KITCHEN FIRE SUPPRESSION SYSTEM

SYSTEM MANUAL

Designed in Sweden

SECTION 1 – GENERAL INFORMATION

1.1 Design and Application

KitchenX is a pre-engineered wet chemical fire extinguishing system designed to extinguish fires originating from kitchen appliances and to prevent such fires from spreading through the ventilation system or to other parts of the premises. The system is mechanically activated, manually or automatically, and operates independently of any electrical supply or water piping connection.

System operating temperature is between -5 to 55 °C and operating pressure is 7.6 bar at the outlet of the pressure reducing regulator supplied by 145 bar nitrogen cartridges. Installation is intended in indoor environments where wind conditions cannot interfere with system operation.

Strict adherence to this manual is required to successfully extinguish fires with KitchenX.
For reliable function, the system must be designed, installed, commissioned and maintained according to this manual by a KitchenX certified technician trained by a Dafo approved trainer.

The end user must also operate and maintain their kitchen and their KitchenX system in accordance with the KitchenX user manual to minimize the risk of uncontrolled fire development or system failure.

1.2 System Approvals

The system is tested according to the standard EN 17446 – Fire Extinguishing Systems in Commercial Kitchens by an independent testing laboratory accredited to EN ISO/IEC 17025.

1.3 Safety Summary

Design, installation and service of KitchenX involves situations and practices associated with risk.
To avoid injuries and damage to system components, to nearby equipment, and to the premises, technicians and system designers must be trained by a Dafo approved trainer before they perform design, installation, service or commissioning of a KitchenX system.

Situations and practices associated with risk are indicated with the symbols defined below.

⚠ DANGER ⚠

Indicates a situation or practice where there is risk of considerable harm to the person in the situation or to people who will be subjected to a situation because of a faulty practice.

⚠ WARNING ⚠

Indicates a situation or practice where there is risk of considerable damage to system components, to nearby equipment or to the property.

! NOTE !

Indicates information, a situation or practice that has cause for close attention or careful consideration.

1.3.1 Cartridges and Pressurized Systems

Agent tanks and gas expellant gas hoses must be hydrostatically tested and pressure reducing regulators must be flow tested no less than every twelfth (12) year.

Nitrogen cartridges must be hydrostatically tested no less than every tenth year (10). Shipping caps should be mounted whenever cartridges are not installed at the release mechanism. Cartridges can explode if temperature exceeds their operating temperature. Refer to safety data sheet in appendix 1 for complete contents.

1.3.2 Wet Chemical Agent and Flushing Concentrate

For complete content, see safety data sheets of appendix 1.

1.4 Definition of Terms

Auto-Ignition Temperature

Auto-ignition temperature is the lowest temperature at which a substance will spontaneously catch fire in air without any external flame or spark.

Broiler

A cooking appliance where the food is on a grate, directly exposed to an intense heat source by radiation or convection. Neither the food nor the radiation source necessarily needs to be in horizontal position.

Deep Fat Fryer

A cooking appliance where the food is fried submerged in a fixed vat filled with oil exposed to an intense radiant or convective heat source.

Discharge Time

Time during which the discharge of the extinguishing agent occurs without interruptions, excluding the residual expellant gas discharge.

Dripboard

A section on a fryer which is located at or just below the oil surface. It is used as a surface where fried food items can drip off excess oil.

Duct

A channel that carries away smoke, steam, heat, odors and grease particles produced during cooking.

Fat Fire Extinguishing Agent

Normally referred to as a wet chemical agent. Extinguishing is achieved by a saponification reaction, causing cooling and oxygen depletion simultaneously.

Flow Number

A number that relates to the volume discharged through a nozzle upon system activation. A higher value indicates more volume discharged.

Extinguishing System

A system designed to detect and extinguish a pre-determined fire hazard, usually by automatic discharge through distribution piping with nozzles.

Expellant Gas

Pressurized gas, either in an external cartridge, or in the headspace of an extinguishing agent tank, used to discharge extinguishing agent.

Fat Fire

A fire that primarily uses fat as fuel. This includes vegetable oils, grease, animal fats, and other oily substances used in or resulting from the preparation of food. These fires differ from conventional fires by the extreme heat involved and their high auto-ignition temperature. Typically, they re-ignite after being extinguished with CO_2 and react explosively if extinguishing is attempted with water. Such fires are denoted as class F in the EN 3 system and class K in the NFPA system.

Fusible Link

A fire detector constructed with an alloy designed to melt and separate at a specific temperature.

Griddle

Cooking appliance where the food is cooked on a flat heated surface.

Hood

Device part of a kitchen exhaust system that directs and captures grease and oil vapors and the combustion gases from cooking appliances.

Nozzle

A means to control the discharge of an extinguishing agent. Nozzle types differ in their specific flow rates, spray patterns, and droplet sizes. KitchenX nozzles are marked with the flow number and the spray angle.

Perimeter

Either the position at the edge of a hazard or the geometrical circumference. For rectangular shapes: The sum of the lengths of all sides. For circular shapes, the circumference is calculated as the diameter × π.

Plenum

The space inside a kitchen hood enclosed behind the filters.

Pre-engineered Extinguishing System

Performance tested system with predetermined, standardized components and/or requirements regarding flow rates, pipe sizes, or structural elements. Installation of such systems must be made in accordance with the limitations prescribed by the manufacturer and the system manual.

Fat Fire Hazard

Hazards that should be protected with a fire suppression system. Includes any hot surfaces and appliances that produce fat-saturated vapors or risk igniting or propagating fat fires. A kitchen hood's duct, plenum, and the associated filters are also classified as hazards.

Referred to as *hazard* in this manual.

Range Top

Cooking appliance where the food is cooked using cookware on a heated surface. It can be powered by electrical conduction, induction or by gas.

Saponification

A chemical reaction in which fat or oil reacts with a base to produce a non-combustible soap-like product.

Split-Vat Deep Fat Fryer

Fryer that incorporates a divided partition which splits the fryer into sections, where each vat incorporates a separately controlled heating source.

Spray Angle

When extinguishing agent is discharged in a cone shape, the spray angle describes the angle of this cone in degrees. A wider angle covers a larger area but delivers lower agent density.

System Manual

Manufacturer's documentation where the function and the requirements of design, installation, and maintenance of the system are defined.

Tilt Skillet

A cooking appliance with a flat-bottomed, high-sided pan with a powered or manual tilting mechanism where the food is cooked, boiled, sautéed or fried.

Wok

Bottom domed round frying pan. Can be used on a range top or at specific wok stations.

1.5 Version History

Version	Publishing Date	Change Summary
1.0		Initial publication

1.6 Warranty Terms and Conditions

Design, installation, maintenance, and commissioning of KitchenX involves situations and practices associated with risk of damaging system components, property and nearby equipment. The approval of any warranty claims requires:

- That the system was designed, installed, commissioned and serviced by KitchenX approved technicians and that design, installation, commissioning, and maintenance were performed according to this system manual.
- That only components described in this manual or otherwise approved by written statement by an official Dafo KitchenX representative were used in any function critical part of the system, including components of the system cabinet, detection system, distribution system and the extinguishing agent.
- That the kitchen and system have been maintained and operated according to the KitchenX user manual.

Warranty period is 1 year from date of delivery.

SECTION 2 – SYSTEM DESCRIPTION

2.1 Working Principle

KitchenX systems consists of one to three non-pressurized wet chemical agent tanks, one nitrogen cartridge and distribution piping with nozzles. The system is mechanically activated with a release mechanism, either automatically — with fusible links — or manually — with one or two manual pull stations.

The KitchenX wet chemical agent has been specifically designed for effective extinguishing of fat fires (class F fires). The potassium salts of the agent react with superheated fat, oil, or grease to create a saponification layer. This layer inhibits oxygen from transferring to the fire, thus allowing the fire to cool down below the auto ignition temperature before re-ignition can occur. KitchenX nozzles discharge the agent as a spray to prevent splashing hot oil droplets upon activation. The small droplet size also contributes to more efficient cooling of the fire.

2.2 Systems Summary

There are four types of KitchenX systems:

1. KX1R – Single Tank System
1. KX2R – Double Tank System
2. KX2RM – Double Tank Manifold System
3. KX3R – Triple Tank System

Refer to SECTION 4 – SYSTEM DESIGN for selection of system for specific installations.
Other equipment that are necessary for completion of the system are described in SECTION 3 – SYSTEM COMPONENTS and includes components of the distribution system, the detection system, the manual pull station, and electrical switches used for shut off of kitchen appliances or to trigger the fire alarm.

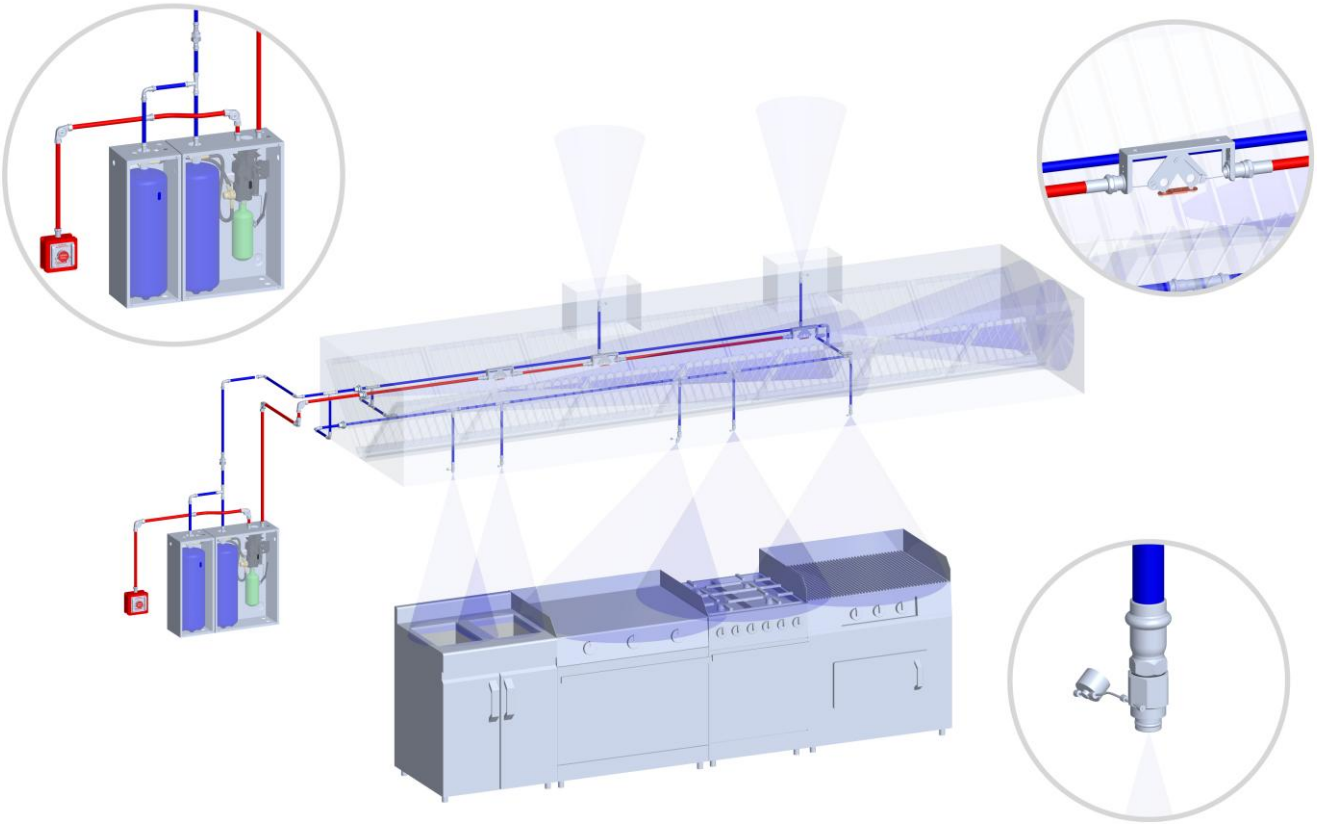
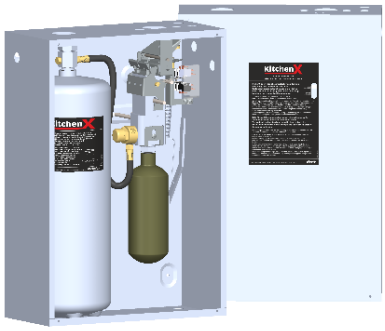


Figure 2.1: KitchenX system overview. Agent tank and distribution piping are coded in blue. Detection line and manual pull station are coded in red.

SECTION 3 – SYSTEM COMPONENTS

Tank and Release Mechanism Cabinet
p/n 55-1618-40



Includes a 11.7 liter stainless steel tank, release mechanism, pressure reducing regulator, expellant gas hose and two microswitches. The cabinet does not include nitrogen cartridges or KitchenX agent. (Figur: Ta bort drivgaspatronen)

KitchenX systems larger than KitchenX single tank systems must be supplemented with additional single tank cabinets and expellant gas hoses.

Bild på mekanism .med utpekande av delar.

Single Tank Cabinet
p/n 55-1618-60

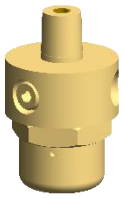
Includes a 11.7 liter stainless steel tank. Single tank cabinet is used for KitchenX systems larger than KitchenX single tank systems.

Burst Disc
p/n 55-1618-80

The burst disc prevents agent leakage into the distribution piping due to temperature and pressure fluctuations. It bursts when the system is activated.

Pressure Reducing Regulator
p/n 55-1618-50

The pressure reducing regulator reduces and stabilizes the pressure from nitrogen cartridges to the distribution system. The secondary outlet of the regulator is used as an expellant gas feed for one additional tank in double and triple tank system configurations.



Stainless Steel Tank, 11.7 liter
p/n 55-1618-00

Includes a 11.7 liter tank and a valve with a riser tube. The valve contains a vent plug and a burst disc. The vent plug equalizes the pressure with the ambient pressure when the system is installed and not activated. The tank is connected to distribution piping with an NPT ⅜" adapter.

The tank is shipped uncharged and must be filled with KitchenX during installation. The vent plug is available as a spare part (p/n 55-1618-12).

Nitrogen Cartridges
p/n see table below

The gas cartridges store nitrogen expellant gas under pressure until the system is activated. Upon activation, the cartridge seal is punctured, and the released gas causes discharge of the agent from one or more tanks through the distribution piping and nozzles.

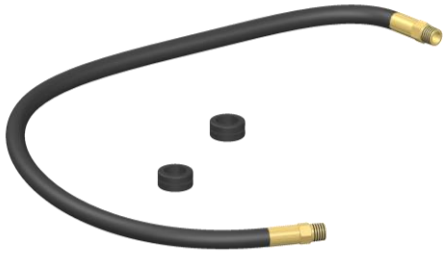
Two nitrogen cartridges are available.

Part No.	Component	Pressure	Vol.
55-1320-04	N8A	145 bars	0.8 l
55-1320-30	N16A	145 bars	1.6 l

Expellant Gas Hose
p/n 55-5840-20

The expellant gas hose connects the agent tank to the outlet of the regulator. For triple systems, it is used to connect two agent tanks.

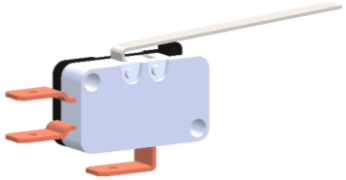
Both ends of the hose have swiveling connections. Two rubber grommets are included.



Microswitch kit
p/n 55-2019-62

The microswitch is used to shut off or turn on functions like electrical gas valves, alarms, contactors and other electrical devices when the system is activated. Two microswitches are installed on a release mechanism by default and two additional microswitches can be installed.

Two microswitches, screws and nuts and isolating plastic is included in the kit.



Wet Chemical Agent Type KitchenX, 11.7 liter
p/n 55-1618-20

The KitchenX wet chemical agent is a potassium-based liquid designed for fast knock-down and suppression of fat fires. The agent is shipped in plastic containers that provide one complete tank charge. It has a freezing point of -40°C.
Shelf life is five years at -40 to 55 °C.
When installed, the accepted temperature range is -5 to 55 °C.

KitchenX Flushing Concentrate, 1000 ml
p/n 55-1618-90

The flushing concentrate is used to flush the distribution system before reseting a KitchenX system after discharge. It is diluted approximately at one part water and ten parts concentrate.
Shelf life is 5 years at -30 to 50 °C.

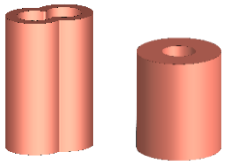
Manual Pull Station
p/n 55-1135-12 (incl box) 55-1135-12 (excl box)

The Manual Pull Station is used to manually activate the extinguishing system and can be purchased with or without a box. It includes a breakable rod which splits upon activation.

The breakable rod is available as a spare part (p/n 55-1135-94).

Stop- and Oval Sleeve for 1.6 mm Wire Rope
p/n 55-1116-16 & 55-1116-18

Stop sleeves are used at the ends of wire ropes to create a stop point for tension. Oval sleeves are used to construct a wire rope loop. These two components are needed to fasten detection and manual activation wire rope to the pull station(s) and the release mechanism.



Pulley Elbow
p/n 55-1119-31

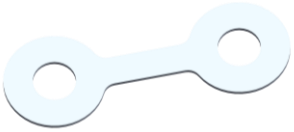
The pulley elbow allows a direction change of 90° for wire ropes used in the detection and manual activation systems. It includes compression rings for connecting to 18 mm conduit piping and a ball bearing to allow efficient force transfer of the wire rope from fusible links and manual pull stations.

Pulley Tee
p/n 55-1119-40

The pulley tee allows the joining of two conduit pipes used for two separate manual pull stations.

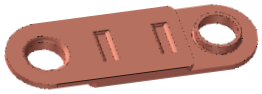
Test Link
p/n 55-3291-90

The test link replaces the fusible link at the terminal detector during the test procedure at commissioning and semi-annual maintenance.



Fusible Links
p/n see table below

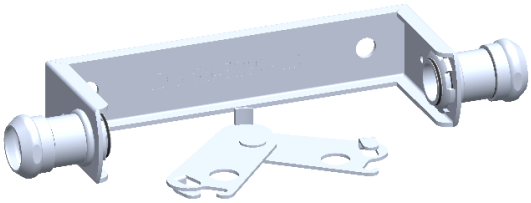
The fusible link is used in the detector assembly and is designed to separate at a specific temperature. This releases slack in the wire rope and activates the system. The fusible links are available in several different fixed temperatures



Part No.	Marked	Temperature
55-3292-07	Black	74°C
55-3292-13	Blue	138°C
55-3292-18	Red	182°C
55-3292-23	Green	232°C
55-3292-26	Yellow	260°C

Detector Bracket and Linkage Scissor
p/n 55-3290-20

The detector bracket includes: the bracket, scissor linkage, and conduit couplings with threads. Fusible links are not included. When the fusible link's alloy melts, the scissor linkage releases slack into the detection system, triggering activation of the KitchenX system.



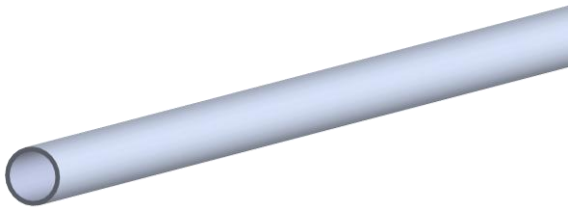
Wire Rope
p/n 55-1115-10 & 55-1115-13

The ø1.6 mm stainless steel wire rope is available in 152 m and 15 m lengths. It is used in detection and manual pull station conduit piping.

Part No.	Length
55-1115-10	152 m
55-1115-13	15 m

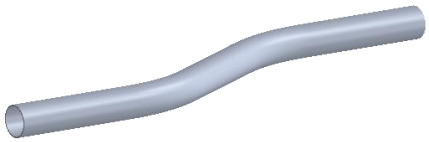
Conduit Pipe 18 mm
p/n 55-5008-18

Aluminum pipe for the detection system and manual activation conduit piping.
Dimensions are 18 × 1.5 mm, length 2 m.



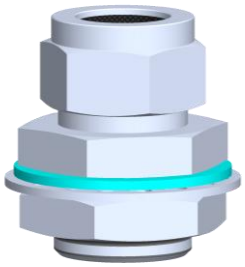
Pipe Bend
p/n 55-5009-80

The pipe bend is used to bring conduit piping towards the cabinet from the wall without the use of pulley elbows.



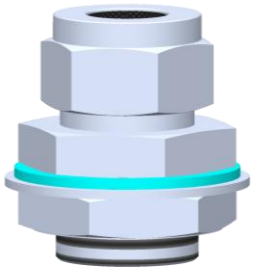
Compression Connector for 18 mm pipe
p/n 55-5199-10

This compression connector is used to get a tight seal when penetrating a kitchen hood with the 18 mm conduit piping used for the detection system.



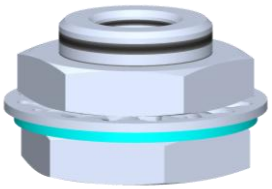
Compression Connector for 15 mm pipe
p/n 55-5199-06

This compression connector is used to get a tight seal when penetrating a kitchen hood with the 15 mm pipe used for the agent distribution system.



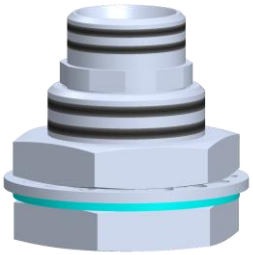
Compression Connector for ⅜" Adapter
p/n 55-5199-04

This compression connector is used to get a tight seal when penetrating a kitchen hood with the agent distribution system with pipe adapters. It has a NPT ⅜" inner thread for each connection.



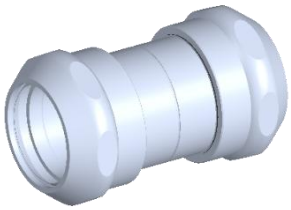
Compression Connector for Pulley Elbow
p/n 55-5199-18

This compression connector is used to get a tight seal when penetrating a kitchen hood with the detection system with a pulley elbow in one end, and a conduit pipe at the other end. When used, the compression ring of the pulley elbow is used at the protruding side of the connector. Bild på hur det ser ut när pulley elbow är på, bredvid till höger.



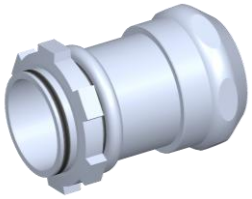
Conduit Coupling
p/n 55-5199-02

The conduit couplings are used to connect the conduit piping in the detection and the manual activation systems.



Conduit Coupling with Thread
p/n 55-5199-00

The conduit couplings with threads are used at detector brackets and at pull stations to connect to the conduit piping of the detection and manual activation systems.



KitchenX components for Distribution System
p/n see Table 3.1

The distribution piping and system components are manufactured of stainless steel and approved for working pressures up to 20 bars at a temperature range of -20 to 100 °C. Most connections are made by press couplings to enable easy installation. The couplings are compatible with the nozzles available for the KitchenX system.

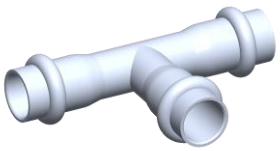
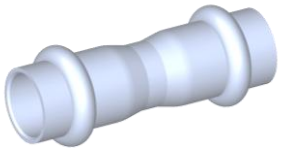
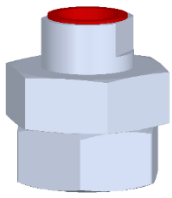
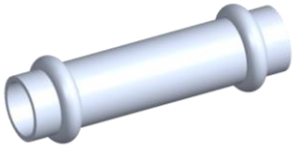
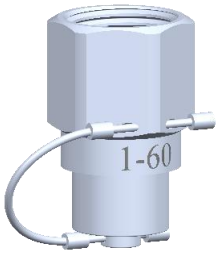
Part	Picture	Part No.	Picture
55-5200-01 Elbow coupling M/F		55-5200-02 Elbow coupling F/F	
55-5200-03 Coupling 45° M/F		55-5200-04 Coupling 45° F/F	
55-5200-05 T-coupling F/F/F		55-5200-06 Straight coupling F/F	
55-5200-08 Adapter F/NPT ⅜”		55-5200-09 Union coupling F/F	
55-5200-13 T-coupling F/F/NPT ⅜”		55-5200-12 Elbow coupling F/NPT ⅜”	
55-5200-16		55-1621-27 Union coupling for manifold with burst disc NPT ⅜”/ NPT ⅜” TA bort röd plugg	
55-5200-07 Splicing sleeve F/F			

Table 3.1: Components for KitchenX distribution system.

Nozzles
p/n see table below

Nozzles with ⅜" NPT thread are available for different applications of the system. They are marked on the neck of the nozzles with the flow number and the spray angle. A blow off cap is attached to the nozzle body with stainless steel wire rope. The strainer in the nozzle cup can be removed for cleaning with the help of a circlip plier.

Nozzle caps (p/n: 55-6156-91) and O-rings (p/n 55-6156-92) are available as spare parts.



Part No.	Marking	Number of Flow	Spray Angle
55-6156-16	1-60	1	60°
55-6156-11	1-110	1	110°
55-6156-23	2-30	2	30°
55-6156-26	2-60	2	60°

Swivel Adaptor
p/n 55-6155-90

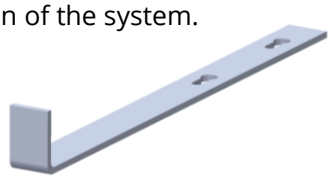
The Swivel Adaptor assembly consists of a swivel nut, swivel body and swivel ball. The swivel adaptor enables all nozzles to be rotated 30° in all directions.

Cocking Lever and Lock Plate
p/n 55-9650-10

The cocking lever is used to set the release mechanism in operational mode at installation or after discharge. the release mechanism in the cabinet. (vänd uppochned, så att den är I läget som den används)

Lock Plate
55-9650-00

When the release mechanism is in operational mode, the lock plate is used to eliminate accidental activation of the system.

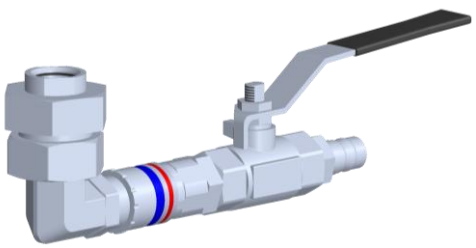


Regulator testing tool
p/n 55-9650-22

The regulator testing tool is used to flow test pressure reducing regulators.

Purge Adapter for Distribution System
p/n 55-9650-04

Used with a compressor to blow through or purge distribution piping.



SECTION 4 – SYSTEM DESIGN

4.1 Design Workflow

To effectively design a KitchenX system, the following step-by-step sequence is recommended.

1. Identification of hazards to protect.
2. Nozzle selection and placement for each hazard.
3. Selection of tanks and cartridges.
4. Design of distribution piping.
5. Design of detection system.

These steps are described in detail in the subsequent parts.

4.2 Identification of Hazards to Protect

Hazards to protect include any hot surfaces and appliances in the kitchen that produce fat-saturated vapors or risk igniting or propagating fat fires. It also includes the hoods and exhaust ducts that evacuate cooking fumes and gases away from those appliances.

One larger or several smaller systems can be chosen to protect the hazards depending on the premises. For instance, a food court including several kitchens of different restaurants can be protected with multiple smaller systems or a single large one. If a multitude of kitchens share a common duct, the duct must be protected so that fires in the duct are prevented from spreading to other kitchens, regardless of which kitchen the fire originates from.

4.3 Nozzle Selection

Once the hazards have been identified, the discharge nozzles must be selected. The choice between two or more nozzles can be made for some hazards and multiple nozzles are required for other hazards. All nozzle placement measurements originate from the tip of the nozzle.

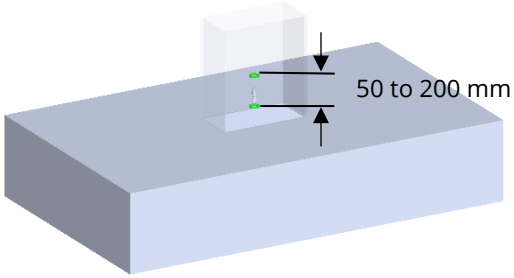


Figure 4.3: Nozzles are placed 50 to 200 mm into the duct from the duct opening.

4.3.1 General Requirements

1. For each hazard protected with KitchenX, there is a specified nozzle type, nozzle aiming point (indicated in red), nozzle placement (indicated in green) and coverage area.
2. The nozzle spray cone should not be obstructed such that it prevents wet agent from reaching the entire area of a hazard.

4.3.2 Ducts

Ducts are protected with single or multiple 1-110 nozzles. The nozzle(s) must be placed between 50 to 200 mm into the duct opening and they must aim up along the duct direction. In case the duct is protected with a single nozzle, the nozzle must be placed in the center of the duct.

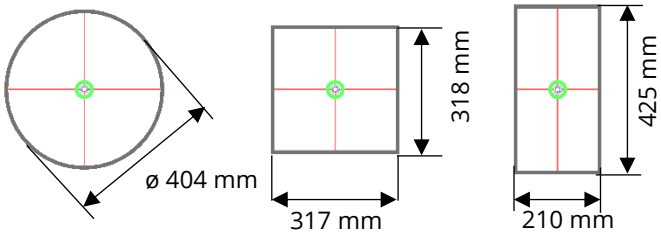


Figure 4.1: Single nozzle protection of ducts.
The 1-110 nozzle will protect circular ducts with diameter up to 404 mm and rectangular ducts with perimeter up to 1270 mm.

Multiple nozzles are used in case the perimeter or diameter exceed those of *Figure 4.1*. For larger ducts, the cross section of the duct can be divided into smaller sections that are possible to protect with single nozzles. Each section must be within an area enclosed by the maximal rectangular perimeters for each single nozzle section and the nozzles must be placed in the center of their dedicated area.

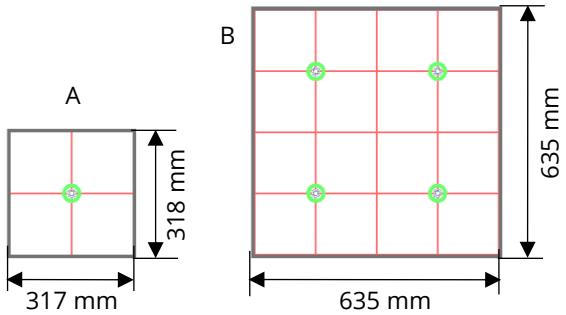


Figure 4.2: Multiple nozzle protection of ducts.
***A**: A single nozzle protects an area with a maximum perimeter of 1270 mm. **B**: A large duct is protected by more nozzles of which each cover an area with perimeter of maximum 1270 mm.*

4.3.3 Plenum Protection

Plenums are protected with single or multiple 1-60 nozzles. Placement of nozzles is always horizontal. If there are multiple nozzles they must aim in the same direction.

Plenums with Angled Filters

The first nozzle must be placed up to 150 mm from either end of the plenum, facing straight into the rest of the plenum interior. To protect plenums with single rows of filters, one or more 1-60 nozzles are used. The nozzles must be placed at a 50 to 100 mm distance perpendicular to the faces of the filters, equidistant to the filter top and bottom edges. This will protect maximum 3000 mm of horizontal distance from the start of the plenum for the first nozzle, and maximum 3000 mm of horizontal distance from the nozzle tip for following nozzles. The maximum width is 600 mm.

To protect double rows of filters ("V" style filters), one line of 1-60 nozzles can be used for each filter row separately. Similarly, as for single rows of filters, the nozzles must be placed at a 50 to 100 mm distance perpendicular to the faces of the filters, protecting maximum 3000 mm of horizontal distance from the start of the hood for the first nozzle, and maximum 3000 mm of horizontal distance from the nozzle tip for following nozzles. As long as these requirements are met, the nozzles can be horizontally distributed according to what is easiest for installation. The maximum width is 1200 mm.

Plenums with Filters of Other Type

Plenums with other types of filters are protected in a similar manner. A 1-60 nozzle is placed at the start of the plenum and protects 3000 mm of maximum horizontal distance and a maximum width of 600 mm.

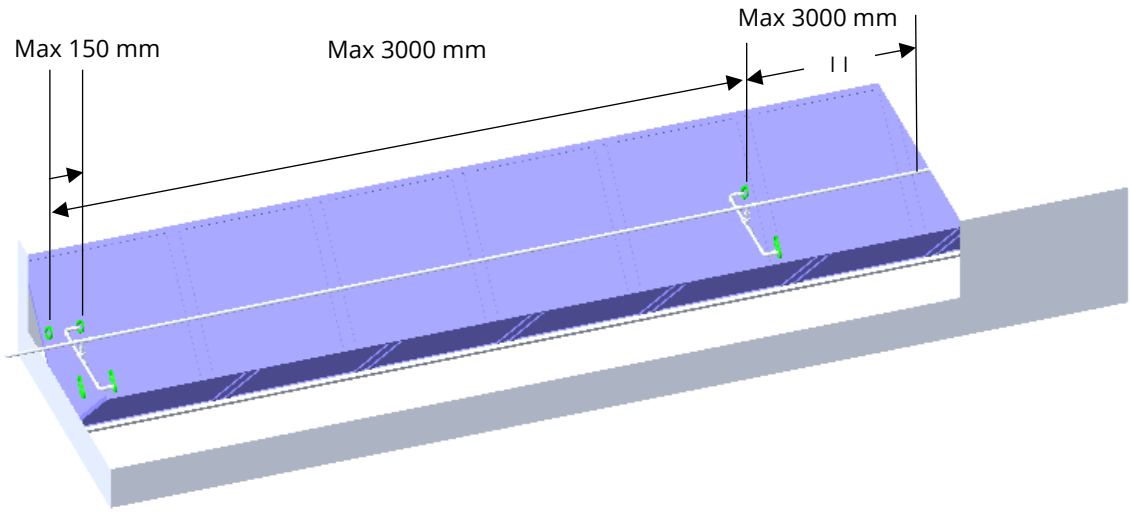


Figure 4.4: Nozzle placement in plenums. Nozzles are positioned in the same direction, and each nozzle protects maximum 3 meters of horizontal distance.

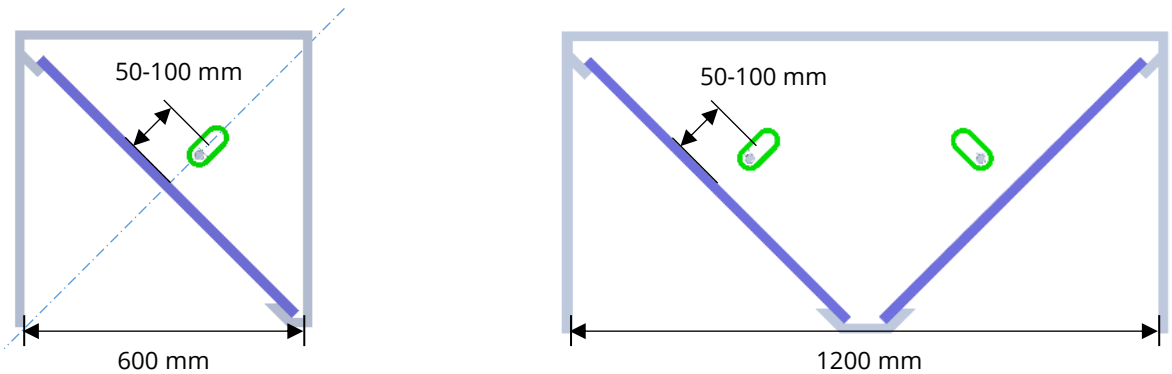


Figure 4.5: Linear nozzle placement in plenums. Nozzles are placed 50-100 mm from the filter on the centerline perpendicular to the filter surface. For two rows of filters, nozzles are placed similarly way but with one line of nozzles for each row of filter.

4.3.4 Deep Fat Fryer

The 2-30 nozzle is used for protection of deep fat fryers. A single nozzle protects single vat and split vat fryers, both with and without drip boards.

The nozzle must be placed above the area enclosed by the perimeter of the fryer and aim towards the middle of the fry pot. The nozzle is placed at a height of 690 to 1200 mm measured from the top of the fryer. This configuration allows single nozzle protection of fryers with a maximum side of 380 mm and a maximum area of 0.137 m^2.

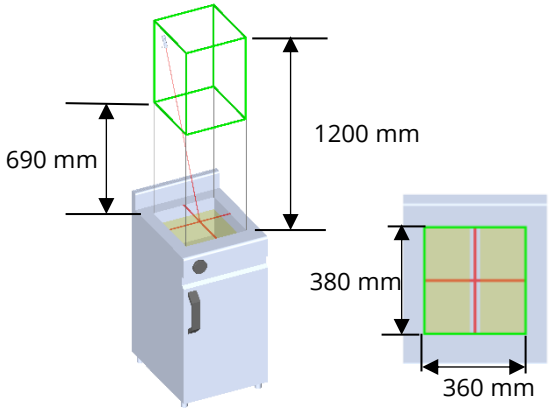


Figure 4.6: Maximum coverage and nozzle height of a single nozzle for split vat or non-split vat fryer without drip board.

In case the fryer has a drip board, the maximum dimensions are a side of 540 mm and an area of 0.194 m^2, of which the fry pot's maximum dimensions are a side of 380 mm and an area of 0.137 m^2.

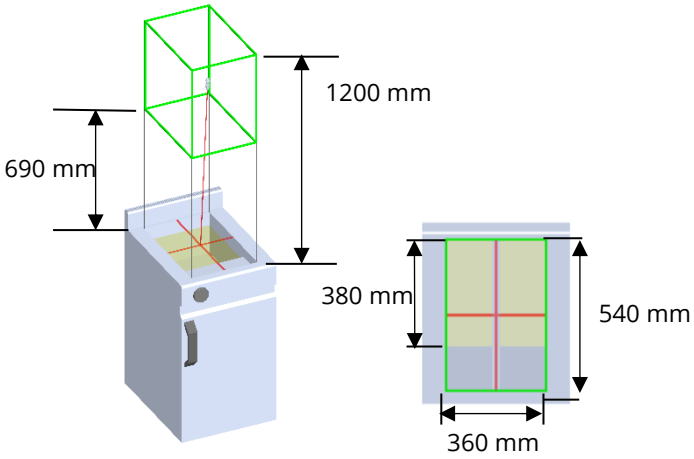


Figure 4.7: Maximum coverage and nozzle height of a single nozzle for split or non-split fryer with drip board.

For fryers exceeding these dimensions, multiple 2-30 nozzles can be used provided that the entire fryer area does not exceed 0.55 m^2. In this case, the nozzles must be aiming at the center of their dedicated area and be located above the area enclosed by the perimeter of their dedicated area.

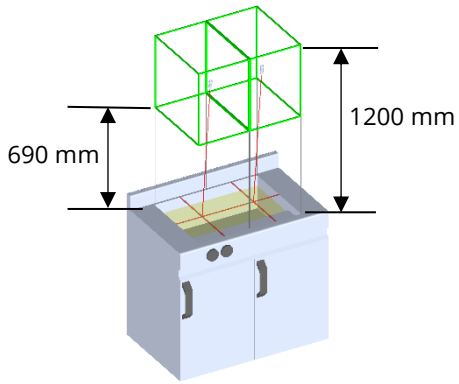


Figure 4.8: Multiple nozzle protection of fryers.

For fryers without drip boards, each nozzle covers at most 0.137 m^2 with a longest side of 380 mm.

For fryers with drip boards, each nozzle covers at most 0.194 m^2 with a longest side of 540 mm if the section includes the drip board. If the section that the nozzle is dedicated to does not include the drip board, the maximum area of that section is 0.137 m^2 with a longest side of 380 mm. BILD

4.3.5 Griddle

The 1-60 nozzle is used for protection of griddles. A single nozzle protects a maximum total area of 0.578 m^2 with a longest side of 760 mm.

The nozzle is positioned at a height of 760 to 1020 mm measured from the surface of the cooking area and it must aim towards the midpoint of the cooking surface.

The nozzle is placed at the perimeter of the griddle or at maximum 50 mm from the perimeter towards the center

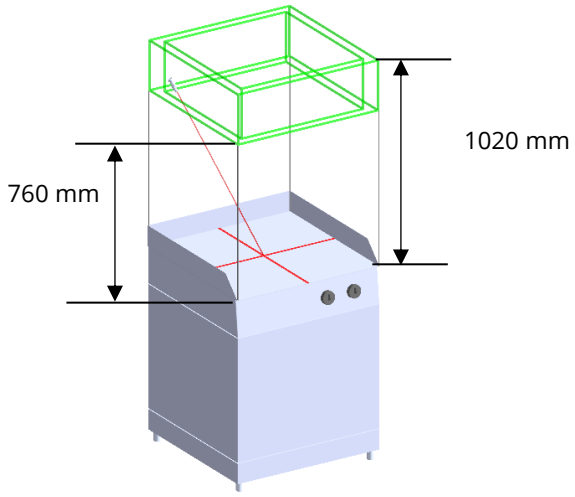


Figure 4.9: Single nozzle protection of griddles.

Multiple nozzles can be used for larger griddles. In this case, the griddle area is divided into sections possible to cover with a single nozzle. The nozzles are placed at the perimeter of their dedicated area.

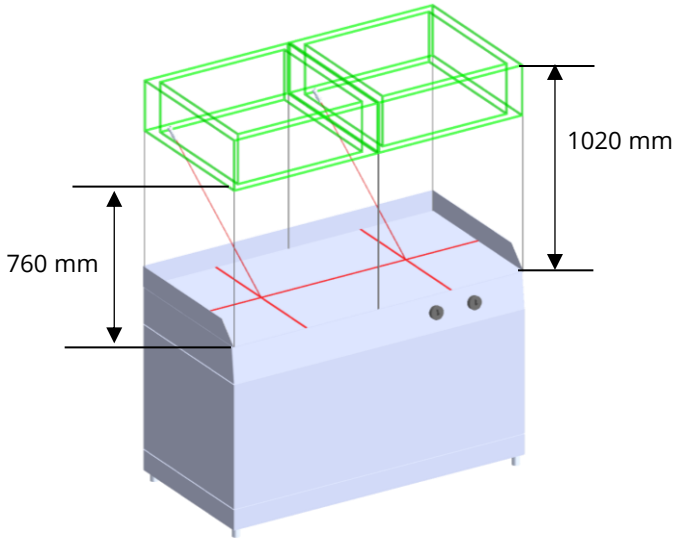


Figure 4.10: Multiple nozzle protection of griddles.

4.3.6 Range Top

Range tops are protected using the 2-60 nozzle. The nozzle is centered over the protected area aiming straight down at a height of 760 to 1020 mm measured from the cooking surface.

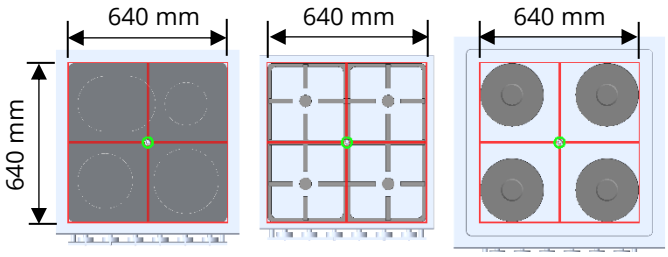


Figure 4.13: Single nozzle protection of range tops. One nozzle will protect a square of 640 × 640 mm.

One nozzle will protect a square with sides of 640 mm. Alternatively, it will protect a rectangular area with a maximal diagonal length of 866 mm and a maximal longest side of 792 mm. Other rectangular dimensions are also possible, provided that a standard 260 mm diameter pot cannot be placed with its center point further away than 270 mm from the nozzle aiming point.

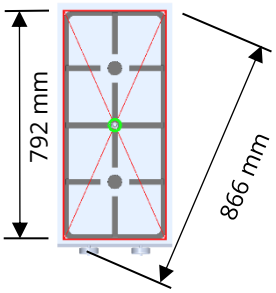


Figure 4.12: Maximum diagonal and side for a rectangular area protected with a single nozzle.

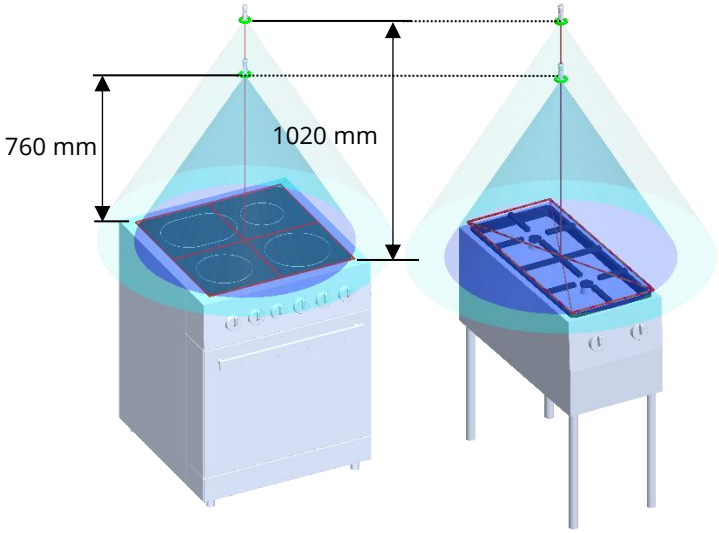


Figure 4.11: Spray pattern for the 2-60 nozzle at minimum height 760 mm and maximum height 1020 mm.

Larger range tops can be protected by dividing the hazard area into sections that are possible to protect with a single nozzle.

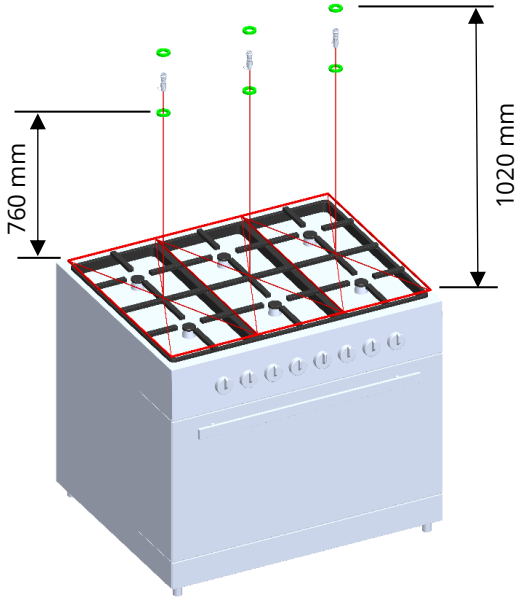


Figure 4.14: Multiple nozzle protection of range top. The range top is sectioned into three rectangular areas with diagonal less than 866 mm and longest side less than 792 mm.

In case there is a shelf above the range top, the nozzle must be placed so that the shelf does not interfere with the spray pattern. Ensure that the line between the nozzle and the inner edge of the hazard is free. If necessary, the nozzle can be moved away from the shelf, provided that the entire hazard area is within the area dedicated for the nozzle(s). The nozzle should still aim straight down. See example in *Figure 4.13*.

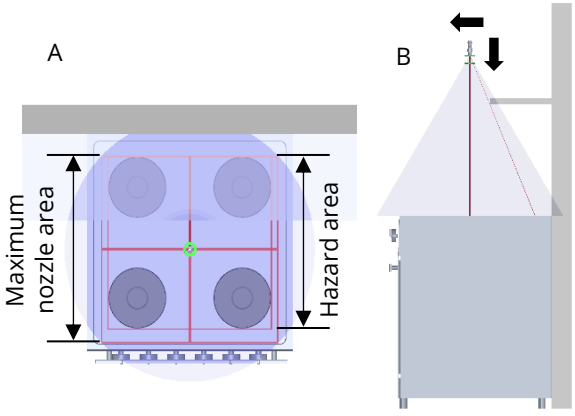


Figure 4.15: Nozzle placement with obstruction.
***A**: The nozzle can be moved away from the shelf provided that the entire hazard area is enclosed by the dedicated area of the nozzle(s). **B**: The height is adjusted such that there is a clear line from the nozzle to the inner edge of the hazard area.*

4.3.7 Broiler

Electric- and gas-powered broilers are protected with the 1-60 nozzle. The nozzle is placed within or above the perimeter of the broiler at a height of 500 to 1020 mm measured from the broiler grate. The nozzle must aim towards the middle of the grate.

This configuration protects broilers with a maximum area of 0.561 m^2 with a longest side of 920 mm.

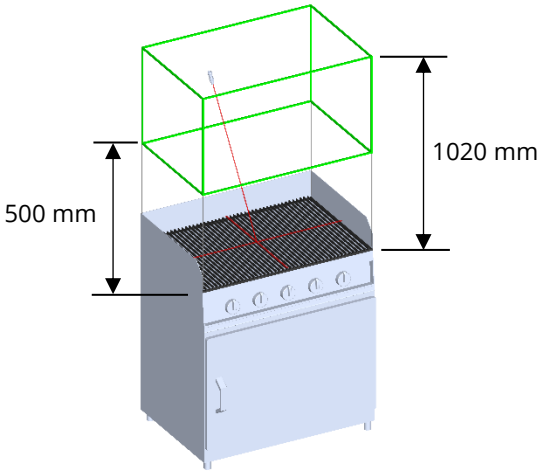


Figure 4.17: Single nozzle protection of broilers.

4.3.8 Wok

The 2-30 nozzle is used to protect woks. The nozzle is placed within the perimeter of the wok pot at a height of 690 to 1200 mm from the burner, aiming at the center of the wok.

This configuration will protect woks with a diameter up to 410 mm and a depth up to 230 mm.

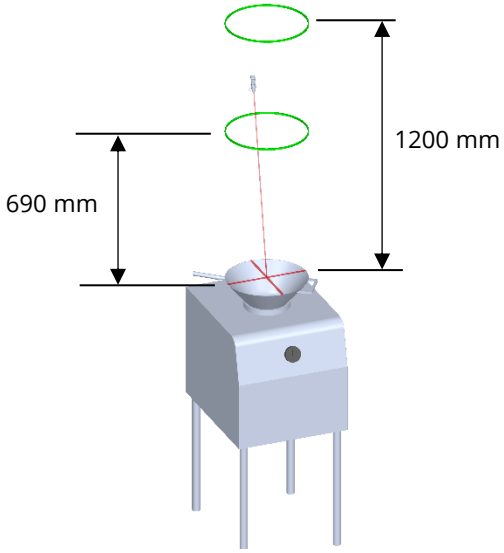


Figure 4.18: Protection of woks.

4.3.9 Tilt Skillet

Tilt skillets are protected as fryers. The 2-30 nozzle is used and must be placed above the area enclosed by the perimeter of the tilt skillet, aiming towards its midpoint. The nozzle is placed at a height of 690 to 1200 mm measured from the top of the skillet.

This configuration will protect tilt skillets with a maximum area of 0.194 m^2 and a longest side of 540 mm.

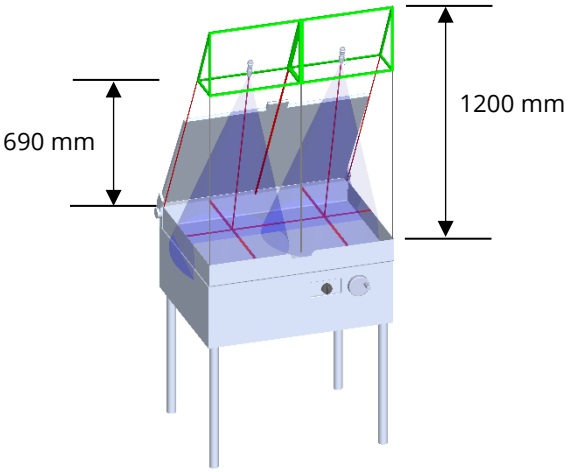


Figure 4.16: Protection of tilt skillets. The maximum height of the nozzle may need be reduced to prevent the lid from obstructing the spray angle.

For tilt skillets exceeding these measurements, multiple 2-30 nozzles are used. In this case, each nozzle covers at most 0.194 m^2 with a longest side of 540 mm and they must aim at the center of their dedicated area.

If the tilt skillet has a lid, the nozzle must be placed so that the lid does not interfere with the spray pattern when it is in its opened position. Ensure that the line between the nozzle and the inner edge of the skillet is not obstructed.

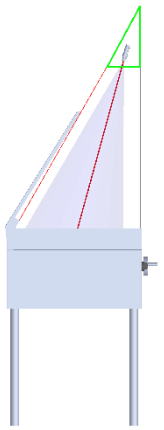


Figure 4.19: Nozzle placement with lid.

4.3.10 Summary of Nozzle Selection

Hazard	Hazard Dimensions	Nozzle(s)	Nozzle Placement
Duct	Circular duct with a maximum diameter of 404 mm	1-110	50 to 200 mm into the duct opening, centered in the duct, aiming straight up.
	Rectangular duct with a maximum perimeter of 1270 mm	1-110	50 to 200 mm into the duct opening, centered in the duct, aiming straight up.
	Ducts with perimeter exceeding 1270 mm	1-110	Duct area is split into rectangular sections with perimeters of max 1270 mm. Nozzles are placed in the center of their dedicated area.
Plenum	Single row of filters. Maximum width: 600 mm Maximum length: 3000 m	1-60	Placed horizontally 50 to 100 mm from center of filter faces. Nozzle placed maximum 150 mm from plenum start. For longer plenums, a nozzle is placed maximum every 3 m facing the same direction.
	Double row of filters (V-style) Maximum width: 1200 mm Maximum length: 3000 mm	1-60	Placed horizontally 50 to 100 mm from center of filter faces. Nozzle placed maximum 150 mm from plenum start. For longer plenums, a nozzle is placed maximum every 3 m facing the same direction.
Deep fat fryer (split or full vat) without dripboard	Maximum length of one side: 380 mm Maximum area: 0.137 m^2	2-30	Within or at the perimeter at a height of 690 mm to 1200 mm above the top of the fryer, aiming towards the center of the fryer.
	Area from 0,137 m^2 up to 0.55 m^2	Multiple 2-30 nozzles	Each nozzle covers at most 0.137 m^2 with a longest side of 380 mm. Nozzles must aim at the center of their dedicated area and be located above and within the perimeter of their dedicated area.
Deep fat fryer (split or full vat) with dripboard	Maximum length of one side: 540 mm Maximum area: 0.194 m^2 Of which the fry pot's maximum dimensions are: Maximum length of one side: 380 mm, maximum area: 0.137 m^2	2-30	Within or at the perimeter at a height of 690 mm to 1200 mm above the top of the fryer, aiming towards the center of the fry pot.
	Area from 0,137 m^2 up to 0.55 m^2	Multiple 2-30 nozzles	For sections with drip board, each nozzle protects at most 0.194 m^2 with a longest side of 540 mm. Fry pot area may be at most 0.137 m^2 with a longest side of 380 mm. For sections without drip board, each nozzle protects at most 0.137 m^2 with a longest side of 380 mm. Nozzles must aim at the center of their dedicated area and be located above and within the perimeter of their dedicated area.

Hazard	Hazard Dimensions	Nozzle(s)	Nozzle Placement
Range top	Square area with sides of 640 mm. Rectangular area with maximum diagonal of 866 mm and longest side of 792 mm	2-60	760 to 1020 mm over the center of the cooking area, aiming directly down.
	Larger range tops	Multiple 2-60 nozzles	Hazard area split into sections capable of being protected with single nozzles. Nozzles placed 760 to 1020 mm over the center of the nozzle's dedicated section, aiming directly down.
Griddle	Maximum length of one side: 760 mm Maximum area: 0.578 m^2	1-60	At the perimeter at a height of 760 to 1020 mm, aiming towards the center of the griddle.
	Griddles larger than 0.578 m^2	Multiple 1-60 nozzles	Each nozzle protects maximum 0.578 m^2, placed at the perimeter at a height of 760 to 1020 mm, aiming towards the center of their dedicated area.
Gas or electric broiler	Maximum side: 920 mm Maximum area: 0.561 m^2	1-60	Within or at the perimeter at a height of 500 to 1020 mm, aiming at center of the broiler.
	Broilers larger than 0.561 m^2	Multiple 1-60 nozzles	Each nozzle protects maximum 0,561 m^2, placed within or at the perimeter at a height of 500 to 1020 mm, aiming at the center of their dedicated area.
Wok	Maximum diameter of 410 mm Maximum depth: 230 mm	2-30	Within or at the perimeter at a height of 690 mm to 1200 mm above the top of the pot, aiming towards the center of the pot.
Tilt skillet	Maximum area for one nozzle: 0,194 m^2 Maximum length of a side for a nozzle: 540 mm	2-30	Within or at the perimeter at a height of 690 mm to 1200 mm above the top of the skillet, aiming towards the center of the nozzle's dedicated area. If there is a hinged lid, ensure that spray pattern is not obstructed when the lid is open..

Table 4.1: Nozzle selection quick guide.

4.4 Selection of Tanks and Cartridges

Once the number of nozzles and flow numbers required to cover all hazards has been determined, the appropriate quantity of tanks and cartridges can be chosen based on *Table 4.2*.

System	Flow Numbers	Quantity of agent tanks	Cartridge Type and Quantity
KX1R – KitchenX Single Tank	1 to 11	One	Single N8A
KX2R – KitchenX Double Tank	12 to 22	Two	Single N16A
KX2RM – KitchenX Double Tank Manifold	12 to 22	Two	Single N16A
KX3R – KitchenX Triple Tank	22 to 33	Three	Single N16A

Table 4.2: Selection guide for number of tanks and type of cartridge.

⚠ DANGER ⚠

Do not use any other combination of cartridges and tanks than those described in *Table 4.2*. Failing to do so may result in extinguishing agent not reaching the fire hazard or excessive pressure in the discharge piping. Multiple systems may not be interconnected.

4.5 Design of Distribution Piping

The distribution piping must ensure an adequate amount of agent is distributed to each hazard protected by the system. The wet agent must also be distributed at the correct pressure to avoid splashing of oil and fat and to achieve the correct spray pattern of the nozzles.

4.5.1 Definition of Distribution Piping Terms

The *supply line* is defined as the length of piping originating from the agent tank and concluding at the final nozzle branch point.

A supply line can be *linear* or *split*. A split line is a supply line with a tee and two legs. In case the supply line is split, the length of the supply line is the sum of both legs of the supply line and piping leading up to them.

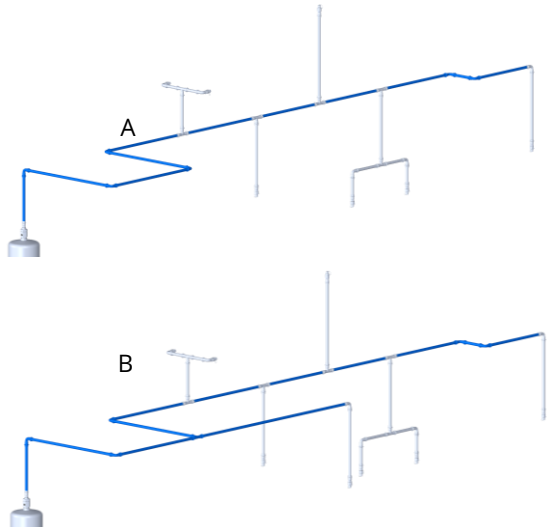


*Figure 4.20: **A**: Linear supply line highlighted in blue.*
__B__: Split supply line highlighted in blue.

A *branch point* is defined as the point in which a portion of flow is directed towards one or more nozzles. This is usually at a tee or an elbow.

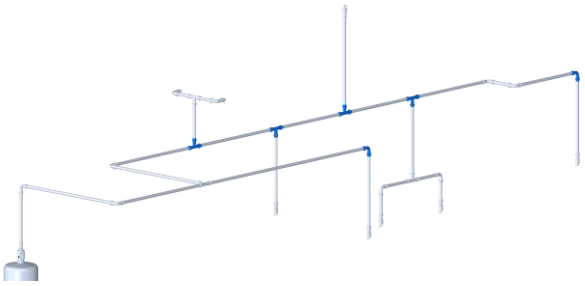


Figure 4.21: Branch points are highlighted in blue.

Branches have different limitations depending on whether they protect appliances, plenums or ducts.

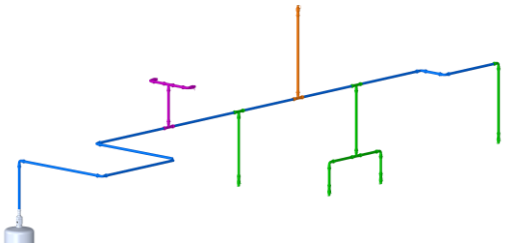


Figure 4.22: Supply line in blue, (3) appliance branches in green, (1) plenum branch in purple and (1) duct branch in orange.

The final branch point marks the end of the supply line. This point can be chosen downstream or upstream along the supply line pipe, given that the general piping requirements and the criteria of *Table 4.3* and *Table 4.4* are satisfied.
Refer to *Figure 4.23*.

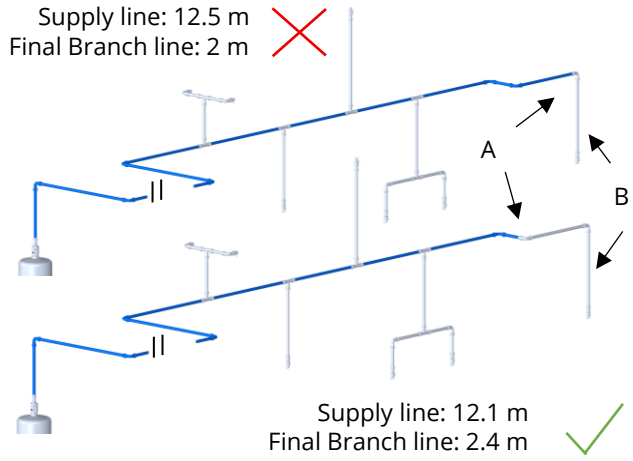


Figure 4.23: Supply line indicated in blue.
***A**: Final branch point. **B**: Final branch line.*

4.5.2 General Piping Requirements

The distribution piping must satisfy the following requirements as well as the system dependent requirements of *Table 4.3* or *Table 4.4.*

4. The distribution system should be constructed with KitchenX approved components. It is crucial that components are manufactured of stainless steel or of metal with similar corrosive resistance. Galvanized components should not be used. Components must resist working pressures of 16 bars and be rated for temperatures between -20 to 120 °C. The inner diameter of pipes should be between 13 to 13.8 mm.
- To ensure adequate volume of Kitchen agent is available at each nozzle, maximum 18.2 m total piping after the first tee is allowed. This length includes the legs of the supply line if the supply line is split.

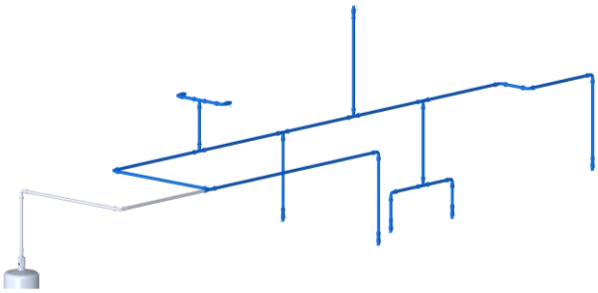


Figure 4.24: Length of piping following first tee highlighted in blue. Maximum length after first tee is 18.2 m. (motsvarande bild på ett icke-split system

- Piping and fittings can be installed under the hood if temperatures do not exceed 120 °C and components are not subjected to direct flame impingement.
- To prevent splashing of heated oil droplets, the length of piping from the tank outlet to any nozzle protecting a wok, a fryer, a tilt skillet or a range top shall be at minimum 1.8 m.
- Length of piping is calculated from center to center of fittings. The length of pipe inserted into a fitting is not considered.

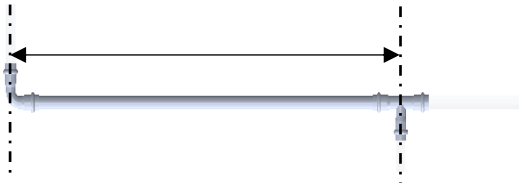


Figure 4.25

- When calculating bends, two 45° elbows are counted as one 90° elbow.
- Change of direction can only be achieved by fittings. Bending of piping is not allowed

4.5.3 Design of Distribution Piping

KitchenX Single Tank System

The allowed total flow number of every nozzle in a KitchenX Single system is 1 to 11. Maximum total piping length is 23 m. This is calculated as the sum of all branch lines and the supply line, excluding the parts of pipes that are inserted into fittings.

The values of *Table 4.3* cannot be exceeded for the piping system. For the supply line, the values are calculated between the agent tank and the final branch point, excluding the final coupling.

For the appliance, plenum and duct branches, the values are calculated from each branch point and includes the initial coupling.

A KitchenX single system will contain one supply line and one or more appliance branches, plenum branches and duct branches.

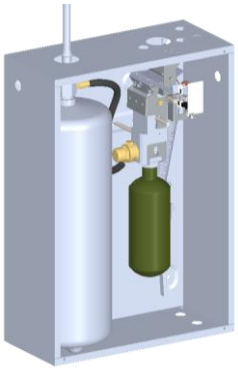


Figure 4.26: KitchenX single tank system

The limitations of *Table 4.3* apply to the supply line and each branch separately and there is no restriction on the number of branches. For the supply line, rise is calculated from the agent tank. For the appliance, plenum and duct branches, rise is calculated from the branch point.

	Supply Line	Appliance Branch	Plenum Branch	Duct Branch
Length	12.1 m	3.6 m	1.2 m	2.4 m
Rise	1.8 m	0.6 m	0.6 m	1.2 m
Elbows	9 pcs	6 pcs	4 pcs	4 pcs
Tees	1 pc	4 pcs	2 pcs	2 pcs
Flow	11 pcs	4 pcs	2 pcs	2 pcs

Table 4.3: Limitations for KitchenX single tank systems and for the supply lines of KitchenX double and triple tank systems.

KitchenX Double Tank Manifold System

The KitchenX Double Manifold system is a convenient solution when one supply line is needed but the flow numbers of a single system do not suffice. Directly after exiting the agent tank, the supply lines of both tanks are combined. The burst disc is removed from each tank valve and replaced with a burst disc at the start of the supply line.

The allowed total flow number of every nozzle in a KitchenX Double Manifold system is between 12 and 22. Maximum total piping length is 20.6 m. This is calculated as the sum of all branch lines and the supply line, excluding the parts of pipes that are inserted into fittings**.**

The values of *Table 4.4* cannot be exceeded by the piping system. For the supply line, the values are calculated between the agent tank and the final branch point, excluding the final coupling.

For the appliance, plenum and duct branches, the values are calculated from each branch point and includes the initial coupling.

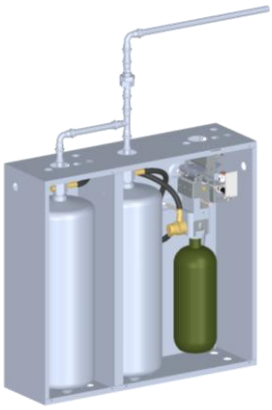


Figure 4.27: KitchenX Double Tank Manifold System.

Any KitchenX system will contain one supply line and one or more appliance branches, plenum branches and duct branches. The limitations of *Table 4.4* apply to the supply line and each branch separately and there is no restriction on the number of branches. For the supply line, rise is calculated from the agent tank. For the appliance, plenum and duct branches, rise is calculated from the branch point.

.

	Supply Line	Appliance Branch	Plenum Branch	Duct Branch
Length	9.7 m	3.6 m	1.2 m	2.4 m
Rise	1.8 m	0.6 m	0.6 m	1.2 m
Elbows	8 pcs	6 pcs	4 pcs	4 pcs
Tees	2 pcs	4 pcs	2 pcs	2 pcs
Flow	22 pcs	4 pcs	2 pcs	2 pcs

Table 4.4: Limitations for KitchenX Double Tank Manifold systems.

KitchenX Double Tank and KitchenX Triple Tank Systems

A separate supply line is connected to each of the tanks. For the supply lines, the same limitations as for a KitchenX single system apply to each line separately. See *Table 4.4*. For a KitchenX double tank system, the total flow number may be 12 to 22, maximum 11 for each supply line. For a KitchenX triple tank system, the total flow number may be 23 to 33, maximum 11 for each supply line.

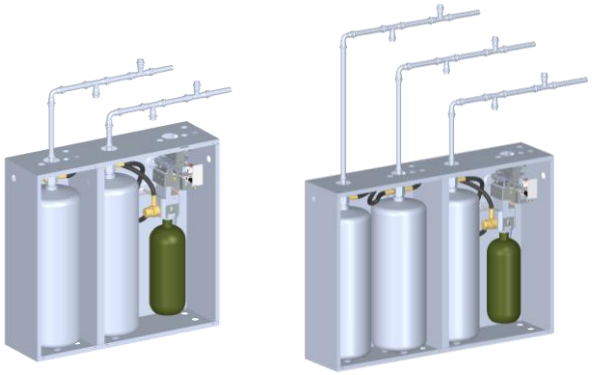


Figure 4.28: KitchenX double tank system on the left and KitchenX triple tank system on the right.

4.6 Design of Detection System

The detection system should be constructed with KitchenX detection components or other KitchenX approved components.

4.6.1 Design of Conduit Piping

When designing the conduit piping for automatic detection, the values of *Table 4.5* must not be exceeded.

	Without pipe bend	With pipe bend
Max number of detectors	12 pcs	12 pcs
Max length of wire rope	40 m	40 m
Max number of pulley elbows	20 pcs	16 pcs

Table 4.5: Maximum length, number of detectors and number of pulley elbows for a detection system.

4.6.2 Detector Placement and Selection

Detectors must be placed at each duct opening and above each cooking appliance protected by the system.

If one or more appliances are completely within an area of 1220 mm × 1220 mm with the center of the area directly underneath the duct detector, they do not require separate detectors. In this case, the detector at the duct must be placed at maximum 300 mm into the duct opening.

Detectors for appliances should be placed in the center of the exhaust gas stream leading to the exhaust duct. In most scenarios, the detector should be placed offset from the center of the appliance towards the duct.

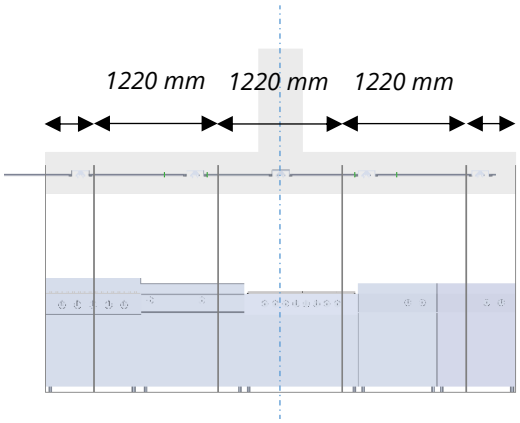


Figure 4.29

Only one detector is required for appliances having a continuous area less than 1220 mm × 1220 mm. Otherwise, multiple detectors must be placed so that each area of the appliance is within a 1220 mm × 1220 mm area of any of the detectors for the appliance. For selection of detector, refer to *Table 4.6: Detector selection guide.*

It is recommended to take a temperature reading of the maximum temperatures reached during normal cooking operations over each appliance and duct to ensure correct selection.

Part No.	Color	Temp. rating	Max cooking temperature
55-3292-07	Black	74 °C	38 °C
55-3292-13	Blue	138 °C	107 °C
55-3292-18	Red	183 °C	143 °C
55-3292-23	Green	232 °C	182 °C
55-3292-26	Yellow	260°C	204 °C

Table 4.6: Detector selection guide.

4.7 Manual Pull Station and Conduit

At least one and at most two manual pull stations should be installed for each KitchenX system.
A pulley tee is required for systems with two pull stations.

The requirements of *Table 4.7* must be satisfied for each conduit piping leading to a pull station.

Maximum length of wire rope	45 m
Maximum number of pulleys	20 pcs
Maximum number of pulley tees	1 pc
Maximum number of pipe bends	1 pc

Table 4.7: Pull station requirements.

If there are two pull stations sharing an initial section of conduit piping, the length of the piping and the number of pulley elbows are calculated between the cabinet and each pull station separately and must be within the requirements of *Table 4.7*. The total length and number of pulley elbows for the system are allowed to exceed those of *Table 4.7.*

In case a pipe bend is used, no pulley tees are allowed to be used in the detection system.

4.8 Electrical Switches

Two switches come as standard on the mechanical release device. Their purpose is to activate alarms or turn on or off electrical devices. To shut off gas supply, the microswitch signal must be relayed to an electrically activated gas shut off valve.
Appliance shut off is often performed after system installation. Responsibility for wiring of the appliance shut-off function should be clearly defined and agreed upon by all involved parties prior to installation.

! NOTE !

To prevent re-ignition, activation of the KitchenX system must immediately cause shutdown of electrical power and gas supply to all protected hazards.

Each microswitch has a single-pole, double throw contact rated at 16 A at 125/250 VAC, 10 A at 30 VDC or 1/3 hp at 125 VAC 10 A. For installation at a KitchenX cabinet, the maximum current of the connection to the microswitch cannot exceed 4 A at 49 VAC/VDC.

⚠ WARNING ⚠

Wiring must be performed by a qualified electrician according to national standards and regulations.

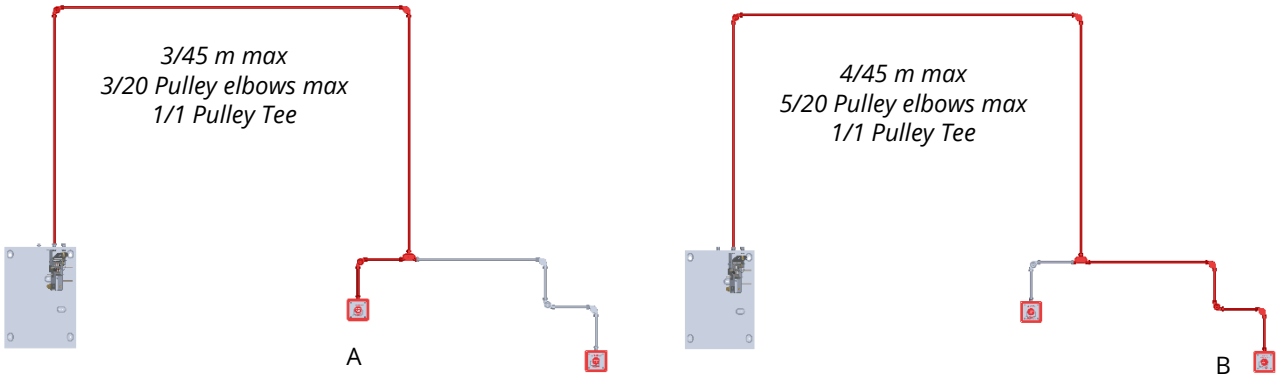


*Figure 4.30: The conduit factors of Table 4.7: Pull station requirements. are calculated for each conduit length to a pull station separately. Ensure that conduit length, nr of pulley elbows and pulley tees along the red path are within the requirements, both for pulley station **A** and for pulley station **B**..*

SECTION 5 – INSTALLATION

5.1 Installation Workflow

Before proceeding with installation, ensure that the system design is complete and that flow numbers, pipe lengths and conduit piping lengths are within the requirements specified in *SECTION 4*.
Installation involves:

- Installation of cabinets and cabinet components.
- Installation of distribution system components and nozzles.
- Installation of detection system.
- Installation of manual pull station.
- Installation of electrical switches.

⚠ WARNING ⚠

Installation of a KitchenX system may only be performed by a KitchenX certified technician.

Ensure that each installation step is understood completely before proceeding in practice. Failure to do so may result in accidental release of the fire extinguishing system or injury caused by puncture of nitrogen cartridges.

5.2 Cabinet and Cabinet Components

All cabinets used must be placed where the ambient temperature is within the operating temperature of -5 to 55 °C. Avoid placing a cabinet close to cooking equipment radiating heat.
The cabinets must also be installed so that they are accessible for service maintenance.

Cabinets shall be mounted on a structurally sound vertical surface with four screws. If installing multiple cabinets, they must be placed side by side with an 8 mm gap. Before mounting additional cabinets, punch out the knockout holes and install grommets included with the expellant gas hose (p/n 55-5840-20).
It is crucial to place a grommet in each knockout hole to prevent chafing of expellant gas hoses.

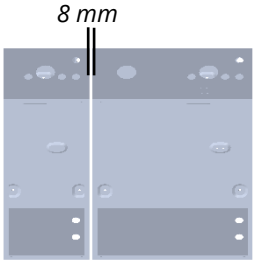


Figure 5.2: An 8 mm distance is required to allow space for the grommet.

Fill up each agent tank with 11.7 liters of KitchenX agent. When filling, the agent temperature should be between 16-27 °C.
after filling, ensure the distance from the tank outlet to the KitchenX agent surface is 46 to 51 mm.

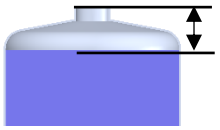


Figure 4.1: The agent surface fill level is 46 to 51 mm from the tank outlet.

⚠ WARNING ⚠

Wear safety goggles when handling KitchenX agent. In case of contact with eyes, immediately rinse for 15 minutes and contact emergency services if irritation persists.

After filling the agent, fasten the valve to the agent tank and tighten until metal-to-metal contact is achieved.

Apply thread tape and fasten the expellant gas hose which is attached to the regulator to the tank valve. Both connections of the hose are swiveling.

KitchenX Single Tank System

If installing a KitchenX single tank system, ensure a vent plug is fastened at the second connection of the tank valve and that the regulator's secondary connection is plugged with a fixed plug.

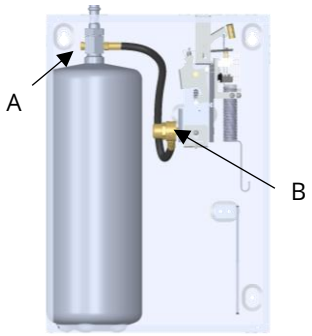


*Figure 5.3: **A**: A vent plug is necessary to prevent pressure buildup due to temperature fluctuations.*
***B**: The secondary connection of the regulator must be plugged to prevent leakage of expellant gas.*

KitchenX Double Tank System

If installing a KitchenX double tank system, remove the plug from the secondary connection of the regulator. Apply thread tape and fasten a new expellant gas hose (p/n 55-5840-20) at this position. Route the hose to the second cabinet. Apply thead tape and fasten it to the second tank's valve. Ensure that each tank's secondary connections are plugged with a vent plug.

Figure 5.5: Routing of expellant gas hose for a KitchenX double system.

KitchenX Triple Tank System

If installing a KitchenX triple tank system, follow the steps for a KitchenX double system, but remove the plug from one of the first two tank's valves. Instead, attach a third expellant gas hose and fasten it to the third tank's valve. Ensure that the two remaining tank valves are plugged with a vent plug.

Figure 5.4: Routing of expellant gas hoses for a KitchenX triple system.

! NOTE !

Do not arm the system and do not mount cartridges at this point. Finish the installation of the distribution and the detection systems first. Cabinet front covers can be left unmounted until commissioning the system.

5.2.1 Distribution System

The following points must be complied with when installing the distribution piping.

1. Ensure all pipes, couplings and nozzles are internally clean before mounting them.
2. Cutting of pipes should be performed with appropriate tools to prevent angled or deformed cuts. After cutting, ream the pipe ends and clear any debris.
3. Ensure the pipes are supported properly. Pipe hangers or brackets are recommended at every 1.5 m of pipe or at every 0.6 m of pipe in case there is an elbow, or a tee between the supports.
4. Apply new thread tape whenever fastening components with threaded connections in the distribution system that do not use a gasket or O-ring for sealing. This includes nozzles, swivel adapters and ⅜“adapters. Ensure the thread tape does not occlude the orifice of couplings or nozzles.
5. Install each nozzle according to the system design and ensure it is correctly oriented regarding height, aim point and positioning. The swivel adapter can be especially useful for some hazards.
6. When tightening a nozzle, use two keys to prevent creating torsion at pressed joints, which can otherwise weaken them.

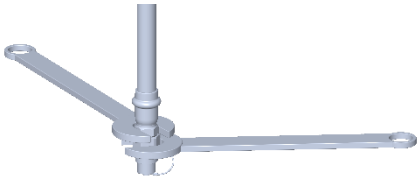


Figure 5.6: A nr 17 key is used for 3/8” adapters and a nr 20 key is used for nozzles.

7. Pressing of KitchenX press couplings must be performed with the appropriate tool with V15 jaws or inserts.
8. In case the distribution pipe design must be adapted during installation, ensure that the requirements of 4.5.3 Design of Distribution Piping are satisfied.
9. Penetration of kitchen hoods with distribution piping should be done with oil-tight fittings. Use leakage-tight compression connectors when possible (p/n 55-5199-04, 55-5199-04).

When connecting the distribution piping to the agent tank, unscrew the packing nut from the valve, press a 3/8” adapter (p/n 55-5200-08) to the pipe and fasten the packing nut to the adapter. Before fastening the packing nut to the tank valve, ensure the burst disc is not damaged.

⚠ WARNING ⚠

A broken burst disc can allow KitchenX agent to creep up into distribution piping where it may solidify, thus preventing proper discharge of KitchenX agent.

KitchenX Double Tank Manifold Systems

There are special steps to consider regarding the burst discs when installing a manifolded system.

1. Remove the packing nut from both tank valves and take out the burst discs. Remove the foil from the discs and discard it. Place the gasket piece back in the valves.
2. Connect a piping configuration like illustrated in *Figure 5.7*. Press a ⅜” adapter and a 90-degree elbow to a short pipe. Fasten it to one of the tank valves. At the other tank, make a similar attachment but with a tee instead. Connect the pieces with a horizontal pipe segment. Mount a union coupling for manifold with burst disc (p/n 55-1621-27) directly following the tee. It should be mounted with the protruding segment facing in the direction to the nozzles. Use ⅜” adapters at both pipe connections to the union coupling and fasten with thread tape.

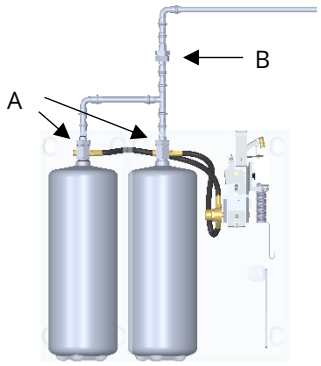


Figure 5.7: Piping system for a manifolded system.
***A**: Remove the foil from the burst discs in the tank valves.*
***B**: Add a union coupling for manifold with burst disc directly after the joining tee.*

5.2.2 Detection System

Installation of the detection system is identical regardless of system size. It is recommended to start fastening the detector brackets, then installing the conduit piping and lastly threading the wire rope and mounting the fusible links.

The following points must be complied with when installing the detection system.

1. Cutting of pipes should be performed with appropriate tools to prevent angled or deformed cuts. After cutting, ream the pipe ends and clear any debris.
2. Detector brackets should be attached with two screws, or if placed at the duct, with two pipes that are fastened immediately at the perimeter of the opening. Refer to *Figure 5.8*.

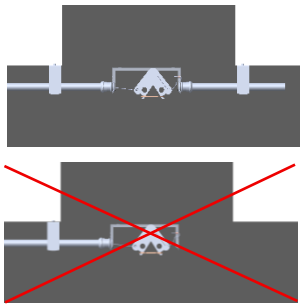


Figure 5.8

3. Install all conduit piping with adequate fastening points, at least two attachments per pipe section are recommended. Compression fittings at detector brackets, pulleys and joints must be tightened completely with the pipe in its innermost position.
4. In case the detection system design needs to be adapted during installation, ensure that the lengths and quantities of *Table 4.5* are not exceeded.
5. The entire length of the wire rope must be enclosed by conduit piping except for inside the cabinet and within detector brackets.
6. Change of direction can only be achieved with a single pipe bend immediately connected to the cabinet, or by pulley elbows and pulley tees.
7. Penetration of kitchen hoods with conduit piping should be done with oil-tight fittings. Use leakage tight compression connectors when possible. (p/n 55-5199-10, 55-5199-18).

The wire rope can be threaded through the conduit piping from either the terminal detector bracket or the release mechanism. If the wire gets stuck at the pulleys, the covers can be detached so that the wire can be fed to the next section more easily.

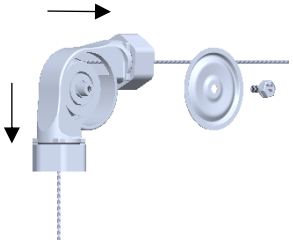


Figure 5.9

Cut the wire rope after the entire conduit piping has been fed but leave a long tail at the release mechanism.

! NOTE !

The wire rope should not be spliced. If the wire rope is too short, cut it from the sleeve at either end and use an oval sleeve to crimp it to the end of a new wire rope. Cut excess wire and tape over the sleeve with electrical tape. (bild nedan md tejpbild) This will enable it to pass pulley elbows when pulling the wire from the opposite end. In case it nevertheless gets stuck, remove the pulley elbow caps to help it through the bends.

In case the terminal detector bracket is attached by the screw-holes, the wire rope is fixed with a stop sleeve as illustrated in *Figure 5.10*.

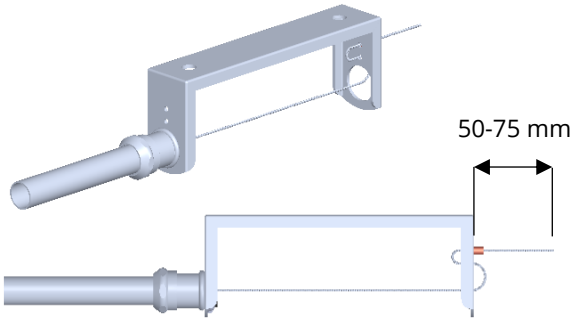


Figure 5.10: Leave 50-75 mm when crimping the stop sleeve. Afterwards, the wire can be cut closer to the sleeve.

However, in case the terminal detector is at a duct and therefore fixed in position by two pipes, route the wire rope as illustrated in *Figure 5.11*.

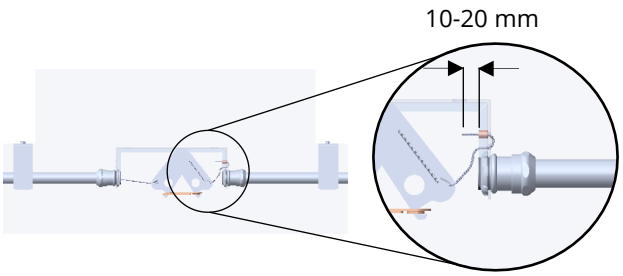


Figure 5.11: Leave 50 to 75 mm when crimping the stop sleeve but shorten it to 10 to 20 mm after crimping.

To prevent crimping at any frayed part of the wire rope, it is recommended to push 50 to75 mm of wire through the crimp sleeve before crimping. Afterwards, ensure that the crimp sleeve is fixed in position on the wire and remove all slack.
To prevent the loose end interfering with linkage scissors, it should be cut to leave
10 to 20 mm of tail.

When proceeding to place fusible links, the wire should be put to light tension by hanging a small weight or tool from the wire at the cabinet. Place the scissor linkages with the appropriate fusible link as illustrated in *Figure 5.12.*
Refer to *Table 4.6: Detector* selection *guide.*

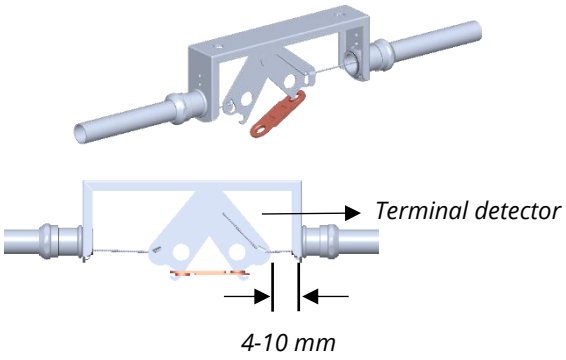


Figure 5.12: Mounting of fusible link. The scissor linkage should sit close to the terminal end side of the bracket without touching the conduit opening. An adjustable plier can be used in the scissor linkage holes to hold it in a suitable position for mounting fusible links.

Tensioning the Wire Rope

When all wire has been threaded and the fusible links have been mounted, the wire rope should be put to appropriate tension for proper system activation.

1. Run the wire rope through the trigger hammer of the release mechanism.

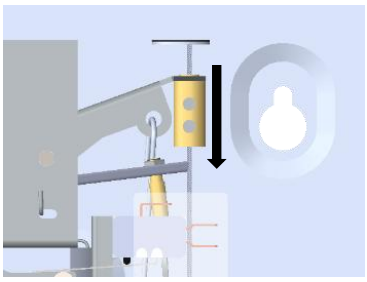


Figure 5.13

2. Activate the release mechanism by using the cocking lever to put the cocking pin in the upper position.

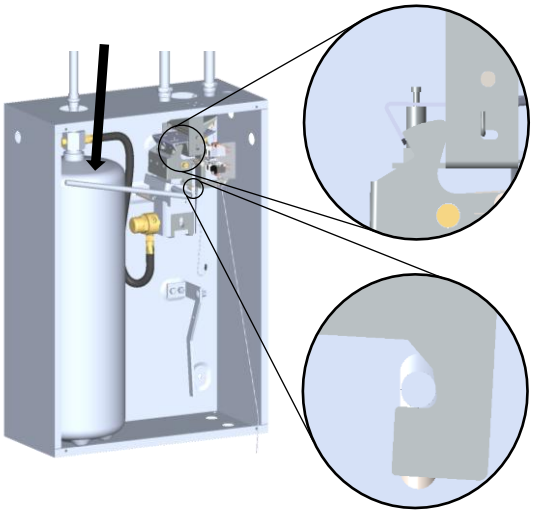


Figure 5.15. Ensure that the cocking pin is in position and that the plate lever is in lower position at the lock pins.

3. Insert the lock plate to prevent accidental system activation.

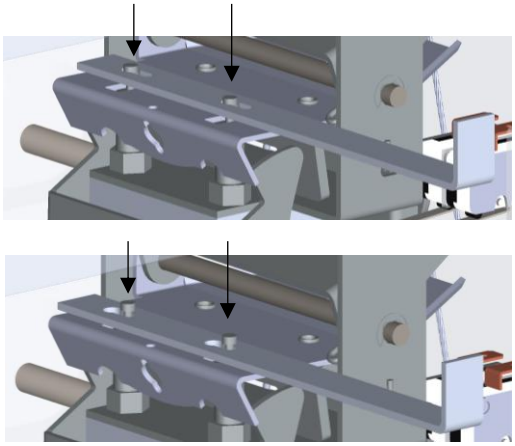


Figure 5.14. Ensure the lock plate grabs the lock pins.

4. Pull the wire rope to tension and lift the trigger hammer. If the wire rope is long with many detectors and pulleys, more tension will be required.
5. Fasten the hexagonal socket screws with a 2.5 mm hex key. Make sure they grip the wire rope firmly.

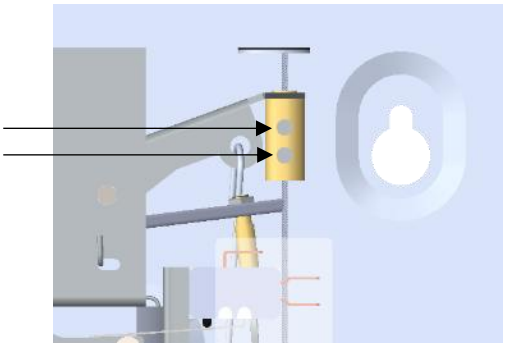


Figure 5.17

6. Pull down the tension lever.

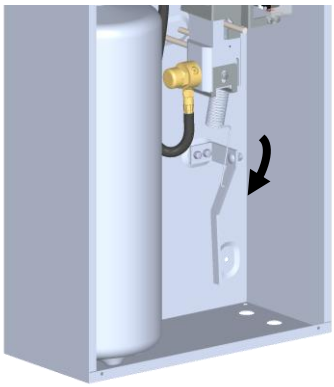


Figure 5.18

7. Confirm that the distance between the bottom of the trigger hammer and the bottom of the lever plate is between 6.5 to 9.5 mm.

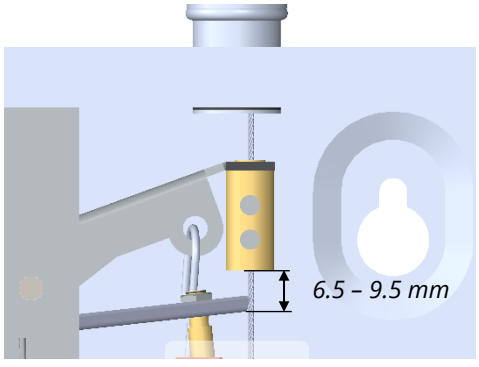


Figure 5.19

8. To prevent the wire rope from interfering with the action of the release mechanism, pull it through the interior of the spring. (BILD)

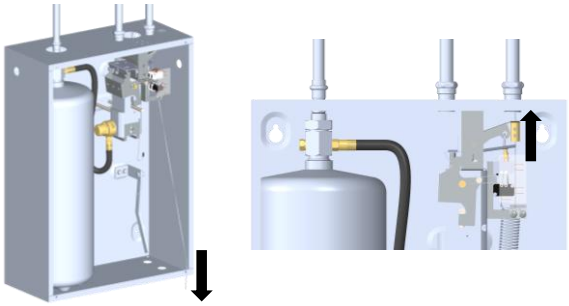


Figure 5.16. Gör vajer mer tydlig, inzoomad trigger hammer för högra steget)

! NOTE !

After putting the wire rope to tension, ensure that all fusible links are still positioned towards the terminal end and that there is no slack in the system.

Non-released slack may suddenly be released at a later point, resulting in accidental system activation.

5.3 Manual Pull Station

At least one and at most two manual pull stations should be installed for each KitchenX system. Unless local regulations prescribes otherwise, the following points should be complied with.

- Manual pull stations should be placed at least 2 m away from the closest kitchen hazard, thus allowing manual activation during active fire.
- Manual pull stations should be placed in the evacuation route leading from the kitchen, at a height between 1 to 1.2 m above the floor.
- The wire rope should run through conduit piping throughout its entire length.
- Turns and bends can only be achieved with pulley elbows, pulley tees or one pipe bend.

Follow these steps for installation of the pull station(s).

1. Ensure that the lock plate is correctly positioned at the lock pins and that there is no cartridge attached at the release mechanism.
2. Install the conduit piping in accordance with the design section. Do not exceed 45 m of wire and pipe, 20 pulley elbows, one pulley tee and one pipe bend.
3. The manual pull station can be installed at a junction box or flush-mounted in the wall. If mounted at a junction box, push out the knockout hole of the box and attach the conduit with a compression connector. It is not necessary to mount an elbow pulley to achieve the 90-degree bend inside the box. If the pull station is flush mounted, an elbow pulley is attached directly to the backside of the pull station. The pull station should be securely mounted with each screw hole.

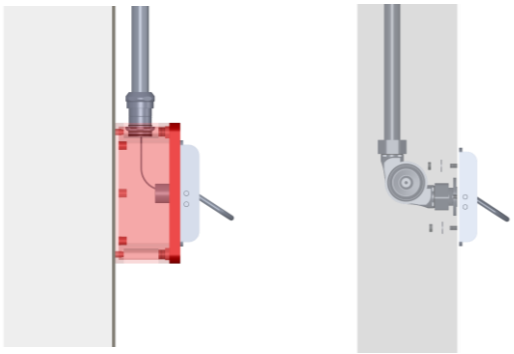


Figure 5.22

4. The wire rope can be threaded through the conduit piping from either the pull station or from the release mechanism.
5. Attach the wire rope to the release mechanism with an oval crimp sleeve according to *Figure 5.23*.

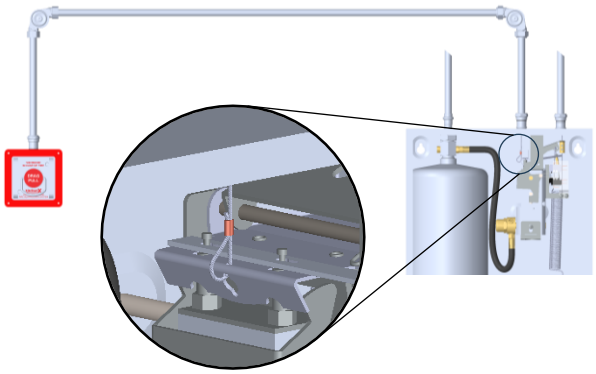


Figure 5.23. Crimp the wire rope with an oval sleeve with 50 to 75 mm excess wire. After crimping, use a wire cutter and shorten the wire rope down to maximum 10 mm.

6. If two pull stations are used, the wire ropes can be joined before the pulley tee

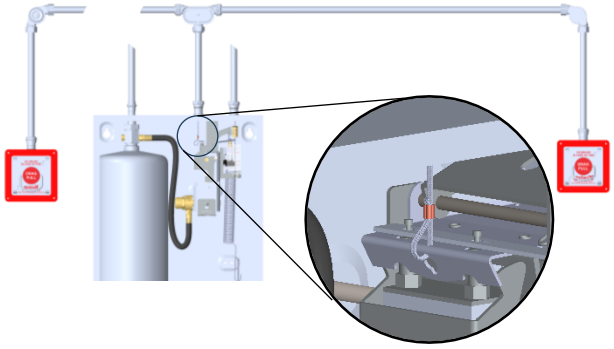


Figure 5.21: In case the first pulley after the cabinet is a pulley tee, both wire ropes can be connected to the release mechanism.

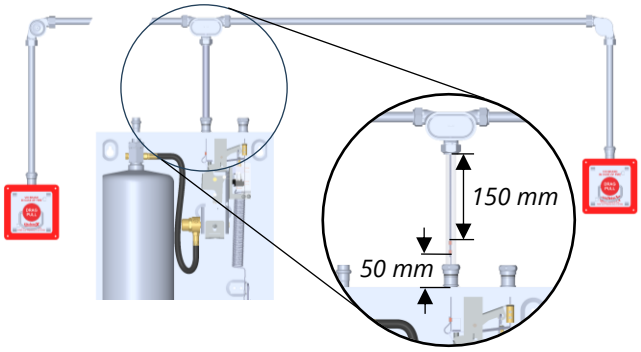


Figure 5.20: If there are any pulley elbows between the cabinet and the pulley tee, the wires are crimped with two oval sleeves with at least 150 mm distance to the pulley tee's compression connector, and 50 mm distance to the closest compression connector towards the cabinet. Byt bild till en där det finns fler pulley elbows innan pulley tee.

according to Figure 5.21 or Figure 5.20.

Bild på pulley tee i side tee-läge. (se 5-39)

7. Remove the handle from the pull station and crimp the wire rope with an oval crimp sleeve with 50 to 75 mm excess wire. After crimping, use a wire cutter and shorten the excess wire rope down to maximum 10 mm.
8. Push back the handle of the pull station into the plate. Remove the socket screw from either side of the station and insert a breakable rod (p/n 55-1135-94) through the handle. Re-fasten the socket screw.

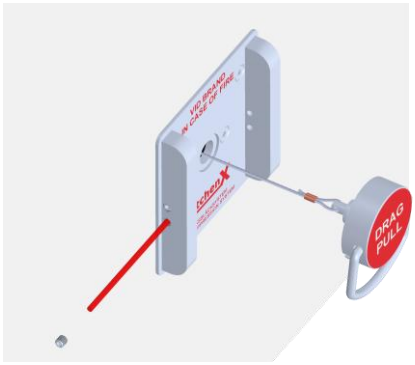


Figure 5.24: Socket screws can be removed from either side of the pull station.

5.4 Electrical Switches

To prevent re-ignition after extinguishing, electrical switches should be connected to shut off gas valves and kitchen appliances when the KitchenX system is activated. This task is often performed by an electrician after system installation. Perform the following steps to prevent having to open the cabinet to access the wires.

1. Punch out one of the knockout holes on the right-hand side of the cabinet or at the top and right-hand side of the cabinet closest to the wall.

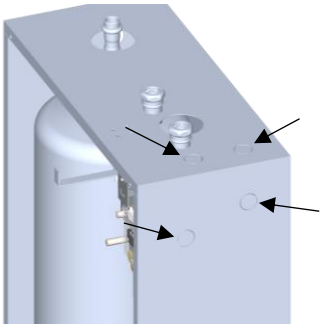


Figure 5.25: Gör knockout tydligare

2. Install an electrical junction box (p/n 55-2413-00). The box can either be installed on the side or on top of the cabinet.
3. In case there is risk of chafing of the electrical wires, mount a cable fitting or a grommet at the interface between the box and the cabinet.

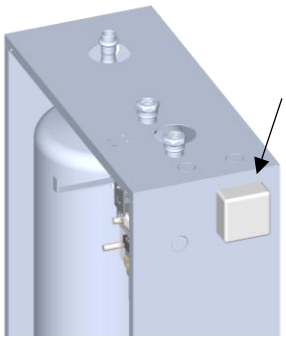


Figure 5.26

4. Pull through the cables and bundle them according to the microswitch they connect to, for example with a cable tie.
5. Put a wire cap or electrical tape on the loose cable ends.

If necessary, two additional electrical switches can be installed on the lower position of the microswitch bracket. These switches will be oriented upside down as compared with the pre-installed upper switches. If adding such additional microswitches, mark the cable bundles to indicate **lower** and **upper** microswitches.

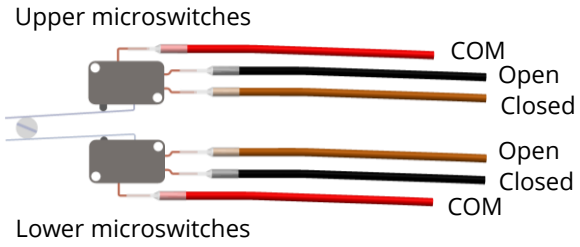


Figure 5.27: Upper and lower microswitches with release mechanism in operating mode.

⚠ WARNING ⚠

Electrical wiring must be performed by a qualified electrician according to national standards and regulations.

If you have authority to perform electric installations, follow the wiring diagram of *Figure 5.29* for **upper** microswitches.

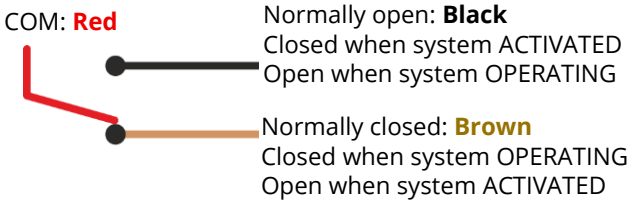


*Figure 5.29: Wiring diagram for **upper** microswitches.*

In case more than two microswitches are used, the additional, **lower** microswitches will have opposite wiring to upper microswitches as seen in the wiring diagram of *Figure 5.30*.

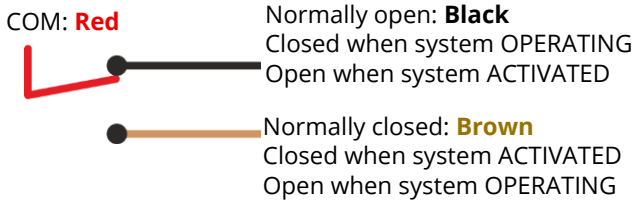


*Figure 5.30: Wiring diagram for **lower** microswitches. Additional, lower microswitches will have opposite wiring to the upper microswitches.*

Despite the microswitches' higher rating, when used for the purposes of this system the loads may not exceed 4 A or 49 VAC/VDC. Ensure that all unused wire ends are capped to prevent malfunctions and electrical shock.

New microswitches (p/n 55-2019-62) are installed pairwise with two screws and nuts and separated by an isolating piece of plastic. Refer to *Figure 5.28*.

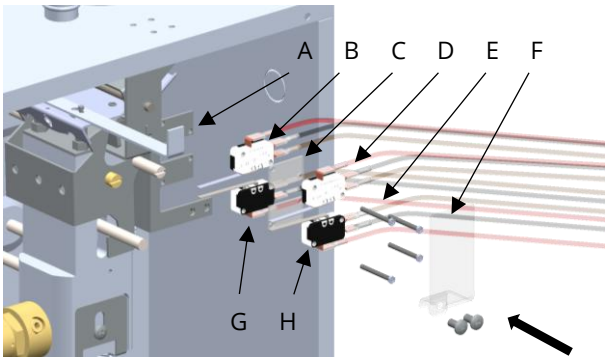


*Figure 5.28: **A**: Hexagonal nut attached to screw from behind bracket. **B**: Microswitch 1 (upper). **C**: Isolating plastic. **D**: Microswitch 2 (upper). **E**: Screws. **F**: Protective cover attached with one screw. The second screw prevents it from turning. **G**: Microswitch 3 (lower). **H**: Microswitch 4 (lower). Bättre upplösning*

SECTION 6 – COMMISSIONING

After installation is complete, key components of the KitchenX system must be tested to ensure proper function in case of fire.

⚠ DANGER ⚠

Make sure that no nitrogen cartridge is installed at the release mechanism and that the lock plate is correctly mounted at the lock pins before proceeding.

6.1 Testing of Pull Station

1. Remove the lock plate from the lock pins.
2. Pull the handle of the pull station. The release mechanism should trigger easily. If excessive force is needed, open the pulleys and check that the ball bearings can rotate without resistance and that the wire rope does not get stuck along its conduit. Make sure that the breakable rod does not interfere with activation.
3. When finishing, push the handle back into the pull station, insert a new breakable rod (p/n 55-1135-94) and re-fasten the socket screw.
4. Use the cocking lever to put the cocking pin in the upper position and reposition the lock plate at the lock pins.

6.2 Testing of Detection System

1. Remove the tension of the wire rope by moving the tension lever to the up position.
2. Find the terminal detector scissor linkage, furthest away from the release mechanism along the conduit piping. Remove the fusible link and replace it with a test link.
3. Re-tension the wire rope by pulling the tension lever to the down position.
4. Remove the lock plate.
5. Use a wire cutter to cut the test link and check if the release mechanism has activated. If not, troubleshoot according to the bullet list below and re-test from step 1.

Make certain that:

- The scissor linkages of all detectors are placed towards the terminal detector in their brackets.
- The wire rope does not snag anywhere along the conduit.
- The wire rope is not frayed at the pulley elbows and does not jam at the detector brackets.
- Lock plate is removed and the release mechanism is in operating position.

6. If the release mechanism is properly activated, push the tension lever to the up position.
7. Place the correct fusible link at the terminal scissor linkage. Ensure that it is mounted towards the terminal side in the bracket.
8. Use the cocking lever to put the cocking pin in the upper position and re-place the lock plate at the lock pins.
9. Push the tension lever to the down position and check that the 6.5 to 9.5 mm distance between the trigger hammer and the lever plate is maintained.

6.3 Testing Electrical Switches

Test the switches by method one or method two.

Method One

A multimeter is required to test the electrical switches. Use it in continuity mode.

Figure 6.1: Continuity symbol

Start by checking the microswitches with the cocking pin in operating position. The wiring is opposite for microswitches in the upper position and the lower position.

1. For **upper** microswitches, firstly test across the COM (red cable) and the Normally Closed terminals (brown cable). The multimeter should register the connection, usually with a beeping sound. Secondly, test across the COM and the Normally Open (black cable) terminals. The multimeter should *not* register the connection.
2. For **lower** microswitches, firstly test across the COM (red cable) and the Normally Closed terminals (brown cable). The multimeter should *not* register the connection. Secondly, test across the COM (red cable) and the Normally Open terminals (black cable). The multimeter should register the connection, usually with a beeping sound.

The switches should also be checked with the cocking pin in activated position. Make sure no cartridge is installed at the release mechanism, remove the lock plate and then activate the release mechanism.

1. For **upper** microswitches, firstly test across the COM (red cable) and the Normally Closed terminals (brown cable). The multimeter should now not register the connection. Secondly, test across the COM and the Normally opened (black cable) terminals. The multimeter should register the connection.
2. For **lower** microswitches, firstly test across the COM (red cable) and the Normally Closed terminals (brown cable). The multimeter should now register the connection. Secondly, test across the COM (red cable) and the Normally Open terminals (black cable). The multimeter should now *not* register the connection.

Finalize by using the cocking lever to place the cocking pin in operating position and position the lock plate at the lock pins.

Method Two

Alternatively, in case wiring to shut off appliances has already been made, the shut-off function should be checked.

1. Turn the power source to the kitchen appliances on.
2. If the breakable rod is mounted in the pull station, remove it by unscrewing one of the socket screws on the side.
3. Remove the lock plate from the release mechanism.
4. Pull the handle of the pull station. If wiring has been performed correctly, the kitchen appliances will shut off.
5. Push the handle back into the pull station, insert the breakable rod and re-fasten the socket screw.
6. Use the cocking lever to put the release mechanism in operational mode and re-position the lock plate at the lock pins.
7. Check that the kitchen appliances can now be turned on again.

If the kitchen appliances do not shut off upon activation of the system, the electrical wiring should be inspected. Restarting appliances may require actions separate from the KitchenX system.

6.4 Inspection of Distribution System

All press couplings should be checked and confirmed that they have been pressed. Check that threaded connections are fastened securely with thread tape where appropriate.

6.5 Placing in Service

1. Ensure that the lock plate is correctly positioned at the lock pins.
2. Select the correct cartridge and remove the shipping cap. An N8A tank is used for a KitchenX single tank system and an N16A cartridge is used for KitchenX double tank and triple tank systems.
3. Weigh the cartridge and verify that the weight is no less than 14 g below the filling weight.
4. Ensure that the membrane of the cartridge is not punctured
5. Fasten the cartridge firmly by hand.
6. Ensure that the tension lever is in the down position.
7. Remove the lock plate.
8. Mount the cabinet cover and fasten with all four screws.
9. Record the installation date in the system journal.

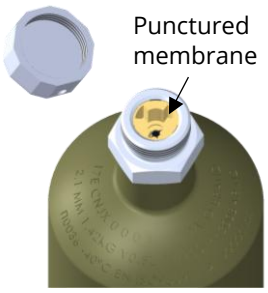


Figure 6.2

⚠ DANGER ⚠

Failure to put the tension lever in the down position will cause the system to remain unresponsive during automatic detection.

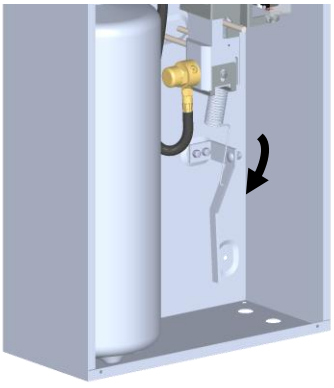


Figure 6.3

SECTION 7 – MAINTENANCE AND SERVICE

Due to the harsh nature of kitchen environments, maintenance is required at 6-month intervals. Extended maintenance is required at 10-year intervals.

⚠ WARNING ⚠

Maintenance and service of a KitchenX system may only be performed by a KitchenX certified technician.

Before commencing service, confirm that all kitchen appliances are turned off and have cooled down.

Confirm also confirm that the system design is correct and that each hazard is protected with the correct nozzle(s). Take into consideration that new kitchen appliances may have been installed or existing ones rearranged and that this could require that nozzles and detectors need to be added or changed.

Cleaning of the kitchen is necessary to prevent excessive buildup of grease but is also associated with risk of damaging or displacing system components. If possible, plan the maintenance to be done just after any extensive cleaning.

7.1 Semi-Annual Maintenance

First check the installation date or previous extended maintenance date of the KitchenX system. In case it will be more than 10 years ago at the next semi-annual maintenance occasion, also perform the steps of *7.2 Extended Maintenance*.

Follow these steps to perform semi-annual maintenance:

7.1.1 Actions at the Cabinet

1. Remove the KitchenX cabinet cover(s).
2. Place the lock plate at the lock pins and make sure they are properly engaged.
3. Remove the cartridge and fasten a shipping cap to prevent accidental puncture of the burst membrane. Check for any corrosion or damage. Discard and replace the cartridge if any such damage is found. If it is more than 10 years since the manufacture date or the previous hydrostatic test, the cartridge should be replaced with a new or a newly tested cartridge. If so, it is recommended to perform all steps of *7.2 Extended Maintenance* if the 10-year interval is near.

⚠ WARNING ⚠

Cartridges must be de-pressurized in a controlled manner before being discarded in accordance with local regulations.

A suitable method is to install the cartridge in the release mechanism and to disconnect the expellant gas hose(s) while still leaving the regulator connected. Then trigger the release mechanism.

4. Remove and inspect the release mechanism's O-ring at the cartridge connection. Replace it if it shows signs of damage or dryness (p/n 55-1000-98). Apply grease before placing it back in the mechanism.

! NOTE !

Use grease that is suitable for rubber for all O-rings of a KitchenX system. For example, silicone-based grease such as Dupont Molykote 55.

Do not use petroleum, alcohol or solvent based lubricants as they can cause the rubber to swell excessively or crack.

5. Check all parts of the release mechanism for damage or deformation and ensure that the mechanism is fastened firmly in the cabinet. BILD med a, b, c förr delar som ska kontrolleras.

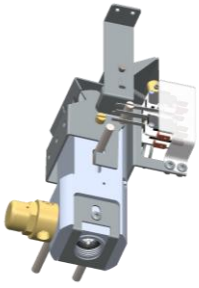


Figure 7.1

6. If it will be more than 12 years since the regulator was manufactured or since it was flow tested at the next maintenance

occasion, perform a flow test according to section *7.2.4.*

7. Disconnect the expellant gas hoses from the agent tanks. Unfasten the packing nuts from the agent tank valves to disconnect them from the distribution piping.
8. Inspect the expellant gas hoses and their connections. Replace them if they show signs of corrosion or chafing. If it will be more than 12 years since manufacturing or the previous test at the next maintenance occasion, replace the hose or perform a hydrostatic test according to section *7.2.3.*
9. Remove the agent tank from the cabinets and unscrew the valve. Check the agent tank, the valve and the riser for corrosion, dents, or other damage. Replace it with a new tank if necessary (p/n 55-1618-20). Likewise, remove the O-ring and inspect it. Replace it if showing signs of damage or dryness (p/n 15-6024-80). Apply grease before placing the O-ring back at the valve. If it will be more than 12 years since manufacturing or the previous test at the next maintenance occasion, replace the agent tank or perform a hydrostatic test according to section *7.2.2.*
10. Remove the vent plug from the valve. Check it for damage and make sure that the internal rubber ball has free movement. If not, wash it and test again. Replace if necessary (p/n 55-1618-12). Apply new thread tape and re-fasten it to the tank valve.
11. Check that the burst disc is not perforated. Otherwise, replace it (p/n 55-1618-80). Make sure that the silver side is facing up when placing it at the valve.

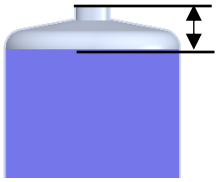
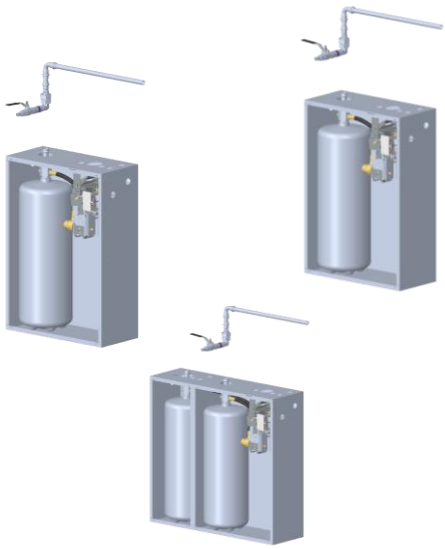


Figure 7.2: The agent surface fill level is 46 to 51 mm from the tank outlet.

12. Ensure that there is a correct amount of KitchenX agent in the tank. There should be 46 to 51 mm from the agent surface to the top of the tank outlet at an agent temperature of 16 to 27 °C.
13. Re-fasten the valve to the tank until metal-to-metal contact is achieved. Place the tank back in the cabinet and reconnect it to the distribution network.
14. Apply new thread tape and re-fasten expellant gas hoses.

7.1.2 Distribution System

1. Check that each nozzle is correct for the hazard it should protect regarding the aiming point, position, hazard dimension, and nozzle type.
2. Clean each nozzle from excess grease. Remove the cap and check it for deformation or damage. Replace it if necessary (p/n 55-6156-91). Replace the O-ring (p/n 55-6156-92) at one-year intervals. Otherwise, inspect it and replace it if it shows signs of damage or if it is dry. Apply grease to the O-ring before placing it back at the nozzle, paying careful attention to avoid the nozzle orifice. Apply new thread tape to the adapter before re-fastening the nozzle.
3. Remove the nozzle and inspect the piping in case there is evidence that cooking grease has entered the distribution piping, for example if the cap has been left off or there is grease under the cap. If so, branch lines may need to be cleaned or replaced. Use new thread tape when re-fastening the nozzle.
4. Perform a blow through test. Attach a purge adapter (p/n 55-9650-04) to the distribution system with the packing nut that is normally connected to the agent tank valve. For KitchenX double tank and triple tank systems, purge each distribution line one at a time. For manifolded systems, connect the purge adapter to the union coupling where the flow from each tank is combined. (BILD, en för adapter till



rörsystem. En för adapter för manifoldat rörsystem.)

5.
6.
7.
   - Make sure that all nozzle caps are fitted at all nozzles.
   - Connect an air compressor to the adapter with a quick connect coupling hose to the adapter.
   - At 4 to 9 bars, open the ball valve for a few seconds and then close it.
   - Check that the nozzle cap has come off from each nozzle.

If the nozzle cap did not come off one or more nozzles, this indicates that the O-ring may be dry, the cap may be deformed, or the distribution pipe may be clogged at a section. Inspect the nozzle cap and pipe and replace them if necessary. If it is not possible to fully investigate the pipe, it should be replaced.

7.1.3 Manual Pull Station

⚠ DANGER ⚠

Make sure that no nitrogen cartridge is installed at the release mechanism.

1. Remove the lock plate from the lock pins.
2. Pull the handle and make sure that the release mechanism activates without the need for excessive force. Make sure that the breakable rod does not interfere with activation.
3. Check that the oval sleeve holds the wire rope firmly and that the wire rope does not show signs of fraying.
4. Push back the handle into the pull station, insert a new breakable rod (p/n 55-1135-94) and re-fasten the socket screw. Pull out the wire rope slack into the cabinet. Ensure that the oval sleeve holds the rope firmly and that there are no signs of the wire rope fraying. If necessary, replace the wire rope as illustrated in section *5.2.2 Detection System*.

7.1.4 Electrical Switches

1. While the release mechanism is still in activated mode, check the electrical switches. For upper (standard) microswitches, the switch lever *should not* produce a clicking sound when moving it up and down. If microswitches have been mounted in the lower position, moving the switch lever *should* produce a clicking sound.
2. Use the cocking lever and place the release mechanism in operating mode, position the lock plate at the lock pins, and then check the microswitches again. When moving the switch lever, upper microswitches *should* produce a clicking sound and lower microswitches *should not* produce a clicking sound.
3. If there are any issues in the previous steps, the trigger lever can be adjusted by bending it slightly. Replace the switches if they show any signs of damage (p/n 55-2019-62).

7.1.5 Detection System

4. Remove all fusible links from the detection system and take note of which fusible link type was placed at which detector bracket.
5. Pull the slack of the wire rope, first in the terminal bracket direction and then in the cabinet direction. Look for damage and fraying at each wire rope endpoint and where it contacts conduit couplings at the detector brackets. Replace it if it is showing any signs of damage.

! NOTE !

A frayed wire rope may be more flexible, which can cause accidental activation. Replace damaged wire ropes as illustrated in section *5.2.2 Detection System*.

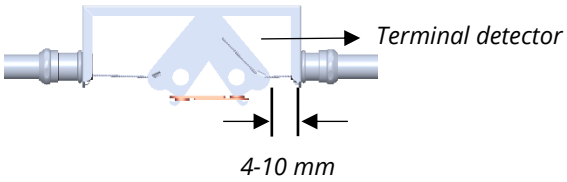


Figure 7.4

6. Lower the tension lever and check that there is a 6.5 to 9.5 mm distance between the bottom of the lever plate and the bottom of the trigger hammer.

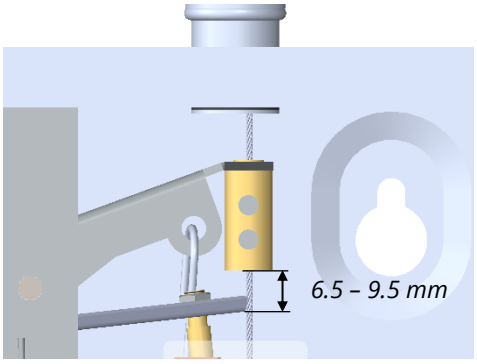


Figure 7.3

7. Move the tension lever to the up position and replace the terminal fusible link with a test link (p/n 55-3291-90).
8. Lower the tension lever to the down position and use a wire cutter to cut the test link.
9. If the system did not activate, check that:
   - The scissor linkages of all detectors are placed towards the terminal detector in their brackets.
   - The wire rope does not snag anywhere along the conduit.
   - The wire rope is correctly positioned in the center of the pulley ball bearings.
   - The wire rope is not frayed at the pulleys and does not jam at the detector brackets.
   - The lock plate is removed, and the release mechanism is in operating position.
   - There is no solidified grease buildup preventing the free movement of the wire rope or the linkage scissors.
10. Check that the shut-off function is working and that the protected kitchen appliances cannot be turned on.
11. Raise the tension lever to the up position and confirm that there is a 6.5 to 9.5 mm distance between the bottom of the lever plate and the bottom of the trigger hammer.

! NOTE !

Restarting appliances may require actions separate from the KitchenX system.

7.1.6 Re-commissioning

1. Ensure that the release mechanism is in operating mode and that the lock plate is correctly positioned at the lock pins.
2. Remove the shipping cap of the nitrogen cartridge and weight it to verify that the weight is no less than 14 g below the filling weight.
3. Attach the cartridge to the release mechanism by hand tightening.
4. Remove the lock plate and make sure that the tension lever is in the down position.

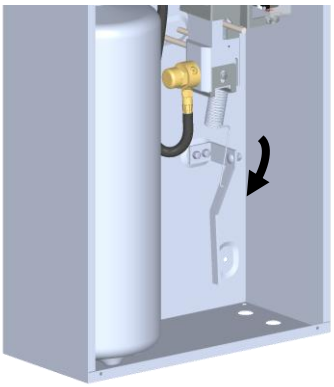


Figure 7.5

5. Attach the cabinet covers.
6. Note the service date and any additional system services performed in the system journal.

⚠ DANGER ⚠

Failure to put the tension lever in the down position will cause the system to remain unresponsive during automatic detection.

7.2 Extended Maintenance

Additional maintenance steps are required on top of the semi-annual maintenance procedure at 10-year intervals. This includes:

- Hydrostatic testing and refilling of nitrogen cartridges. Performed at maximum 10-year intervals from the cartridge manufacture date. (visa på patron vart datumet står. bild)
- Replacement of KitchenX agent, performed at 10-year intervals from the system installation date, maximum 12 years to accommodate to the testing interval for the system cartridge.
- Hydrostatic testing of agent tanks, performed at 10-years intervals from manufacture date (bild på märkning), maximum 12 years to accommodate to the testing interval for the system cartridge.
- Hydrostatic testing of expellant gas hoses, performed at 10-year intervals from manufacture date, maximum 12 years to accommodate to the testing interval for the system cartridge.
- Flow testing of pressure reducing regulators, performed at 10-year intervals from manufacture date, maximum 12 years to accommodate to the testing interval for the system cartridge. (bild på märkning)
- Extended maintenance of distribution system.

As an alternative to testing components, newly manufactured cartridges, agent tanks, expellant gas hoses or pressure reducing regulators can be installed in the system.

! NOTE !

Unmarked pressure reducing regulators and expellant gas should be tested in the year 2036.

Perform the initial steps of section *7.1.1 Actions at the Cabinet* and then the following sections once the agent tank and cartridge have been removed from the cabinet. All steps of semi-annual maintenance must also be performed during the extended maintenance occasion.

7.2.1 Extended Maintenance of Distribution System

1. Remove each nozzle, taking note of where it was mounted.
2. Inspect the pipe for clogging. If a pipe is clogged, remove and clean it, and use a straight F/F coupling (p/n 55-5200-06) to re-attach it.
3. Inspect the nozzle's adapter and replace it if showing signs of corrosion. Part of the pipe may need to be replaced as well.
4. Make sure that the nozzle's strainer is clear and that cap is not damaged. Wash the nozzle clear from grease.
5. Replace the O-ring (p/n 55-6156-92) and re-fasten the nozzle with new thread tape.

7.2.2 Replacement of KitchenX Agent and Hydrostatic Pressure Test

⚠ WARNING ⚠

Use eye protection when handling KitchenX. In case of eye contact, immediately rinse for several minutes.

1. Pour out the KitchenX agent into a plastic container with a volume of at least 12 l. Use a funnel to prevent spills.
2. Rinse the KitchenX tank and then fill it with water and perform a hydrostatic pressure test at 23 bar. Mark the tank with the year that the pressure test was performed.

⚠ DANGER ⚠

Pressure testing must be done with water. Since air is compressible, pressure testing with air can result in explosive bursting of hoses or tanks.

3. Pour out the water and fill the agent tank with new KitchenX agent at a temperature of 16-27 °C.
4. Check that there is 46-51 mm from the tank outlet to the KitchenX agent surface.
5. Seal the plastic container with old KitchenX agent and dispose of it according to local regulations.
6. Replace the O-ring at the agent tank valve (p/n 55-1618-14).

7.2.3 Hydrostatic Pressure Test of Expellant Gas Hoses

The expellant gas hoses used for the system should be hydrostatically tested at 23 bars. They must be completely dry and new thread tape must be applied before re-fastening them to the regulator and tank valve.

7.2.4 Flow Test of Pressure Reducing Regulator

1. Apply thread tape and connect a regulator testing tool (p/n 55-9650-22) to the pressure reducing regulator.
2. Ensure that the other regulator connections are plugged, that the release mechanism is in operating mode, and that the lock plate is correctly installed at the lock pins.
3. Remove the shipping cap and fasten an N8A or an N16A cartridge to the release mechanism. If the system's cartridge is scheduled to be replaced during the same service occasion, use this old cartridge. The cartridge should be conditioned at 16-27 °C before being used for the test.
4. Make sure that the regulator testing tool's ball valve is closed.
5. Remove the lock plate and activate the release mechanism.
6. When the ball valve is still closed, ensure that there are no leakages, indicated by stable pressure on the manometer and no noise.
7. Open the regulator testing tool's ball valve completely and ensure that the pressure is stable at 6.6 to 8.6 bars during release.
8. If the test failed, dispose of the regulator and replace it with a new one (p/n 55-1618-50). Otherwise, ensure the regulator is marked with the year that the flow test was performed.
9. Detach the regulator testing tool and clear the internal threads of the regulator from thread tape remnants.

An alternative to performing the flow test is to replace the regulator with a new one or a regulator which has already been flow tested. In this case, apply new thread tape and then fasten the regulator at the release mechanism.

7.2.5 Hydrostatic Pressure Test and Refilling of Nitrogen Cartridge

1. Ensure that the release mechanism is in operating mode and that the lock plate is correctly positioned at the lock pins.
2. Remove the cartridge. Fasten a shipping cap in case the cartridge was not used for flow testing of the pressure reducing regulator.
3. Remove and replace the O-ring (p/n 55-1618-48) at the cartridge connection of the release mechanism, paying careful attention not to damage the pin of the release mechanism.
4. Select a cartridge suitable for the system, N8A for single tank systems and N16A for multiple tank systems, which has been hydrostatically tested according to national regulations.
5. Before installing, verify that the cartridge weight is no less than 14 g below the filling weight.

BILD

SECTION 8 – SYSTEM RESET & RECHARGE

⚠ WARNING ⚠

Resetting and flushing of a KitchenX system may only be performed by a KitchenX certified technician.

8.1 Cleanup After Discharge

⚠ DANGER ⚠

Before proceeding to clean up, disconnect electrical appliances and ensure the kitchen appliances and any cooking oil have cooled down.

Electrical equipment can be damaged by the KitchenX agent, which can cause electrical chock. Applying water to heated grease and oil can cause explosive vaporization and splashing of heated oil droplets.

In case of discharge, KitchenX should be cleaned from kitchen surfaces within 24 hours to protect the surfaces from corrosive damage.

When KitchenX agent reacts with grease, it forms a foam-like product. This product and KitchenX agent in itself are not toxic but should be disposed of according to local regulations. The products are most easily soaked up with rags and sponges.

⚠ WARNING ⚠

Use eye protection when handling KitchenX.
In case of contact with eyes, immediately rinse for several minutes.

After coming in contact with KitchenX agent, the oil and grease of kitchen appliances is no longer suitable for cooking and should be discarded.

Thoroughly clean all kitchen surfaces and appliances with soap water and allow them to dry completely before use. Check kitchen appliances for electrical damage caused by wet agent.

8.2 Troubleshooting

Before recharging and resetting the system, ensure that the reason for activation has been correctly determined. In case activation occurred unintentionally, some possible reasons are

- Accidental manual activation. In this case, the breakable rod at the pull station will have been split.
- Incorrect selection of detector. If this is suspected, take a temperature reading with the kitchen appliances at intense cooking conditions and reevaluate the selection of detectors.
- Incorrect installation of the detection system. The system might have been activated by slack being suddenly released from the detection system wire rope, or the wire rope or detection conduit components may have been damaged. Inspect and/or replace the wire rope and conduit components.

8.3 Flushing of Distribution System

! NOTE !

Prolonging the time until flushing of the distribution system and allowing piping to be exposed to the heat of normal cooking operations will increase the risk of KitchenX agent solidifying in the distribution piping.

⚠ WARNING ⚠

Use eye protection, gloves and protective clothing when handling flushing concentrate. In case of contact with eyes, rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

If skin irritation occurs or eye irritation persists, get medical attention and bring the safety data sheet of the flushing concentrate which is in the appendix of this manual.

Wash hands thoroughly after handling.

To flush the system, follow these steps:

1. Remove the KitchenX cabinet cover(s).
2. Disconnect the expellant gas hoses from the agent tanks and unfasten the packing nuts from the agent tank valves to disconnect them from distribution piping.
3. Remove the agent tank from the cabinets and unscrew the valve. Remove and inspect the O-ring for damage and replace if necessary (p/n 15-6024-80). Apply grease before placing the O-ring back at the valve.

4. Remove the vent plug from the agent tank valve and check for corrosion and proper function. Ensure that the internal rubber ball has free movement. If not, tit can be washed with soapy water. Replace the vent plug if necessary (p/n 55-1618-12).
5. Apply new thread tape and re-fasten the vent plug.
6. Pour one bottle of KitchenX flushing into each agent tank of the KitchenX system.s
7. Fill the agent tanks with warm clean water until half-full.
8. Fasten the agent tank valves and reconnect them to the distribution system.
9. Apply new thread tape and re-fasten the expellant gas hoses to the tank valves.
10. Create a means to collect the discharge through the nozzles, for example heavy duty plastic bags or plastic tubing. If using a bag, it should have a capacity of at least 5 liters. Create a hole close to the nozzle tip to prevent the expellant gas from bursting the bag and attach it with a cable tie.

Figure 8.1: Hålet I påsen bör vara tydligare.

11. Use the cocking lever to put the release mechanism in operating mode.

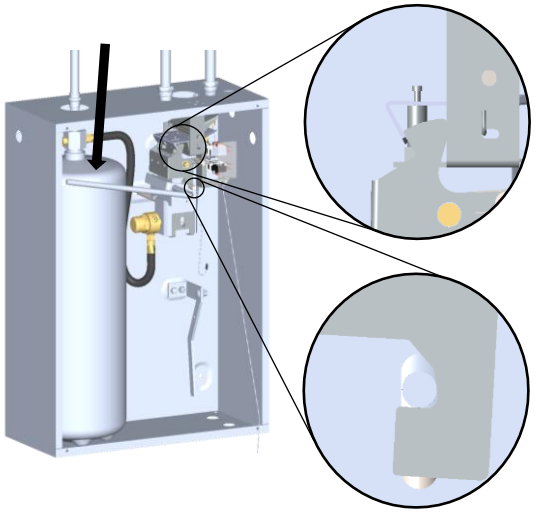


Figure 8.2. Ensure that the cocking pin is in position and that the plate lever is in lower position at the lock pins.

12. Place a lock plate at the lock pins.
13. Remove and inspect the release mechanism's O-ring at the cartridge attachment point. Replace it if damaged (p/n 55-1000-98). Apply grease before placing the O-ring back in the mechanism.
14. Mount a cartridge suitable for the system and hand-tighten.
15. Remove the lock plate and trigger the system with the manual pull station.
16. Check that each bag is filled with appropriate quantity of agent. There should be approximately twice as much agent discharged from two-flow nozzles as compared with one-flow nozzles. Dispose of the discharged agent according to local regulations.
17. Remove all nozzles and wash them with soapy water.
18. Apply new thread tape and re-install the

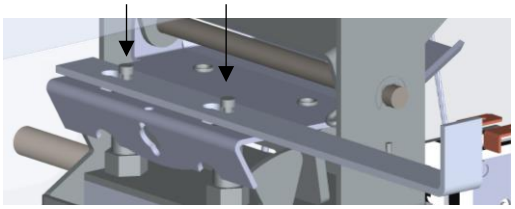


Figure 8.3: Ensure that the lock plate grabs the lock pins.

nozzles, making sure to maintain the correct nozzle type, position and aim point in relation to the hazard.

19. Unfasten the expellant gas hose from the tank valve and disconnect the agent tank from the distribution piping. Remove the valve from the tank.

8.4 Recharging and Resetting

To recharge the KitchenX system, follow these steps:

1. Fill up each agent tank with 11.7 liters of KitchenX agent. When filling, the temperature should be between 16-27 °C. Measured at this temperature range, there should be 46 to 51 mm from the agent surface to the tank outlet.

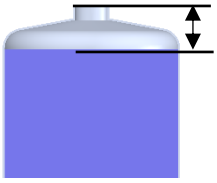


Figure 8.4: The agent surface fill level is 46 to 51 mm from the tank outlet.

2. Replace the burst disc in the agent tank valve (p/n 55-1618-80). Make sure that it is positioned with the silver-colored side in the up direction.

3. Raise the tension lever to the up position.

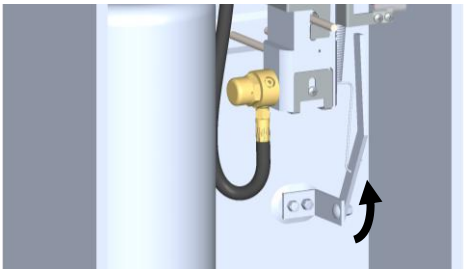


Figure 8.5

4. Fasten the valve to the agent tank until metal-to-metal contact is achieved and install it in the cabinet. Apply new thread tape and fasten the expellant gas hose. Connect the valve to the distribution piping with the packing nut.
5. Use the cocking lever to place the release mechanism in operating mode and position the lock plate at the lock pins.
6. Remove the cartridge used for flushing.
7. In case system activation was due to a fire, all detectors should be replaced. Otherwise, the same fusible links as were previously installed can be used. Install the correct fusible link at each scissor linkage except for at the terminal detector bracket where a test link should be mounted.
8. Lower the tension lever to the lower position.

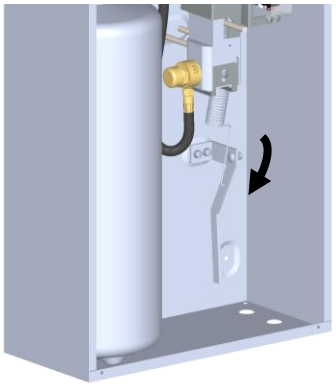


Figure 8.6

9. Remove the lock plate and test the detection system by using a wire cutter to cut the test link at the terminal detector bracket. If the test is not successful, refer to step 9 of section *7.1.5 Detection System*.
10. If the test was successful, use the cocking lever to place the release mechanism in operating mode and install the lock plate at the lock pins.
11. Raise the tension lever and install the correct fusible link at the terminal detector bracket.

! NOTE !

Ensure that all scissor linkage is correctly mounted at the detector brackets. There should be a distance of 4 to 10 mm towards the terminal side.

12. Lower the tension lever.
13. Check that there is a distance of 6.5 to 9.5 mm between the bottom of the trigger hammer and the bottom of the lever plate. If not, lift the tension lever and adjust the clamping position of the trigger hammer with the socket screws.

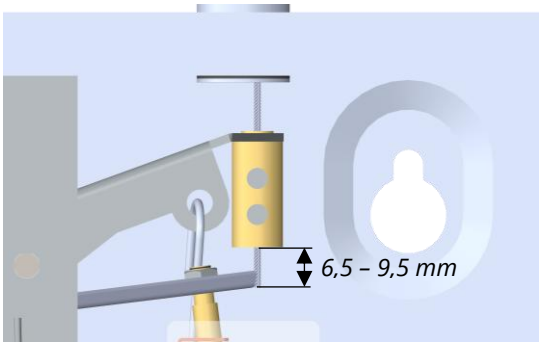


Figure 8.7

14. Remove the lock plate and test the manual activation system by pulling the handle at the pull station. If excessive force is needed, open the pulleys and check that the ball bearings can rotate without resistance and that the wire rope does not get stuck along its conduit. Make sure that the breakable rod does not interfere with activation.
15. If successful, use the cocking lever to place the release mechanism in operating mode and position the lock plate at the lock pins.
16. Reset the manual pull station by pushing in the pull handle and pull the slack at the release mechanism. Unscrew one of the socket screws on the side of the pull station plate. Push in a new breakable rod (p/n 55-1135-94). Afterwards, re-fasten the socket screw.

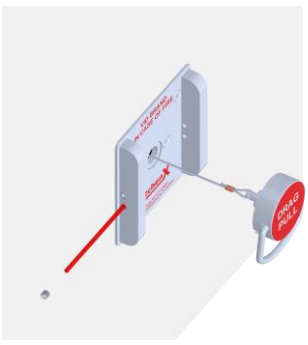


Figure 8.8

17. Before installing a new cartridge at the release mechanism, remove the shipping cap and weigh it. Verify that the weight is no less than 14 g below the filling weight.

⚠ WARNING ⚠

Ensure that the lock plate is correctly installed and engaged at the lock pins.

Choose an N8A cartridge for a KitchenX single tank system and an N16A cartridge for a KitchenX double or triple tank system.

18. Install the cartridge by hand tightening firmly.
19. Remove the lock plate and re-fasten the cabinet covers.
20. Record the recharge date in the system journal.

⚠ DANGER ⚠

Failure to put the tension lever in the down position will cause the system to remain unresponsive during automatic detection.

SECTION 9 – MATERIAL INFORMATION AND CAUTIONARY INSTRUCTIONS

Tryckkärl

SDS för kvävgas?

SDS för släckvätskan och rengöringsvätskan

SECTION 10 APPENDIX I – WET CHEMICAL AGENT TYPE KITCHENX SAFETY DATA SHEET

SECTION 11 APPENDIX II – PARTS LIST