

Motor Starting & Protection solutions for Water Systems

Greenhouse Horticulture (IEC)



Grow healthy and tasty crops with our broad range of scalable Motor Starting and Protection solutions for full-speed motor control of your Water System.

What are Water Systems?

Water is a major factor in the successful production of greenhouse plants. An adequate water supply is required for irrigation, pesticide application, fertilizing, preparing growing media and cleaning up. To perform all of these operations, you need a functional water system designed for greenhouse applications, with pumps, storage tanks, pressure tanks, piping, controls and wastewater management.

Why you need a Motor Starting & Protection solution for your water system

Lack of water or its excess can cause significant damage to crops and can even lead to their complete loss. To ensure the correct amount of water is provided you need the right water pump, which must always be in working order. ABB scalable motor starting and protection solutions ensure complete flexibility in choosing the right starter solution for full-speed motor control of your Water System.

Main benefits

Continuous Operation

ABB products guarantee continuous operation even in simple electromechanical starter combinations by keeping your water system running in any condition, thanks to coordinated products that are reliable in all networks.



Energy-efficiency

AF technology makes your pump starter panel energy-efficient by ensuring 80% reduction in contactor coil consumption, less heat dissipation and a reduction in temperature rise, thereby allowing installation density in the panel to be increased.



Space-saving and ease of installation

Space in the control panel can be reduced by up to 50% thanks to the AF contactor, electronic compact starters and ready-made starter connection kits ensuring compact design, ease of installation and safe connections.



Integrated advanced control & protection

The ABB Advanced Solution provides precise and flexible control with measurement of all parameters and access via flexible communication options. The Advanced solution provides the reliability and protection you need while driving an intelligent data hub for predictive applications, maintenance and asset management.



Controlled Environment Agriculture

Controlled Environment Agriculture (CEA) combines engineering, plant science and computer-managed greenhouse control technologies to optimize plant growing systems, plant quality and production efficiency.

CEA provides protection and maintains optimal growing conditions throughout crop development. Production takes place within an enclosed growing structure such as a greenhouse or building. Plants are often grown using hydroponic methods to supply the root zone with the proper amounts of water and nutrients. CEA optimizes the use of resources such as water, energy, space, capital and labor. The most relevant variables controllable through CEA are:



Nutrients and Irrigation



Temperature



CO₂ supply



Light

(intensity, spectrum, duration and intervals)



Water Systems in Greenhouse horticulture

Water is a major factor in the successful production of greenhouse plants as it is the medium by which plants absorb nutrients.

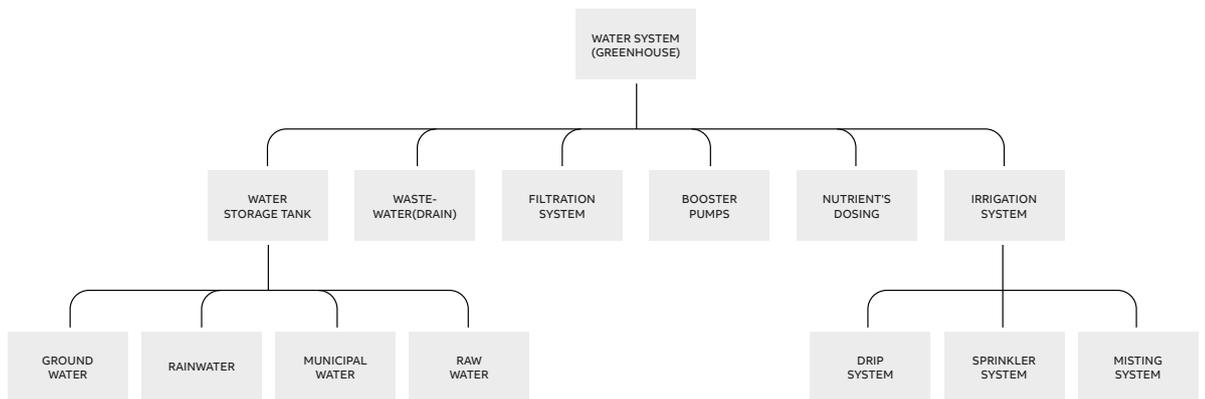
For this reason, ensuring an adequate supply of water and moisture is of the utmost importance to optimum growth and maximum flower production. These variables can be controlled thanks to the water system.

The complete water system used for supplying water to greenhouses consists of:

- **PRV:** Pressure Regulating Valves control the water pressure in your irrigation system to ensure optimal performance.

- **Filters:** Every system must have a filter. The purpose of a filter is to remove the debris and particulate that could clog your sprinkler or emitter.
- **Pump:** It is important to make sure your pump is sized correctly and able to provide the amount of water and pressure the system requires.
- **Tank:** Water storage tanks come in a vast range of capacities and are available in both polyethylene and corrugated steel. They are used to store domestic water, well water, rainwater, freshwater or recycled water.
- **Fertigation:** Our fertigation units will ensure that your system receives the correct amounts of fertilizer and nutrients.

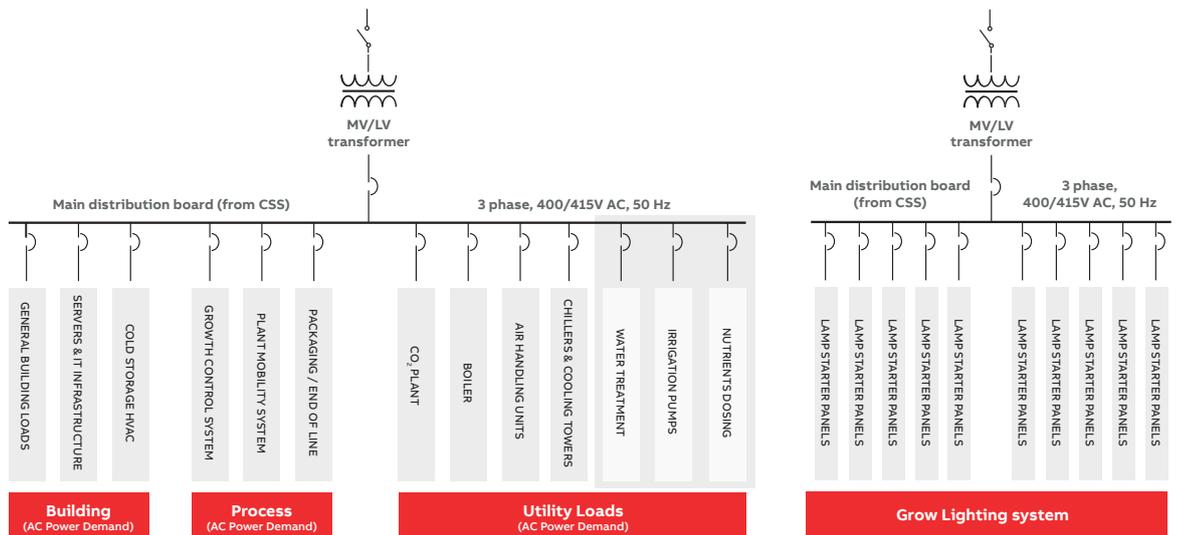
Different types of pump-driven Water Systems in Greenhouse horticulture



Pumps are one of the most important components in a water system. A pump is a device that moves fluids (liquids or gases), or sometimes slurries, by a

mechanical action typically converted from electrical energy into hydraulic energy. For this reason choosing the right pump is critical to a reliable water system.

A typical greenhouse electrical distribution system

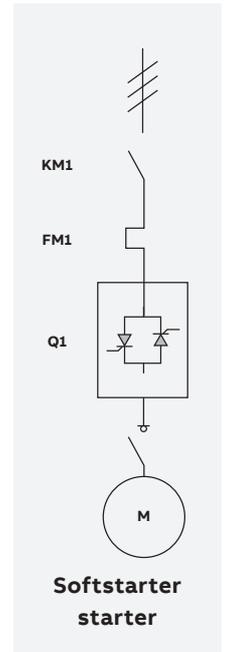
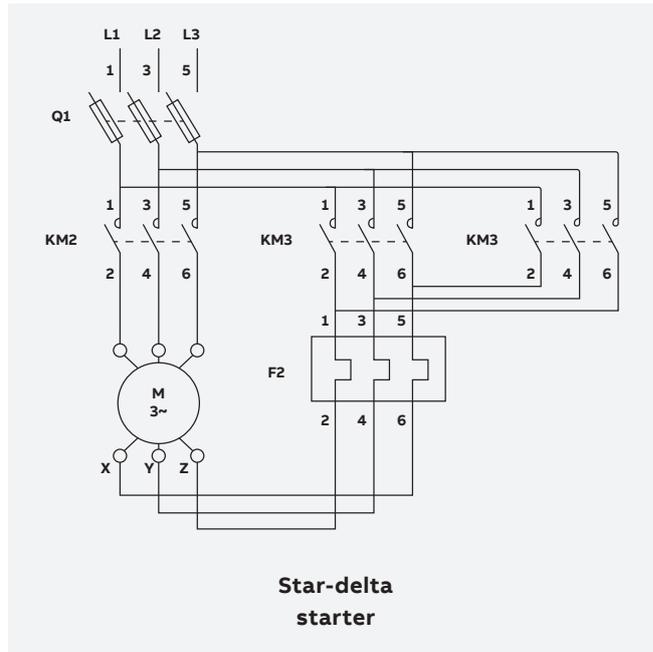
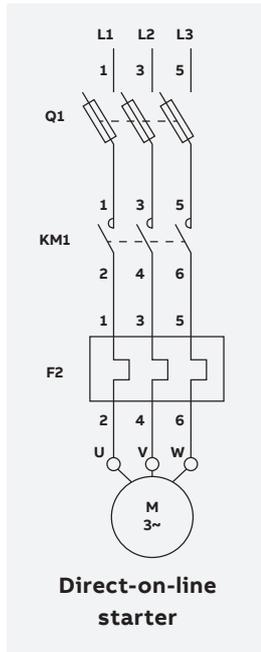


Current rating and starter type

The choice of water pump depends on the amount of water needed and this is based on the area to be watered, the crops grown, the weather conditions, time of the year and environment. Peak use time of the year must also be considered.

The ABB scalable motor starting solution provides complete flexibility in choosing the right starter solution for full-speed motor control of the water system in your greenhouse.

Recommended starter for pumping in the greenhouse with full speed motor control



Main protection functions

- Short-circuit protection
- Overload protection (with adjustable current setting)
- Voltage level monitoring
- Phase loss & phase sequence – for correct pump running management
- Earth fault protection.

Other functions

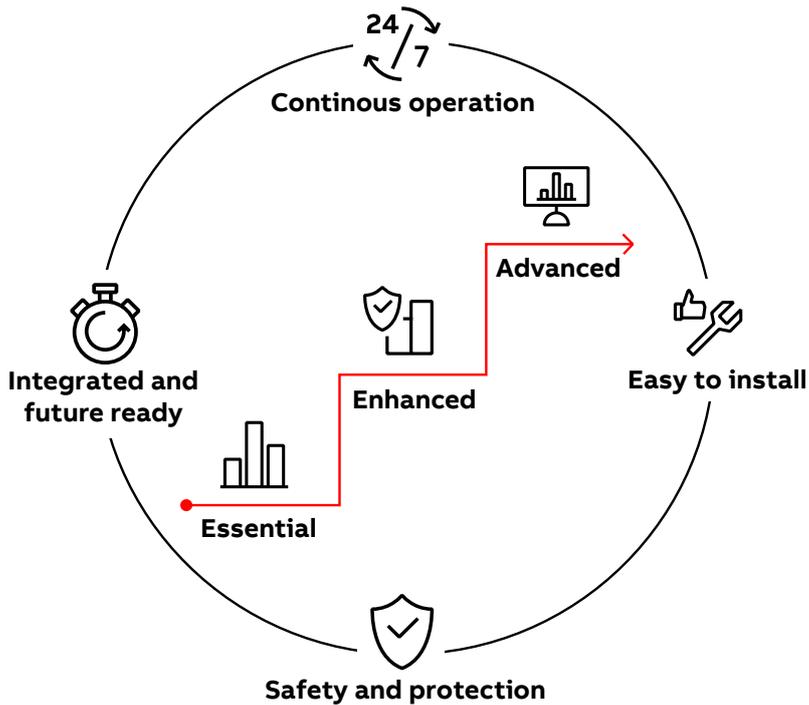
- Locked rotor protection - in case of jammed or clogged pump
- Dry-running detection – by an undercurrent
- Thermistor motor protection - for monitoring the winding temperature.
- Digital connectivity (control, energy measurements, etc...)
- Safety relays (if required, based on the design).

Pump starter panel design parameters

- Motor rated voltage
- Motor rated current
- Utilization category (AC-3/3e)
- Maximum operating current
- Starting torque depending on pump type.
- Acceleration time (starting time)
- Control voltage
- Ambient temperature
- Altitude
- Enclosure type
- Starter type
- Operations - Auto / Manual & Local / Remote.
- Digital connectivity (control/monitoring).

Motor Starting and Protection solutions for Water Systems in Greenhouse horticulture

Discover our Motor Starting and Protection solutions for Water Pump Systems. They always provide the right amount of water and ensure your plants flourish.



Essential Solution | Get the essentials right with fast and reliable installations

The Essential Solution ensures that combinations of core power devices function in a coordinated way, thereby guaranteeing continuous operation and ease of installation. In addition, the Essential Solution typically covers the requirements of stand-alone machinery like pumps, compressors, fans, etc.

Enhanced Solution | Get going with our robust protection offering featuring enhanced safety, control and monitoring functions

The Enhanced Solution provides enhanced control, safety and monitoring functions for applications in the discrete automation field. The Enhanced Solution for Water Systems in Greenhouse horticulture includes additional protection functions such as the liquid level relay, twin pump alternative relay, temperature monitoring, thermistor motor protection relay, under- or over-voltage monitoring relay, safety relays and more besides. We can address any other requirements to suit end-user requests.

The table below provides an overview of the possible functions in our different solution offerings for water systems in Greenhouse horticulture.

Solution level	Basic protection functions	Monitoring of additional protection functions	Digital connectivity and cloud monitoring
Essential	●		
Enhanced	●	●	
Advanced	●	●	●

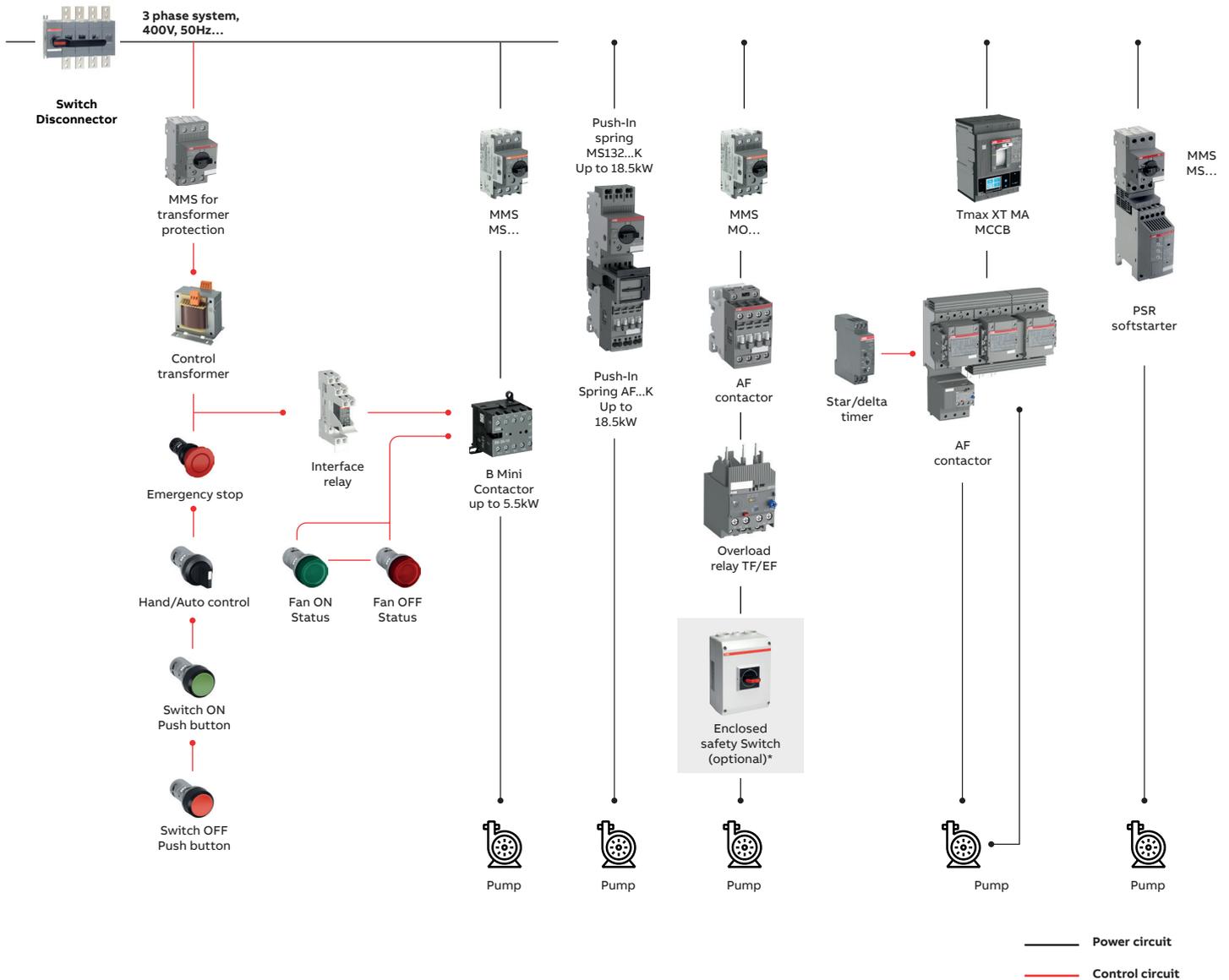
Advanced Solution | Get ahead with smart data and predictive applications to keep your plant running

The Advanced solution for Water Systems includes integrated and future-ready motor protection, flexible motor control, fault diagnostics, maintenance schedules and supports all major communication protocols.

Fuseless protection with MMS
for motor rating 0.06 kW up to 45 kW

Fuseless protection with Tmax XT MCCB
for motor rating 0.5 kW up to 560 kW
magnetic (MA/MF) and
Electronic trip units (Ekip M
Dip I, Ekip M Dip LIU)

Softstarter with MMS
for motor rating 1.5 kW up to 45 kW



The table below provides an overview of the difference between the combination products offered in the Essential Solution for Water Systems in Greenhouse horticulture.

Product combination	Motor ratings supported	Key Differentiator
B Mini contactor	up to 5.5 kW	For efficiency and space savings
Contactor + MMS (Push-In Spring)	up to 18.5 kW	For reliable connection, faster and easier wiring. Vibration proof
Contactor + MMS + OLR (Screw version)	up to 45 kW	For standard offerings
PSR + MMS (Softstarter)	up to 45 kW	For Smooth starts and stops
Contactor + MCCB (Screw or busbar)	up to 560 kW	With dedicated MCCB for motor protection

Note:

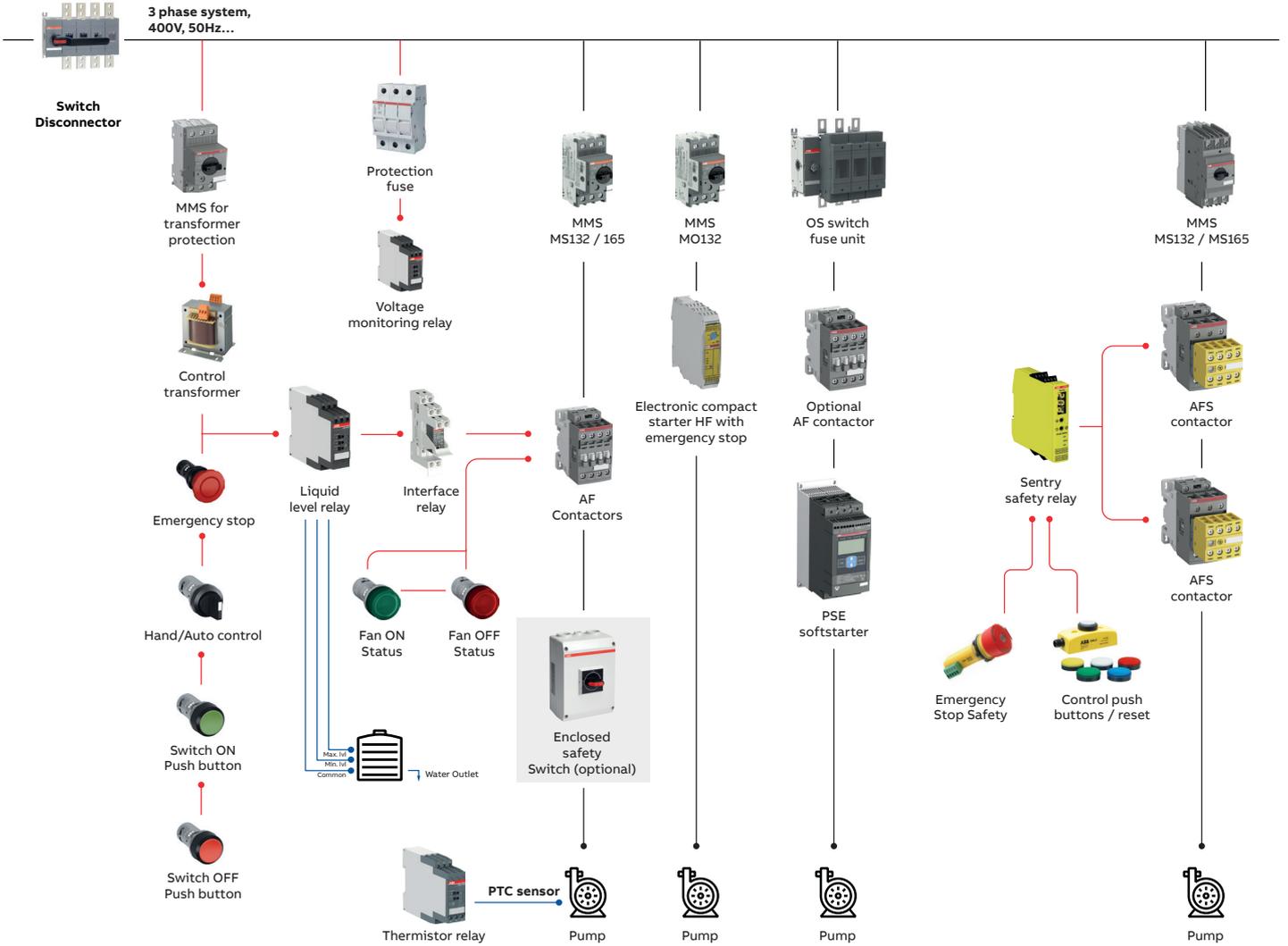
The safety switch provided will be close to the motor so as to isolate the power supply if the pump needs maintenance, thereby ensuring safe conditions for the person working near the pump.

MMS - Manual Motor Starter



ENHANCED

The ABB Enhanced Solution for starting water system pumps in Greenhouse horticulture

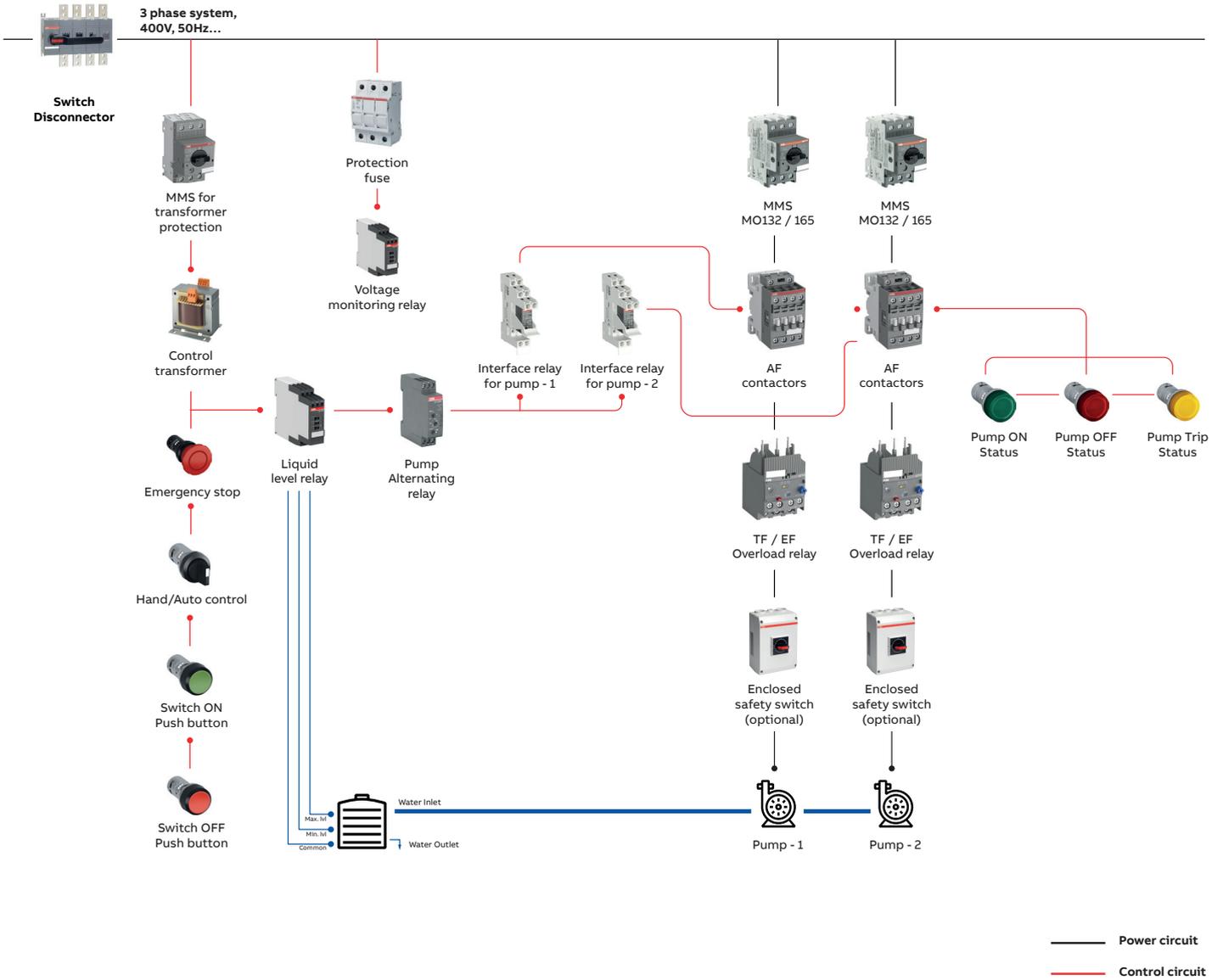


— Power circuit
 — Control circuit



ENHANCED

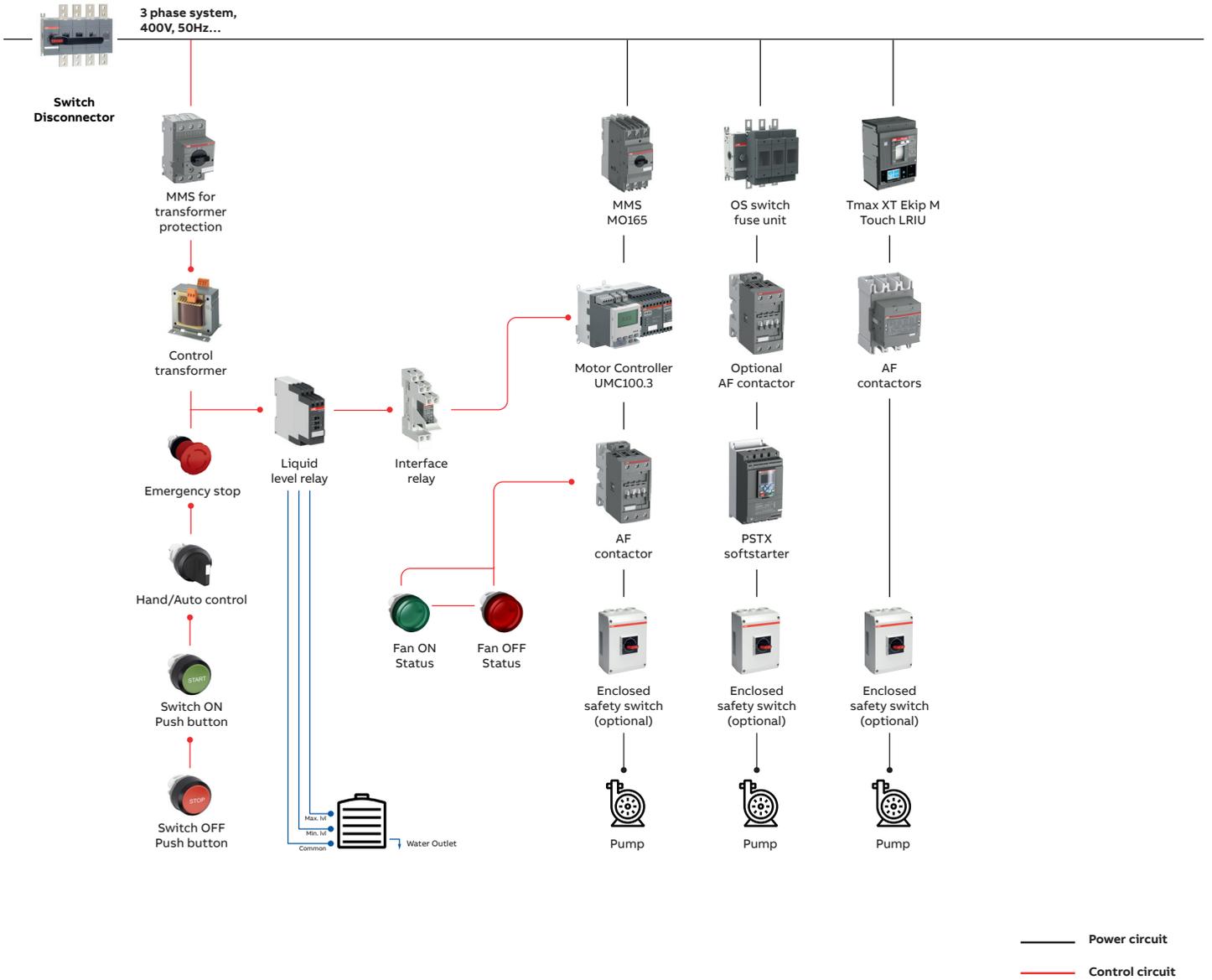
The ABB Enhanced Solution for starting water systems with alternate switching of pumps in Green-house horticulture





ADVANCED

The ABB Advanced Solution for starting water system pumps in Greenhouse horticulture



Digital offering

Smart water treatment systems will enable greenhouse growers to control and monitor their water systems by setting time-based water pump switching ON / OFF sequences depending on the type of crops

and local weather conditions. Water systems are crucial to growing healthy crops and ensuring that water is not wasted.



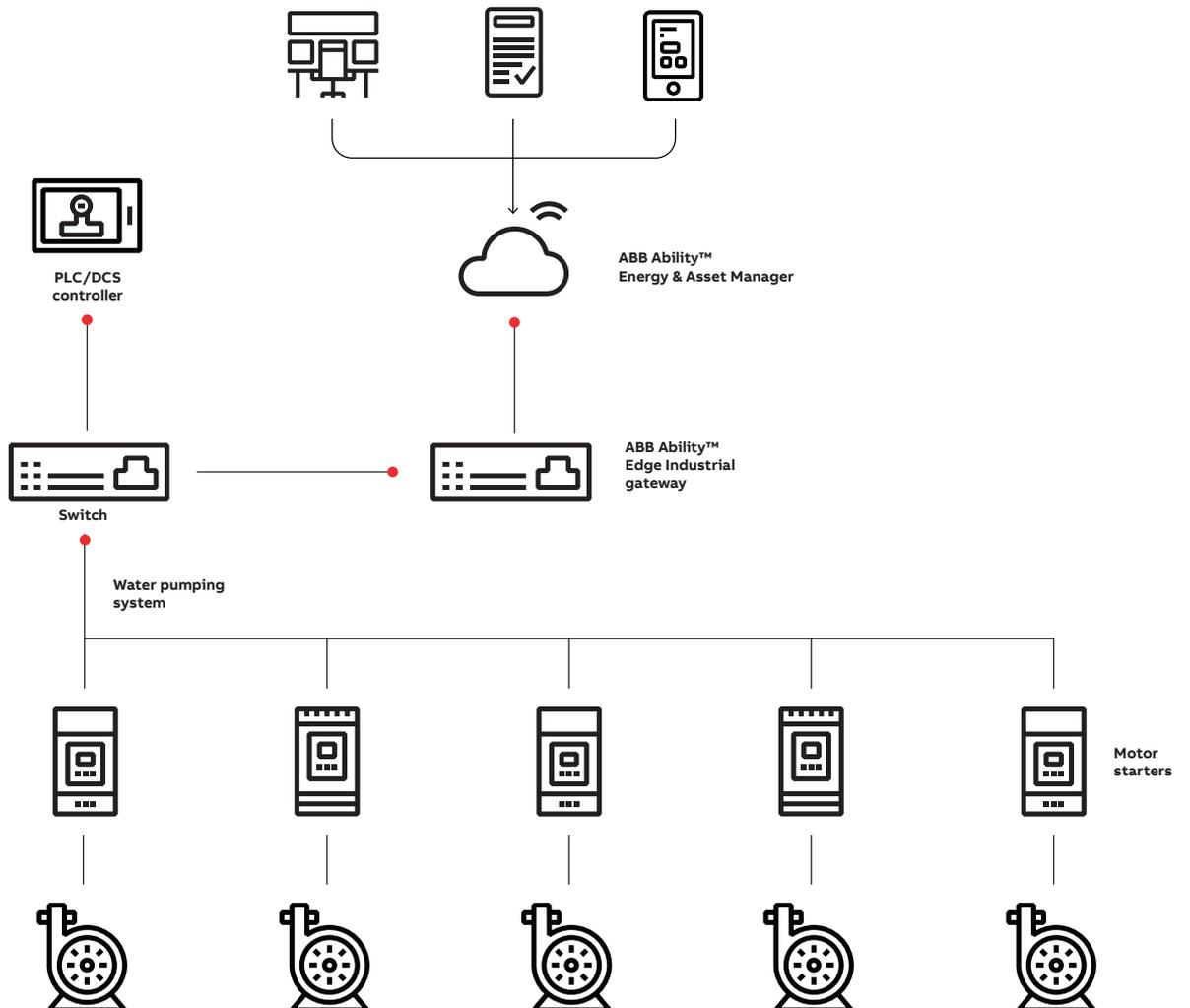
Flexible remote control and monitoring of water pumping and nutrient dosing systems



100% availability of pump measurement data as an aid to predictive maintenance



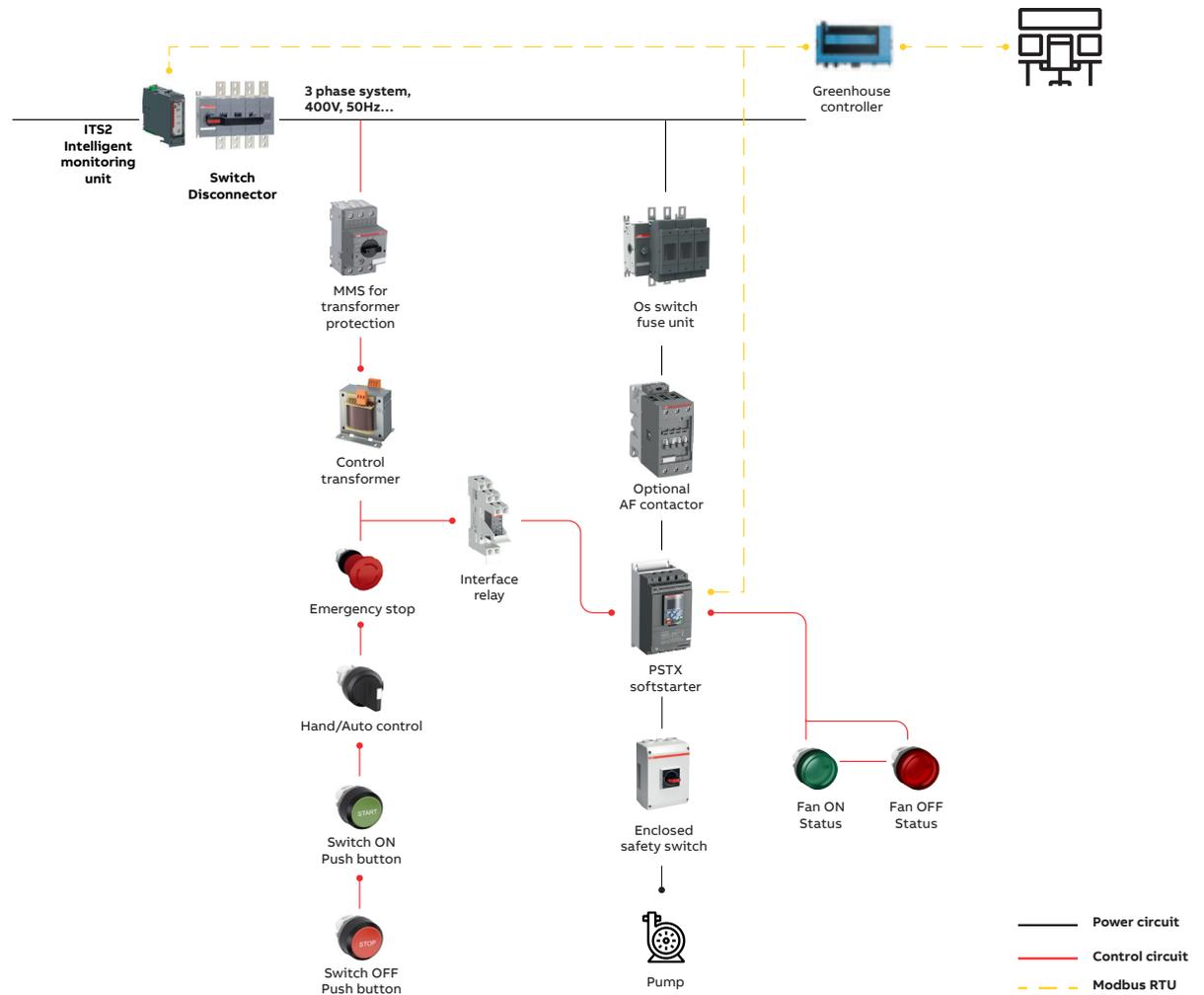
ABB Ability™ Energy and Asset Manager ensuring that data are always quickly available via the web applications and enabling a greenhouse climate controller to be connected



1st scenario:

Digital offering with Softstarter for controlling and monitoring water system pumps in Greenhouse horticulture

For 11kW to 1200* kW motor ratings at 400V AC



Supporting communication protocols

Industrial Ethernet

- Ethernet/IP™ (2-port)
- Modbus TCP (2-port)
- Profinet (2-port)
- EtherCAT
- BACnet MS/TP.

Fieldbus

- Modbus RTU
- DeviceNet™
- Profibus DP.

Features

- Flexible water pump control (remote or local)
- Advanced protection functions
- Status and fault diagnosis
- Monitoring of all electrical parameters
 - Voltage (V)
 - Current (A)
 - Power factor (Cos phi)
 - Active power (kW/HP)
 - Reactive power (kVAr)
 - Apparent power (kVArh)
 - Main frequency (Hz)
 - Total harmonic distortion (THD)
 - Energy consumption in kWh
 - Motor temperature.

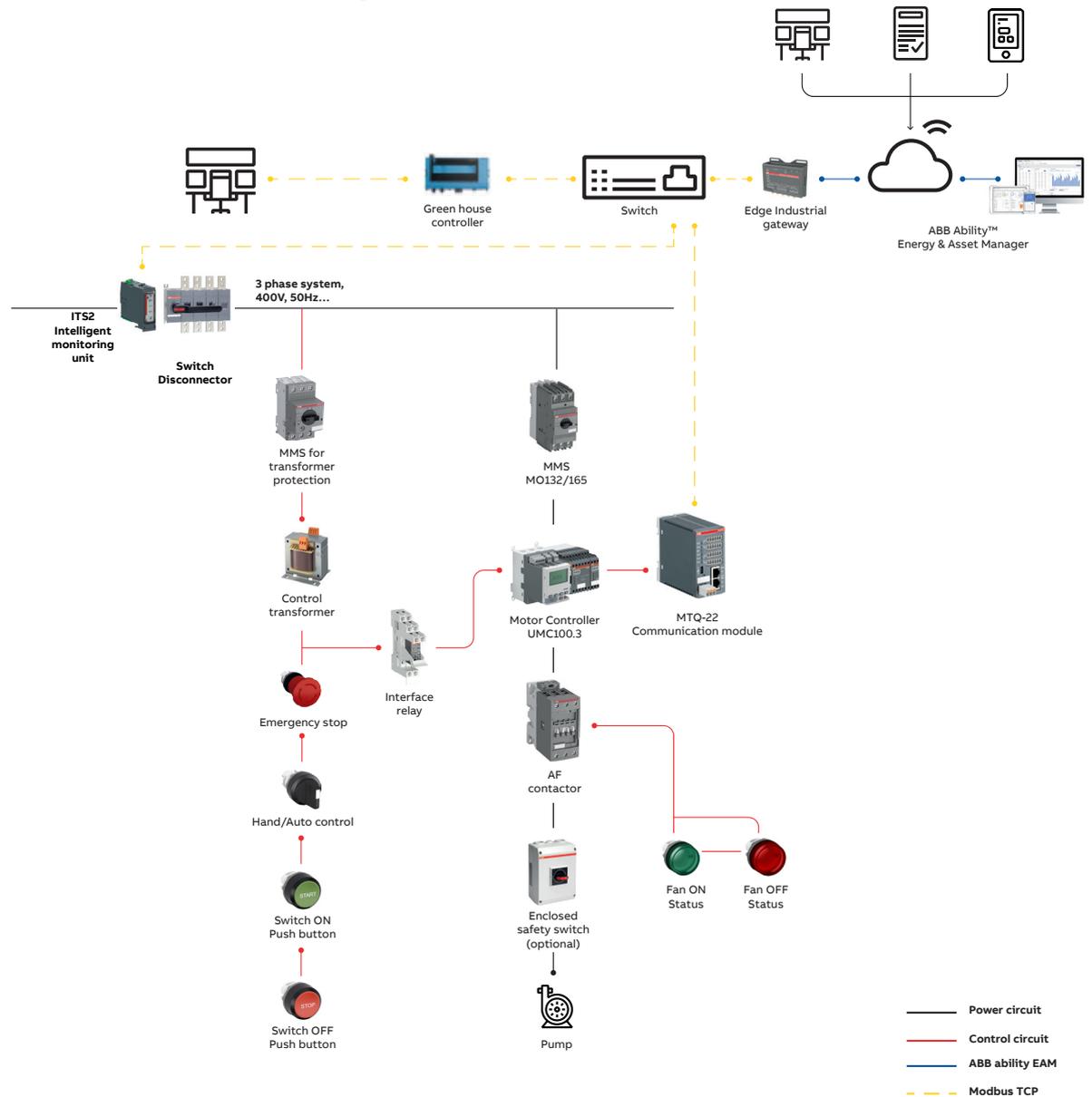
Note:

*1200kW for Softstarter connected in inside delta

2nd scenario:

Digital offering with UMC100.3 for controlling and monitoring water system pumps in Greenhouse horticulture with cloud connectivity

For 0.06 kW to 500 kW motor ratings at 400V AC



Supporting communication protocols

Industrial Ethernet

- EtherNet/IP™
- Profinet IO
- Profinet (S2)
- Modbus TCP.

Fieldbus

- Modbus RTU
- DeviceNet™
- Profibus DP.

Features

- Flexible water pump control (remote or local)
- Advanced protection functions
- Status and fault diagnosis
- Monitoring of all electrical parameters
 - Voltage (V)
 - Current (A)
 - Power factor (Cos phi)
 - Active power (kW)
 - Reactive power (KVAR)
 - Total harmonic distortion (THD)
 - Active energy (kWh)
 - Temperature
- Cloud connectivity - ABB Ability Energy & Asset Manager.

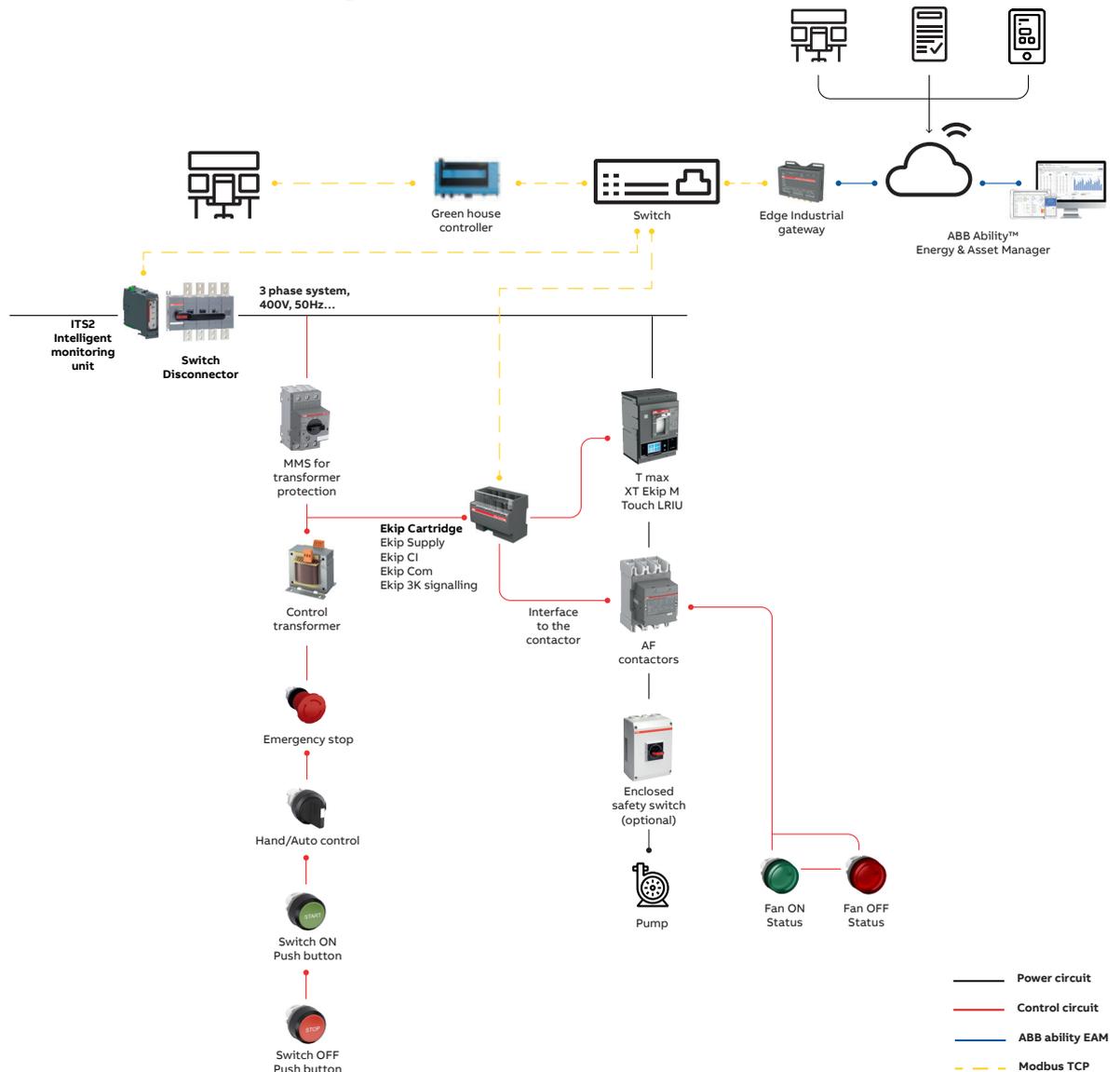
Note:

*UMC100.3 supports ABB Ability through MTQ22 (Modbus TCP)

3rd scenario:

Digital offering with Tmax XT MCCB for controlling and monitoring water system pumps in Greenhouse horticulture with cloud connectivity

For 5.5 kW to 630 kW motor ratings at 400V AC



Supporting communication protocols

Fieldbus networks

- Modbus RTU
- Profibus DP
- DeviceNet™.

Ethernet networks

- Modbus TCP
- Profinet
- Ethernet/IP™
- IEC 61850.

Features

- Flexible water pump control (remote or local)
- Advanced protection functions
- Status and fault diagnosis
- Monitoring of all electrical parameters
 - Voltage (V)
 - Current (A)
 - Power factor (Cos phi)
 - Active power (kW)
 - Apparent power (kVA)
 - Reactive power (KVAR)
 - Total harmonic distortion (THD)
 - Active energy (kWh)
 - Reactive energy (kVARh)
 - Temperature (with Ekip 3T)
- Cloud connectivity - ABB Ability Energy & Asset Manager.

Key benefits of offered products

Reliable in all networks

The electronic system within the AF contactor continuously monitors the current and voltage applied to the coil. The contactor is safely operated in an always-optimized condition and hum free.



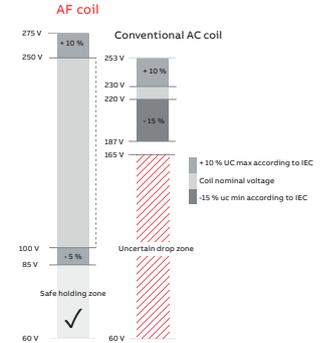
Troubleshooting made easy

Separate thermal and magnetic trip indication makes troubleshooting a lot easier and faster and reduces downtime. This allows you to easily take action based on thermal or magnetic tripping



Wide control voltage

The AF contactor ensures steady operation in unstable networks and signifies a major advancement in motor control and power switching, with no threat of voltage sags, dips, or surges. So, it prevents stoppages caused by voltage fluctuations.



AC & DC control voltage

Thanks to the AF technology the same contactor can be used for AC and DC control. This means easier choice of contactor type, reduced number of parts to keep in stock.



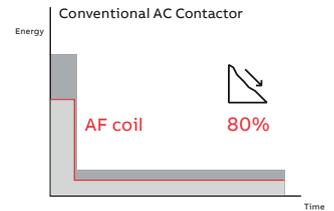
Built-in Surge suppressor

Conventional contactor technology normally requires an external surge suppressor. With the AF contactor technology, surges are handled by a built-in contactor and never reach the control circuit. One less product and one less complication to worry about causing electronics near contactors to fail.



Reduced coil consumption

Thanks to the AF contactor's 80% coil consumption reduction, there is less heat dissipation and a reduction in temperature rise. So, installation density in the panel can be increased. Also, reduction of the control transformer rating, reduction in the size of control panel and a reduction in cost.



Busbar connectors for group mounting

Three-phase busbars ensure a quick and safe connection and are therefore a cost-effective solution and up to 5 manual motor starters can be fitted next to each other with optional spacing for auxiliary contacts.



Easy to connect

Save wiring time and avoid mistakes by using a connecting link between ABB manual motor starters and soft starters or contactors. This creates harmonious and compact starter combinations that are easy to mount.



Ready for IE3 / IE4 motors

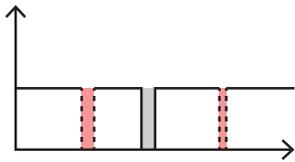
ABB's portfolio matches the latest requirements for IE3 and IE4 motor applications, including the latest utilization categories AC-3 upgrade and AC-3e creation for contactors and motor starters. ABB has validated coordination solutions for AC-3 and AC-3e applications. The results of these tests can be found in ABB's motor co-ordination tables.



Limp mode

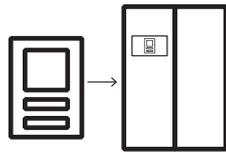
Do only planned stops for increased productivity.

- Keep running with one shorted thyristor
- Do service when you have time
- Protections and main features are still functioning



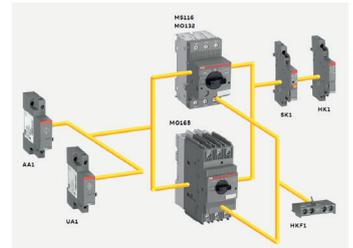
Detachable keypad

Control your process and softstarter safely Detachable keypad makes safe installation possible and comes without need of buying any accessory which will also reduce the costs for the customer.



Harmonized range of accessories

MMS up to 80 A share the same main accessories like auxiliary contacts, signaling contacts, shunt trips and undervoltage releases. This significantly reduces the part list and makes selection of the right accessories easy.



Motor heating option in softstarter

Keep your motor running reliable even in cold and humid environments.

- Remove condensation in idle motors.
- Prevent freezing of the motor.
- Perfect for humid installations and cold environments.



PT100 input for motor protection

The Softstarter has a 3-wire PT100 input. The trip temperature is set by the user. The maximum trip temperature is 250° and lowest is -25°. The PT100 measurement must have an accuracy of +/-3° with 3 wires measuring if the 3 connecting cables have the same resistance.



Tested Co-ordination tables

ABB offers coordinated products to ensure the highest availability and protection for the installation. More than 1,800 tested and validated coordination tables are available in the SOC tool, so, you can quickly and easily choose the right ABB solution.

Motor name	Model	Type	Inlet Trip Current	Current range	Coordination type
Direct-on-line starter	230 V AC	230 V AC	0.05-100	0.05-100	IEC Type 2
Soft starter (in Line)	400 V AC	400 V AC	0.12-100	0.12-100	IEC Type 2
Soft starter (in-line)	400 V AC	400 V AC	0.12-100	0.12-100	IEC Type 2
Drive starter	480 V AC	480 V AC	0.18-100	0.18-100	IEC Type 2
	200 V AC	200 V AC	0.17-100	0.17-100	IEC Type 2

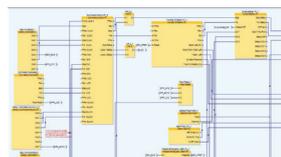
Coated PCBA

Longer lifetime and increased reliability of Softstarter, which reduces risk of unwanted stops. For PSE and PSTX this is standard so no risk of ordering a unit without coated PCBAs and no additional cost.



Flexible soft logic possible with UMC100.3

Flexible in creating the soft logic for switching ON the motor based on digital input conditions.



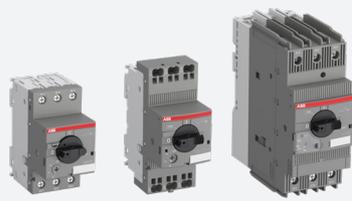
Product offering

Contactors:



 WEB PAGE
 CATALOG

Manual motor starters:



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 CATALOG

Push-In Spring Motor Starting solution:



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 CATALOG

Softstarters:



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Electronic compact starter:



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UMC100.3 Intelligent Motor controller:



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Three phase monitoring relays:



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Pluggable Interface Relays:



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Primary switched mode power supplies:



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Time relays:



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Temperature monitoring relay:



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Tmax XT:



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Switch Fuse Units & Switch Disconnectors:



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Safety relays:



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System pro M compact - MCB:



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Pilot devices:



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CATALOG



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is a state-of-the-art cloud solution that integrates energy and asset management in a single intuitive dashboard.

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