- CD with technical literature (e.g. manuals for pumps, valves, and instruments);

GMP/QA documentation:

- General manufacturing certificate for welding, materials used & surface roughness;
- Cleaning and passivation certificate;
- Test and performance certificate;
- Factory calibration documentation;
- McFlusion FAT protocol – based on PQS404 (Installation) and PQS405 (Operation and Performance) instructions and test scripts;
- FAT execution (2-3 days) - including full installation, operational and performance testing.

Materials of Construction and Manufacturing

McFlusion is providing process equipment – exclusively – for the pharmaceutical and medical device industry segments. As such, our workshops and quality systems are designed for the highly regulated cGMP industry.

- All Non-Wetted (exterior) Surfaces:
  - T304 Stainless Steel, mechanical polish with all weld discoloration removed, unless otherwise specified.

- Wetted Sanitary Surfaces and tubing:
  - T316L Stainless Steel, mechanical polish with nominal surface finish of 25 Ra (tank, pipes & fittings, valve bodies, etc.);

- Sanitary tube welding:
  - All sanitary tube welding will be completed manually – or with an orbital welder. The welding is performed in an argon gas purged atmosphere.

The manual welds necessary on the equipment to minimize dead-leg distances will be performed by highly skilled welders, who perform the welds without the need for extra ground flush or interior polishing.

- Any weld – manual or orbital – not easily accessible will be inspected by a video boroscope. 100% of welds are inspected by McFlusion QA to determine, if the weld is acceptable or not.

Acceptance of welds is based on the ASME BPE 2012 color atlas and the FORCE institute standards.

- Elastomers:
  - FDA approved EPDM are applied for gaskets, seals and diaphragms.

About McFlusion

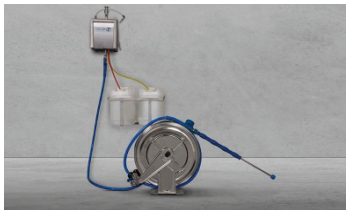
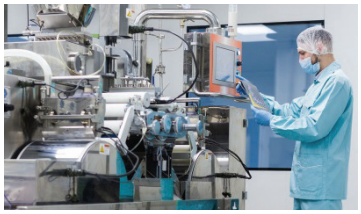
Cleaning, Sanitization and Sterilization are at the core of what we do

We are subject matter experts within process cleaning, sanitization and sterilization and are renowned for our targeted problem-solving approach that provides our clients with the best possible process and equipment solution by using our process, technology and regulatory expertise to ensure that they can manufacture quality products.

McFlusion process cleaning (CIP/COP), sanitization and sterilization (SIP) equipment is designed for efficiency, lean operation and compliance - using all available TACCT parameters.

Our process cleaning (CIP/COP), sanitization and sterilization (SIP) products are perfectly suited for hard-to-remove product residuals as well as hard-to-clean applications, such as Oral (Solid and liquid) Dosage Form and OLC (ointment, liquid, creams) manufacturing facilities.

In all of the industries that we service our products outperform traditional cleaning and sterilization equipment.

The McFlusion Group

The McFlusion Group consists of **McFlusion, Clean 3X and Morrflo**.

McFlusion provides complete process and equipment solutions for cleaning (CIP/COP), sanitization and sterilization (SIP) to the highly regulated life science, pharmaceutical and medical device industries.

Clean3X provides cleaning and sanitization products for cleaning (CIP) and sanitization to cosmetic/topical, medical marijuana, and nutritional industries.

Morrflo provides complete fluid handling and chemical dosing systems for industrial applications, such as oil and gas.

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