EN

MProtect

User guide

MPS20DS16
MPT20D10, MPT20D16



v1.1

1. Description

W4A MProtect is an electrical control panel for controlling, monitoring and providing configurable protection for motors and pumps. It combines the MProtect controller, contactor, circuit breaker and current measurement in one enclosure, depending on the model.

The W4A MProtect app allows sensor, current and timer settings to be configured, real-time state monitoring and history viewing. Remote access depends on configuration and communication availability.

1.1. Models and components

Check the reference on the label before making connections or configuring the motor.

The panel is supplied with internal components assembled. External supply, motor, earth and control sensor connections must be made by qualified personnel, according to 4 Panel connections and controls and the variant's electrical diagram.

1.2. Specifications

Characteristic	MPS20DS16	MPT20D10	MPT20D16
Power supply	230 V AC, 50/60 Hz	400 V AC, 50/60 Hz	
Maximum standby consumption	2.3 W	3.2 W	
Control channels	1		
Power output type	Single-phase	Three-phase	
Contactor rated current	18 A	12 A	18 A
Protective circuit breaker	16 A	10 A	16 A
Voltage readings	1		
Current readings	1	3	
Sensor inputs	3; dry contact, impedance $< 100\,\mathrm{k}\Omega$		
Enclosure protection rating	IP65		

The contactor rated current and circuit breaker rating refer to different components. Check the assembly's suitability for motor rated and starting currents and installation conditions. IP65 requires the enclosure to be closed and cable entries and sealing to be correctly completed.

2. Intended use

The W4A MProtect control panel is intended to control, monitor and protect electric motors in low-voltage installations, within the electrical, environmental and functional limits specified by the manufacturer.

Use the single-phase or three-phase variant compatible with the supply and motor. The supplied internal components do not remove the need to check their suitability for the complete installation.

Installation, electrical connection and maintenance are reserved for qualified personnel, with power disconnected and in accordance with applicable regulations.

The equipment must not be used as the sole means of personal protection, emergency stopping, safety-critical protection or primary fire protection unless expressly stated by the manufacturer. Machines and processes whose failure could cause danger require independent safety measures.

Incorrect use, unsuitable installation, unauthorised modifications or operation outside specifications may compromise safety, cause failures and invalidate the warranty under applicable terms.

3. Safety

Read product warnings, this guide, the installation manual and the electrical diagram before using the equipment. Incorrect installation or use may cause electric shock, fire, motor damage or hazardous load movement.

3.1. Electrical safety and work on the installation

> **DANGER — Hazardous electrical voltage**
>
> Depending on the model, the equipment is supplied at 230 V AC or 400 V AC. Contact with live parts may cause severe electric shock or death.

Before installing, connecting, removing, cleaning or maintaining the equipment or load:

1. Switch off and isolate all power supplies.
2. Prevent accidental reconnection.
3. Wait for stored energy to discharge.
4. Verify the absence of voltage using a suitable instrument.
5. Confirm that the load cannot move or start.

Do not touch terminals, conductors or internal components while the equipment is powered. Unlit indicators do not prove the absence of voltage.

The previous procedure also applies to opening the enclosure and working on the motor.

3.2. Automatic starting

> **WARNING — Unexpected load starting**
>
> The load may start automatically. Before work, stop the system, isolate the supply and prevent accidental reconnection.

Starting may result from sensors, timers, local or remote commands, power restoration or resetting after an alarm.

Loss of Bluetooth, Wi-Fi or Internet does not guarantee load stopping. Follow 3.1 Electrical safety and work on the installation and do not remain in a hazardous area when the motor may start automatically or be controlled remotely.

3.3. Installation and external protection

Mounting, commissioning, connection changes, electrical maintenance and settings affecting protection functions must be performed by qualified personnel.

Follow the installation manual and variant's electrical diagram. Mount the enclosure on a stable surface, provide authorised access and leave space for connections and heat dissipation.

> **WARNING — Installation protection**
>
> W4A MProtect does not replace the protective and isolation devices required for the electrical installation. Applicable protective devices must be included in the installation even when not supplied with the panel.

The panel includes a contactor and circuit breaker, as shown in 1.2 Specifications. The installation must include other protective devices and means of isolation required for the supply, motor and load, including short-circuit, overload, electric shock and surge protection, residual current protection, phase-loss or phase-imbalance protection and emergency stopping, where applicable.

The designer and installer must check protective device sizing and coordination, breaking capacity, contactor suitability for the motor and protective earthing. Do not remove or bypass the circuit breaker, contactor or controller protection functions.

3.4. Conductors, terminals and load

Connect the supply and motor only at the external points identified in the panel diagram. The controller's AC OUT is part of the internal control circuit; do not use it as an external motor connection point.

Before energising, check voltage and number of phases, the PE protective conductor connection, conductor cross-sections and tightness, and motor compatibility. Incorrect or loose connections may cause heating, electrical arcing and fire.

For inductive loads, qualified personnel must select surge suppression according to the supply and

manufacturer recommendations: a flyback diode for DC, observing polarity; an RC snubber or varistor for AC; or another suitable solution. Protection must not compromise contactor release, stopping times or any safety function.

Do not change internal connections or replace components with different variants without W4A authorisation. If the circuit breaker trips, identify and correct the cause before resetting it; do not make repeated attempts.

3.5. Sensors and external controls

Use only compatible level sensors, floats, pressure switches, contacts and accessories. Before connecting, isolate all supplies and check input type, permitted voltage, polarity and model diagram. Do not apply external voltage to sensor inputs unless expressly specified in the model diagram. Physical terminal compatibility does not guarantee electrical compatibility.

Use suitably insulated and mechanically protected cables, away from interference sources and separated from power cables where necessary. Long cables may cause incorrect readings and unwanted operation. Where required, use screening connected according to instructions.

Test each sensor before allowing automatic operation. Configure a safe condition for failure, disconnection, short circuit or invalid readings where this option exists. Sensors do not replace independent protection against flooding, dry running or other serious risks where required by risk assessment.

Modifying, bridging or bypassing sensors and controls may cause unexpected starting, failure to stop or loss of protection. The input A jumper described in 4 Panel connections and controls requires assessment of installation behaviour and safety.

3.6. Environment, handling and storage

Observe specified environmental limits. Do not install in locations with water, rain or condensation without suitable IP protection, conductive dust, flammable or corrosive gases, excessive vibration, direct sunlight or temperatures outside limits. Do not use in potentially explosive atmospheres without explicit certification.

Ensure heat dissipation and keep the panel away from heat sources and flammable materials. Keep the lid, seals and cable glands in good condition and close the enclosure correctly after any work. The IP rating also depends on cable entries and mounting. Observe altitude and humidity limits and avoid condensation.

Avoid drops and impacts. Store in a clean, dry place protected against extreme temperatures and direct sunlight. Do not use damaged or damp equipment or equipment with a burning smell.

3.7. Communication and updates

Bluetooth and Wi-Fi may fail or suffer interference. Do not use them as the only safety control or emergency stop. Before sending remote commands, check that the load area is safe. Loss of communication does not necessarily interrupt automatic functions; if it prevents safe supervision, make the load safe.

Use only firmware, software and updates provided or authorised by W4A, Lda. Do not modify hardware, firmware or protection functions without authorisation. Where applicable, keep the equip-

ment and app updated.

3.8. Maintenance and emergencies

Before any maintenance, follow 3.1 Electrical safety and work on the installation. Do not open, modify or repair the equipment without express instructions from W4A, Lda. Use qualified personnel or authorised support in the event of damage, persistent failure or repair needs.

> **WARNING — Abnormal operation**
>
> In a hazardous situation, immediately switch off and isolate the equipment and load if safe to do so. Do not reconnect until qualified personnel identify and correct the cause.

Apply this procedure in the event of smoke, flames, a burning smell, sparks, excessive heating, liquid ingress, electrical or mechanical damage, loss of control, unexpected starts or repeated protective device tripping, or any risk to people, animals or property.

Do not touch equipment with exposed live parts, fire or water present. In an emergency, use the installation's stopping and isolation devices.

3.9. Prohibited uses and residual risks

Do not exceed electrical or environmental limits, connect loads above permitted ratings, use incompatible accessories or remove or bypass protective devices. Do not use equipment with damaged housing, terminals, conductors or insulation, or as the only protection against electric shock, fire or mechanical hazards.

Risks remain from electricity, unexpected starting, movement, heating, sensor or protection failures, communication loss and incorrect configuration. The designer and installer must assess the complete assembly, provide independent protection and emergency stopping, restrict access and periodically inspect protective devices. Monitoring and records do not replace physical protection.

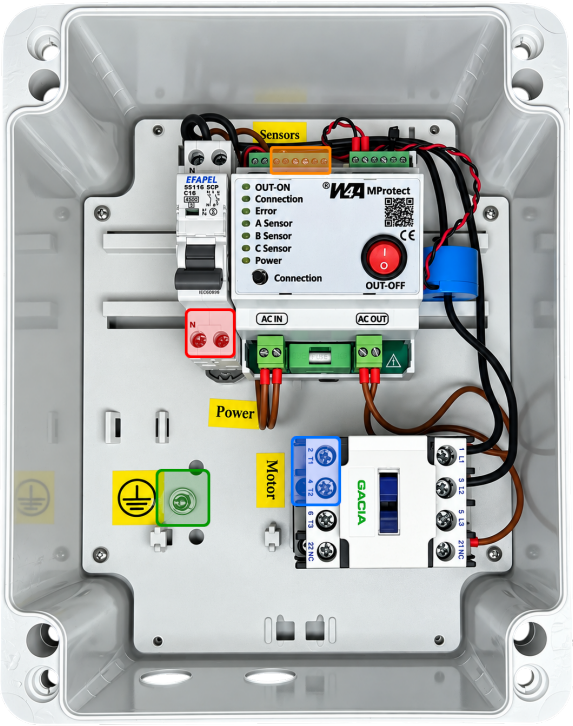
4. Panel connections and controls

Before making connections, check the model and consult the electrical diagram supplied with the panel. Images identify the main connection points; component layout and markings may vary. Always follow the identification on the installed equipment.

> **NOTE — Removable connectors**
>
> Connectors can be removed from their sockets to make cable connection easier, especially sensor cables. Do this with the supply switched off and isolated, after verifying the absence of voltage. Before powering the panel again, check each connector's position, conductor tightness and correct seating.

4.1. Single-phase panels

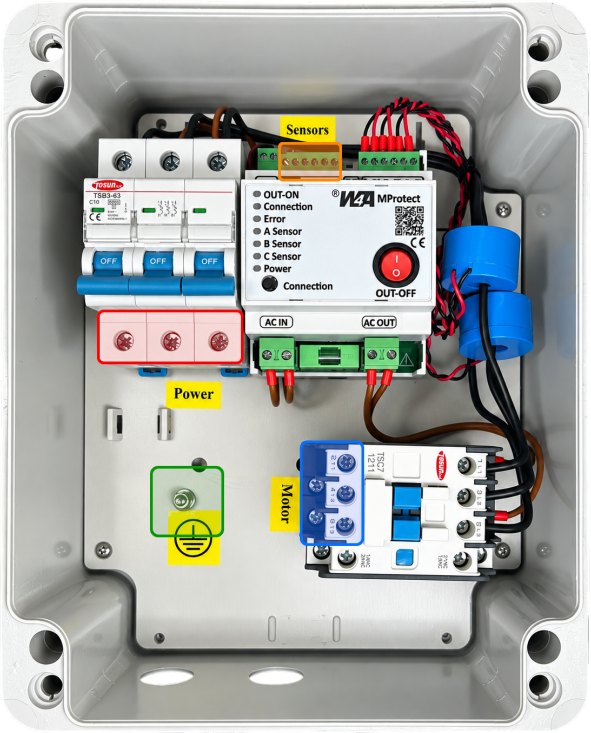
MPS20DS16



Zone	Connection	Function / external connection
Red	L / N	Panel supply: single-phase mains.
Blue	L / N	Power output: single-phase motor or pump.
Green	PE	Protective earth for supply and motor.
Orange	A-Rs / B-Rs / C-Rs	Control inputs: compatible floats, sensors or contacts.

4.2. Three-phase panels

MPT20D10 / MPT20D16



Zone	Connection	Function / external connection
Red	L1 / L2 / L3	Panel supply: three-phase mains.
Blue	T1 / T2 / T3	Power output: three-phase motor or pump.
Green	PE	Protective earth for supply and motor.
Orange	A-Rs / B-Rs / C-Rs	Control inputs: compatible floats, sensors or contacts.

4.3. Controller and sensors

The MProtect controller operates the contactor and receives sensor signals. Controller controls and indicators retain the following functions:

Identification	Function
OUT-OFF	Enables or inhibits operation through hardware.
Connection	Activates phone pairing with the controller.
A-Rs	Sensor A input, with hardware cut-off.
B-Rs / C-Rs	Sensor B and C inputs.
Rt-T1 / Rt-T2 / Rt-T3	Internal current measurement terminals.
AC IN / AC OUT	Internal controller supply and control.

> **NOTE — What does hardware cut-off mean?**
>
> Hardware cut-off interrupts operation through the electrical circuit, independently of the software. Opening the contact connected to A-Rs may interrupt load control, according to the connection specified for the panel.

If sensor A is not used, retain or fit the shunt (jumper) only where specified and required by the model diagram. Check the existing connection and intended behaviour before commissioning. Do not add or remove jumpers while power is connected.

4.4. Current measurement

Single-phase panels use channel T1, with the sensor internally connected to Rt-T1; three-phase panels use T1, T2 and T3, with sensors connected to Rt-T1, Rt-T2 and Rt-T3, as shown in 1.2 Specifications. Current sensors form part of the internal assembly.

In the app, select the measurement mode corresponding to the model, submit the change and check the saved value before testing, as described in 9.2 Current protection. For single-phase panels, explicitly select **Single-phase mode**; internal sensor assembly does not automatically configure this setting. Check values during the motor test. Inspection or modification of internal connections is reserved for qualified personnel, with the supply isolated and according to the panel diagram.

4.5. Commissioning

Before first energising, check supply, motor, earth and sensor connections, terminal tightness, cable protection and enclosure sealing. Keep operation inhibited during pairing and initial configuration.

After configuration, test sensors, stop controls and motor operation with on-site supervision. Confirm measured current and protection settings before enabling automatic operation. On the three-phase model, also check motor rotation direction.

5. Waste electrical and electronic equipment

At the end of its service life, take the equipment to a waste electrical and electronic equipment collection system according to applicable legislation. Do not dispose of it with unsorted household waste.

6. Simplified EU Declaration of Conformity

W4A, Lda. declares that this radio equipment complies with Directive 2014/53/EU.

The full text of the EU Declaration of Conformity is available at:

`www.w4a.pt/products/w4amprotect/legal/ce`

7. Preparing the app

Configuration and viewing of the W4A MProtect control panel are performed through the **W4A MProtect** app. Prepare the phone before pairing with the device.

Use a compatible phone with Android 8.0 or later or iOS 15.0 or later.

7.1. Installation and preparation

1. Scan the QR code below to access W4A MProtect app installation.
2. Install and open the app.
3. Enable phone Bluetooth and grant the requested permissions to communicate with the device.

7.2. Viewing documentation

The Installation and configuration manual and User manual are available in the app's **Instruction manual** menu. Internet access is required to view them.

This guide presents the essential steps for use. Before making electrical connections, consult the model's installation manual and the electrical diagram supplied with the panel.

8. Device pairing

First complete panel connections and checks. For this operation, the controller must be powered and the phone nearby. Button access must comply with the safety conditions in 3 Safety.

1. In the app, select **Add device**.
2. During the search, press **Connection** on the controller installed in the panel for approximately 1 second, until the Connection LED lights up. Release the button and confirm that the LED flashes, indicating pairing mode.

3. Wait for data synchronisation to finish. Then open the device to view its state and configure operation.



Figure 8.1: Device pairing sequence in the app.

Before allowing motor operation, complete the configuration in 9 Configuring operation and check safety conditions.

9. Configuring operation

In **Configuration**, adjust control sensors, current protection and, where needed, the clock and analyser. Settings affecting protection must be configured by qualified personnel.

9.1. Sensors

Define the intended sensor behaviour so motor operation follows the required states. Use **advanced mode** when greater control over settings is needed.

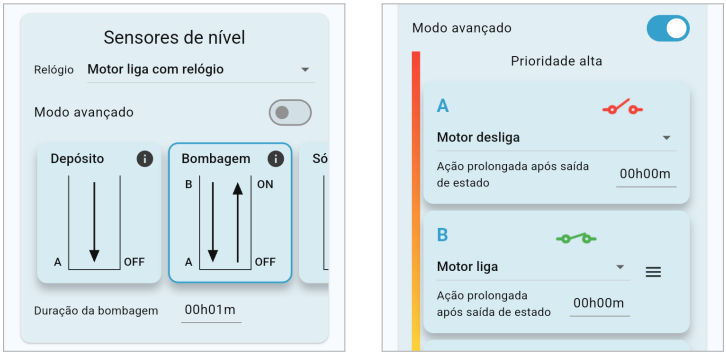


Figure 9.1: Level sensor configuration

Test each sensor individually before allowing automatic operation, as described in 3 Safety.

9.2. Current protection

Select the measurement mode corresponding to the panel: single-phase for MPS20DS16, analysing T1, and three-phase for MPT20D10 and MPT20D16, analysing T1, T2 and T3. Sensors form part of the internal assembly described in 4.4 Current measurement.

> **NOTE — Select single-phase mode**
>
> For a single-phase panel, select **Single-phase mode** in the app, submit the change and check the saved value before testing. Internal installation of the sensor on Rt-T1 does not automatically configure measurement mode.

Settings and the **current test** must be handled by qualified personnel. The test shows starting and normal operating values; the motor runs while **Play** is held down. Release it to end operation and confirm that the motor stops.

Set minimum and maximum current, starting time, time outside limits and reset settings from the motor nameplate, normal load conditions and test results, observing panel limits and coordination with the installed circuit breaker and contactor. Do not copy values from another installation or widen limits to hide an anomaly.

> **WARNING — Test with the motor running**
>
> The test operates the motor. Beforehand, check that the installation is safe and nobody is in the load movement area.

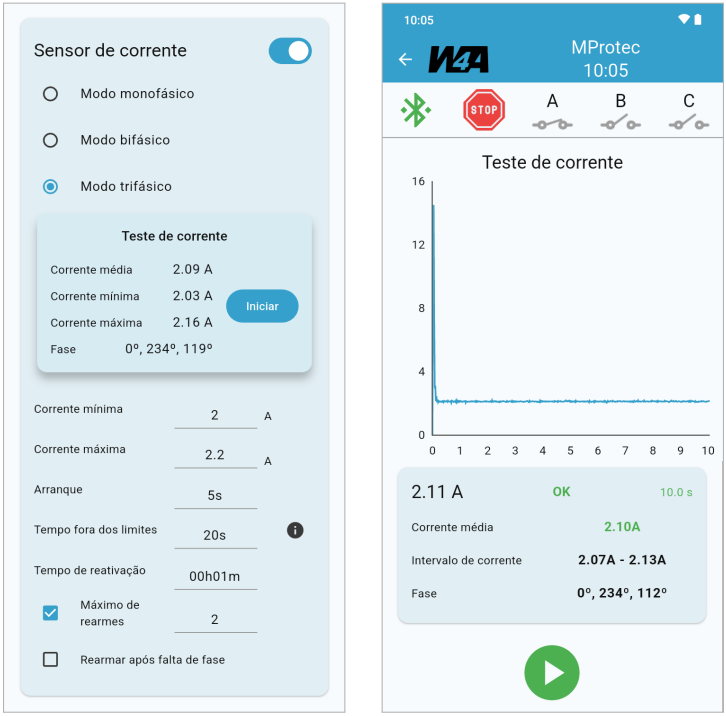


Figure 9.2: Current sensor test and configuration

9.3. Clock and timers

To schedule automatic operation, enable **Clock**. You can define weekly or repeating timers and use advanced timers when additional functions are needed.

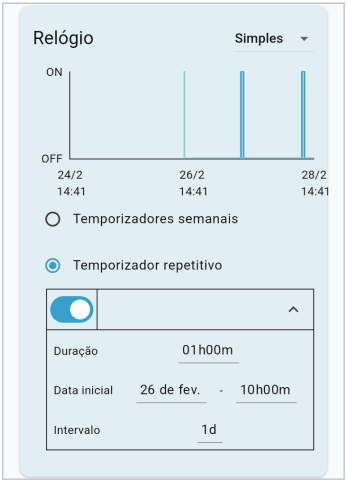


Figure 9.3: Clock and scheduling

9.4. Analyser

The **Analyser** compares operation against **Time window** limits or an **Operating pattern** representative of normal operation.

For the time window, define the period and expected minimum and maximum times. For the pattern, select a normal reference and acceptable tolerance. Depending on configuration, a deviation may generate a warning or interrupt operation and place the device in STOP-SW. Identify the cause before clearing the pause.

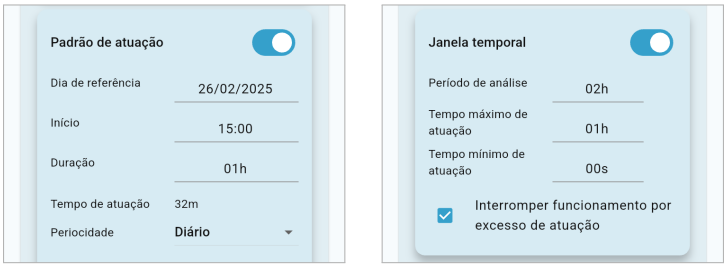


Figure 9.4: Automatic analysis configuration

9.5. Saving and checking

Before selecting **Submit**, confirm the device, review settings and ensure the motor can start safely. Wait for confirmation without interrupting communication and check saved values again. Changes are applied only after transfer to the device.

Test changed sensors, controls and timers under controlled conditions. If transfer fails, restore communication and check settings before submitting again.

10. State and history

10.1. Control

In **Control**, view current state, current, warnings, errors and available operation forecasts.

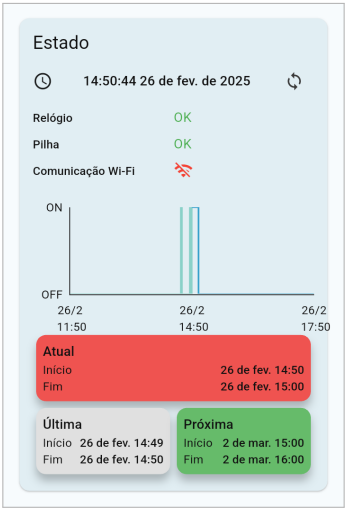


Figure 10.1: Current state and operation forecasts

A current anomaly may generate a warning, temporarily interrupt operation and start the reset waiting time. If the maximum number of resets is reached, the device enters an error state and prevents further automatic attempts. Check the cause and confirm that the motor can start safely before clearing an interlock.

The motor-on indication corresponds to the controller's run command. Check actual motor operation locally where necessary. Use STOP-SW to inhibit operation through the app; OUT-OFF physically inhibits the control circuit. Before opening the panel or working on the load, follow 3.1 Electrical safety and work on the installation.

10.2. Analytics

In **Analytics**, view analyses and operating history: motor operations, level sensor states and current records.



Figure 10.2: Viewing history

Displayed records and consumption values are intended for monitoring. Check the current installation state before executing commands; estimates do not replace certified meters.

11. Warranty

This product is covered by the applicable statutory conformity warranty. Any W4A, Lda. commercial warranty is additional and does not affect the consumer's statutory rights against the seller.

To the extent permitted by applicable legislation, the warranty excludes damage from misuse, abuse, unsuitable installation, accidents, natural disasters or maintenance and repairs by unauthorised third parties; normal wear and damage to finishes or surfaces; products with a modified, removed or illegible serial number; removal and reinstallation costs; and indirect, incidental or consequential damage arising from use.

12. Customer support

Rua do Souto nº 8 Nogueiró, 4715-386 Braga, Portugal

41°33'02.0"N 8°23'04.5"W

geral@w4a.pt

+351 923321817