NASSAR® ELECTRONICS

LEADERS IN TECHNOLOGY

User Manual

MOTOR MONITOR
Models: MM-80
MM-400
MM-1000





Over 50 Years
of Experience

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Description

The **Motor Monitor** is a state-of-the-art, advanced protector featuring the best capabilities for protecting three-phase motors. It can be used with motors operating at 220, 380, and 440 VAC, ranging from 1 to 800 HP, either at full voltage or with a soft starter, with current consumption from 2 to 1,000 Amps.

The **Motor Monitor** protects motors and pumps against the following faults:

- Low voltage
- High voltage
- Voltage imbalance
- Reverse phase sequence
- Phase failure
- Overload
- Underload
- Dry running (low suction level)
- Frequent starts

The display shows the voltages and currents of the three phases, as well as faults, and the maximum and minimum voltages. This allows monitoring of voltage variations sustained by the lines for more than 5 seconds.

The last 10 faults are stored in permanent memory, providing a fault history that can be reviewed on the display.

Adjusting the **Motor Monitor** is straightforward and does not require specialized personnel for operation. It includes an output for a DL-100 voltage grapher, enabling fault voltage history to be recorded and visualized on a computer via a USB memory device for up to 30 days.

Optionally, it can be equipped with a Modbus output to monitor voltages, currents, and faults in any system compatible with this protocol.

The **Motor Monitor** comes with the three necessary current transformers for measurement.

The **Motor Monitor** is available in three models:

- **MM-80**, for a range of 2 to 80 Amps.
- **MM-400**, for a range of 40 to 400 Amps.
- **MM-1000**, for a range of 100 to 1,000 Amps.

Important Safety Warnings

Before connecting or performing maintenance on any equipment, ensure the voltage supply is disconnected to prevent the presence of live voltage.



Wiring any device with the voltage supply connected is dangerous and may result in an electric shock to the person making the connection.

Such a shock can cause severe injuries or even death. Ensure the voltage supply is disconnected before starting the installation.

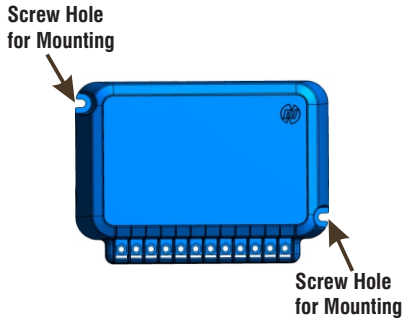
The installation of the **Motor Monitor** must be performed by qualified and trained personnel.

The **Motor Monitor** must not be installed outdoors; it should be placed under a roof and protected from sunlight, rain, dust, and other contaminants commonly found in outdoor environments.

Motor Monitor Mounting

The equipment can be mounted on the mounting plate of a cabinet using two side screws, which are included in the box.

Additionally, it can be mounted on a DIN rail to facilitate installation or removal.

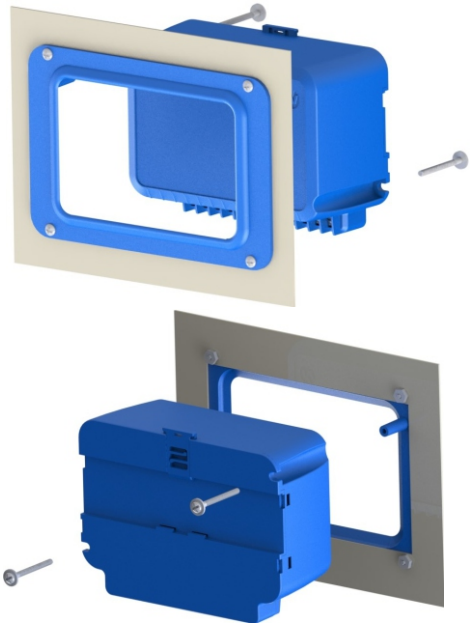




Mounting on a Cabinet Door

The **Motor Monito**r can also be mounted on the front door of a control cabinet to monitor the information on the display and indicators. For this type of installation, it is necessary to purchase the front-mounting adapter plate, model: **PMF-237.**

When using the front-mounted installation, the cabinet must not be installed outdoors, as the **Motor Monito**r would be exposed to sunlight, dust, and rain, which could lead to rapid deterioration or damage.

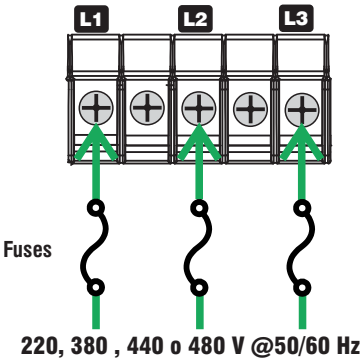




Voltage Supply Connection

The **Motor Monitor** can be powered by three-phase voltage in the range of 180 to 520 VAC, making it suitable for voltages of 208, 220, 380, 440, and 480 V, at 50 or 60 Hz.

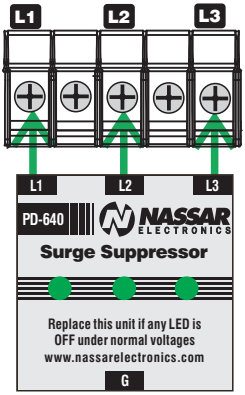
The power supply connects to terminals **L1, L2 y L3**, as shown in the diagram below.



IT IS IMPORTANT FOR THE PROTECTION OF THE MOTOR MONITOR TO INSTALL 3 FUSES OR A THERMAL-MAGNETIC CIRCUIT BREAKER NO LARGER THAN 5 AMPS AT THE POWER INPUT.

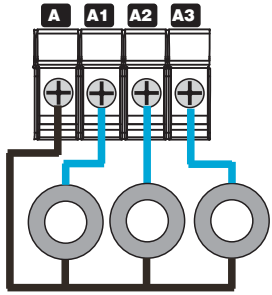
Terminals L1 and L2 must have at least 160 V for the **Motor Monitor** to operate.

The **Motor Monitor** is capable of withstanding voltage surges; however, if the substation where it is installed lacks proper protection, an effective grounding system, or is located in a rural area highly exposed to surges, it is recommended to install a surge protector to enhance protection.



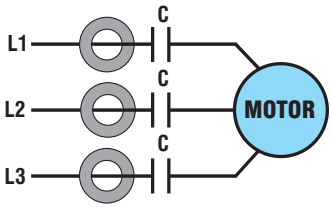
Current Transformer Connection for the 80 A Model

Connect the 3 black wires together to terminal **A**; Connect the 3 blue wires to terminals **A1**, **A2** y **A3**, as shown in the diagram below.



The MM-80 model offers two current ranges: 80 A and 20 A.

For the 80 A Range:
Route the 3 cables L1, L2, and L3 that power the motor through each of the holes in the 3 current transformers of the **Motor Monitor**, as shown in the figure below.



For the 20 A Range:
This range is used to measure currents below 20 Amperes with greater accuracy. Pass each cable (L1, L2, and L3), which powers the motor, through the hole of its respective current transformer of the Motor Monitor.

Each cable must pass through its corresponding transformer 4 times, as shown in the image below.



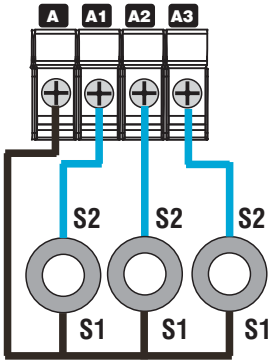
Ensure that each cable passes exactly 4 times through its transformer; otherwise, the current measurement will be inaccurate.

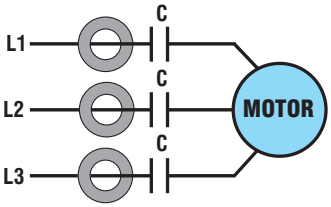
Current Transformer Connection for 400 A and 1000 A Models

Connect the secondary terminals of each current transformer as follows:
Connect the three **S1** terminals of the transformers to terminal **A**, Connect each **S2** terminal to terminals **A1**, **A2** y **A3**, respectively, as shown in the diagram below. Open the orange covers of the transformer to make the connections.



Route the three power cables L1, L2, and L3 (supplying the motor) through the holes in the current transformers.





The 400 A and 1000 A current transformers can be screwed onto the mounting plate of a cabinet l of the cabinet using the included brackets.

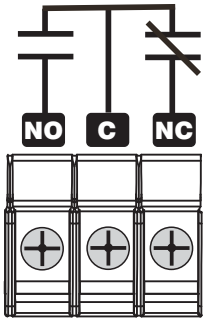


Connection of Motor Monitor Contacts to the Starter

The **Motor Monitor** includes a relay with a single-pole double-throw (1PDT) contact, to disconnect the starter and activate a pilot light indicating a fault when it occurs.This contact has a capacity of 10 A @220 VAC and 2 A @440 VAC.

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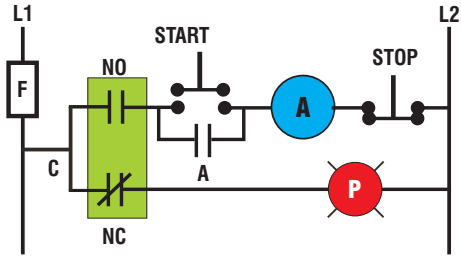
NO - Normally Open
C - Common
NC - Normally Closed



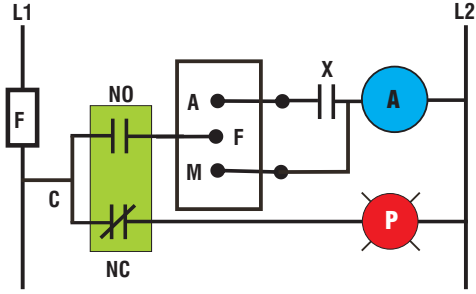
Examples of NO and NC Contact Connection with the Starter

F - 5 A control fuse
A - Main contactor
P - Fault alarm pilot light
X - Contact for automatic operation

BUTTON STATION START-STOP



MANUAL-OFF-AUTO SELECTOR



The NO contact closes when the operation is normal and no faults occur, allowing the motor to start.When a fault occurs, the NO contact opens to disconnect the motor.

The NC contact opens when the operation is normal and no faults occur, turning off the fault indicator pilot light.

When a fault occurs, the NC contact closes to turn on the fault indicator pilot light.

Settings

DURING SETUP, THE MOTOR IS AUTOMATICALLY DISCONNECTED.

Before operating the **Motor Monitor**, it is necessary to configure the settings. To begin, power on the device and press the **SETUP**. button. The first setting will appear on the screen:



This setting allows you to select the desired language by pressing the arrow buttons, as shown in the following figure:


Español

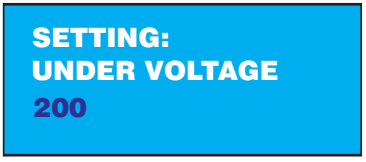

English

Press the **SETUP** button to move to the next setting.



In the 400 A and 1000 A models, the scale setting does not appear.
This setting allows you to select the scale of 20 or 80 A. If the motor consumes less than 20 A, it is recommended to select the 20.0 A scale for greater precision in current measurement. Use the arrow buttons to select the desired scale.

Press the **SETUP** button to move to the next setting.

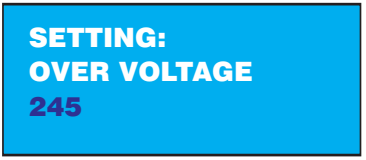


This step allows you to adjust the under-voltage trip point within a range of 180 to 440 V. Use the arrow buttons to set the desired value.

CAUTION:
If the under-voltage setting is close to the nominal voltage, the motor may shut down unnecessarily due to voltage levels that do not pose a risk to the motor. We recommend adjusting the under voltage according to the following table:

NOMINAL VOLTAGE	UNDER-VOLTAGE SETTING
208	190
220	200
380	346
440	400

Press the **SETUP** button to move to the next setting.



This step allows you to adjust the over-voltage trip point up to 520 V. Use the arrow buttons to set the desired value.

The system does not allow the over-voltage setting to be lower than the under-voltage setting.

CAUTION:
If the over-voltage setting is close to the nominal voltage, the motor may shut down unnecessarily due to voltage levels that do not pose a risk to the motor.

We recommend adjusting the over voltage according to the following table:

NOMINAL VOLTAGE	OVER-VOLTAGE SETTING
208	235
220	250
380	430
440	500

Press the **SETUP** button to move to the next setting.

SETTING: VOLTAGE IMBALANCE
5 %

This step allows you to adjust the trip point for voltage imbalance within a range of 1% to 10%. Use the arrow buttons to set the desired value; the recommended value is 5%.

Press the **SETUP** button to move to the next setting.

SETTING: CONNECTION DELAY
5 MIN

This step allows you to adjust the delay for the device to automatically close its contact, enabling the motor to restart automatically after a fault (except for underload). Use the arrow buttons to set the desired value.

Press the **SETUP** button to move to the next setting.

SETTING: CONNECTION DELAY FOR UNDERLOAD FAULTS 15 MIN

This step allows you to adjust the delay for the device to automatically close its contact, enabling the motor to restart after an underload fault.

Note : The connection delay settings have been separated into two because underload faults typically occur when a water well runs dry, and the water level recovery time can be very long.

Press the **SETUP** button to move to the next setting.

SETTING: RESET
AUTO

This step allows you to select the type of reset after a fault: automatic or manual.

In automatic mode, the device resets and closes its contact after the connection delay configured in the previous settings has elapsed.

In manual mode, the device does not reset until the **RESET** button is pressed.

To select the reset type, press the arrow buttons as shown below.

 **Manual**  **Auto**

Important Note: If manual reset is selected, the device will ignore the connection delay settings and will not restore the connection until the **RESET** button is pressed.

Press the **SETUP** button to move to the next setting.

SETTING: STARTS/HOUR = 10

When a motor starts too frequently, the starting currents generate excessive heating. Therefore, the number of starts per hour must be limited. For more information, see page 13.The adjustment range is from 1 to 99. Use the arrow buttons to set the desired number of starts per hour.

Press the **SETUP** button to move to the next setting.

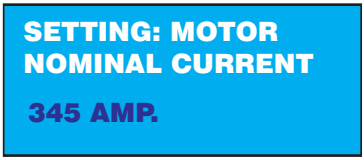


This step allows you to adjust the trip delay for a fault. The purpose of this delay is to prevent the motor from shutting down due to a short, transient fault that has no significant effect on the equipment. Use the arrow buttons to set the desired delay, which can range from 1 to 250 seconds. The recommended value is 5 seconds.

NOTE:

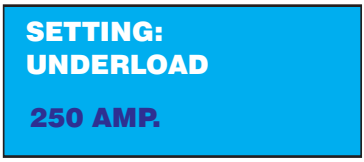
- There is no disconnection delay for reverse phase sequence faults.
- The disconnection delay for phase failure is fixed at 5 seconds.
- The trip delay for overload is calculated by the **Motor Monitor** based on the curve type and overload value.
- When using a soft starter, an underload fault may occur during the stop ramp if the ramp time exceeds the disconnection setting, as the motor's consumption decreases at the end of the ramp.

Press the **SETUP** button to move to the next setting.



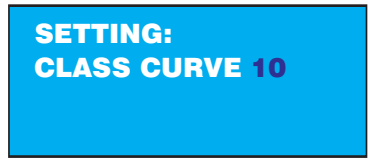
This step allows you to set the nominal current value consumed by the motor under normal conditions. If the motor's current consumption increases by more than 5% of this value, the **Motor Monitor** will consider it an overload and initiate the trip delay, depending on the overload value. Adjust the motor's nominal amperage using the arrow buttons.

Press the **SETUP** button to move to the next setting.



This step allows you to adjust the trip point for underload. When a pump runs out of water, the current decreases, and the **Motor Monitor** detects it as a dry-running condition. The underload adjustment is typically set 15% to 30% lower than the nominal current.
To ensure effective underload protection, it is recommended to test the motor under dry-running conditions for a few seconds to determine the current consumed by the pump when empty. Adjust the desired value using the arrow buttons.
If you do not wish to use underload protection, set the value to zero; the word OFF will appear, indicating that underload protection is not active.

Press the **SETUP** button to move to the next setting.



The **Motor Monitor** allows you to adjust trip curves to protect against overloads in various motor applications (see graph on page 14).

Class 5 - Used for motors that cannot withstand overloads well.
Class 10 - Commonly used for pumps, especially submersible pumps.
Class 20 - Used in general applications.
Class 30 - Used for motors with high inertia loads that take a long time to start.

The class indicates the time, in seconds, it takes for the trip to occur with a 600% overload. The lower the class, the shorter the trip time for a given overload. Use the arrow buttons to set the desired class: 5, 10, 20, or 30.

Press the **SETUP** button to exit the settings menu.

When exiting the menu, all settings are saved in the system. Even if the power is disconnected, the data will remain in permanent memory.

Operation: Resetting After a Fault

When the **Motor Monitor,** is powered on, or after a fault has occurred, a restart delay will occur for the following purposes:

- Allow the motor to cool down after an overload.
- If the device is connected to a submersible pump and the water has been depleted, wait for the well to recover its water level.
- Stabilize the system when intermittent faults occur, especially voltage faults.

Once the delay has elapsed, the **Motor Monitor** will automatically close its internal contact to allow the motor to start. During the delay, the following screen



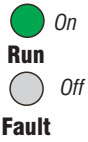
If a voltage fault occurs during the delay, it will be displayed on the screen; the delay will be interrupted and will not restart until the fault is corrected.
If the reset is set to manual mode, the device will not reconnect until the **RESET** button is pressed. In this case, the following screen will appear:



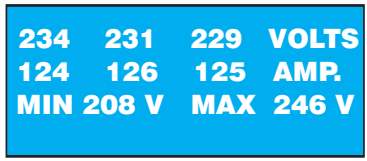
During the connection delay, the **NO** contact remains open, and the **RUN** and **FAULT** LEDs remain off.

Normal Operation

Once the connection delay has elapsed, the **Motor Monitor** will close the **NO** contact and allow the motor to start when commanded. The green **RUN** LED remains on, indicating that the internal relay is energized, while the red **FAULT** LED remains off.



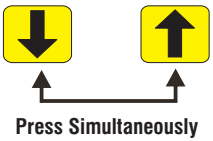
On the LCD screen, the following information will be displayed:



The first line shows the three line voltages. The second line shows the three line currents.The third line displays the maximum and minimum voltages.The fourth line indicates if a fault has occurred. To clear the fault message, press the **RESET** button.
The maximum and minimum voltage readings are useful for identifying voltage variations sustained by the lines. Only variations maintained for more than 5 seconds are recorded. To clear the memory of maximum and minimum values, press the UP arrow for more than 3 seconds.



To verify that the wiring installation of the contact is correct, start the motor and press both arrow buttons simultaneously. The **Motor Monitor** will open its internal contact to shut down the motor and initiate the restart delay.



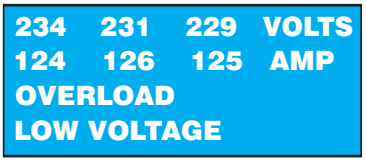
During this step, the following screen will appear:

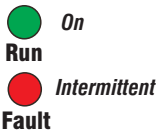


IF THE LCD SCREEN INDICATES OVERLOAD DURING MOTOR STARTUP, THIS IS NORMAL, AS THE MOTOR CONSMES MORE CURRENT THAN THE NOMINAL VALUE DURING STARTUP.

Operation: Disconnection Delay for Faults

The **Motor Monitor** initiates the trip delay when a fault is detected. During the delay, the red **FAULT** LED flashes, and the fault is displayed on the screen. Once the delay ends, the motor is disconnected.





Trip Delays:
Reverse Phase Sequence: Immediate (non-adjustable).
Phase Failure: 5 seconds (non-adjustable).
Overload: Depends on the set class and overload level.
Other Faults: As per the configured delay.

If the fault is corrected before the disconnection time expires, the **Motor Monitor** will not disconnect the motor, and normal operation will resume.

Operation: Fault Indication

When a fault occurs and the delay ends, the red **FAULT** LED lights up, and the green **RUN** LED turns off. The motor is disconnected, and the fault is displayed on the screen.



Operation: Viewing the Memory of the Last 10 Faults

The **Motor Monitor** stores the last 10 faults. Press LAST FAILURE to view them.



To view each fault in memory, use the arrow buttons to scroll through the fault numbers. Fault #1 is the most recent. After viewing them, if you want to exit and clear the memory, press the **RESET** button.
If you want to exit without clearing the memory, press **SETUP,** or the system will automatically exit after 30 seconds of inactivity.

Reverse Phase Sequence Protection

When the phase sequence is reversed, the motor rotates in the wrong direction, affecting its operation. Upon detecting this, the Motor Monitor flashes the red FAULT LED intermittently.



To correct the fault, turn off the switch supplying the voltage, disconnect the cable connected to L1 and reconnect it to L2. Connect the cable previously in L2 to L1, Restore the power supply, and the fault should be corrected.

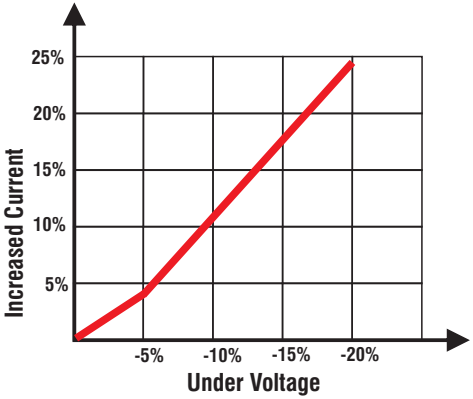
Under Voltage Protection

When the voltage drops, the motor current increases, causing overheating that can damage the motor. This effect is shown in the graph on page 12.

When the **Motor Monitor** detects a voltage lower than the under-voltage setting, the red **FAULT** LED blinks. If the fault persists beyond the set disconnection delay time, the internal relay disconnects, shutting off the motor, and the fault is indicated on the screen.

For the fault to clear and the connection delay to begin, the voltage must rise by more than 2% above the set threshold.

234 231 229 VOLTS
UNDER
VOLTAGE FAULT



Over Voltage Protection

When the **Motor Monitor** detects a voltage higher than the over-voltage setting, the red **FAULT** LED blinks. If the fault persists beyond the set disconnection delay time, the relay disconnects, shutting off the motor. The fault will be displayed on the screen.

234 231 229 VOLTS
OVER VOLTAGE FAULT

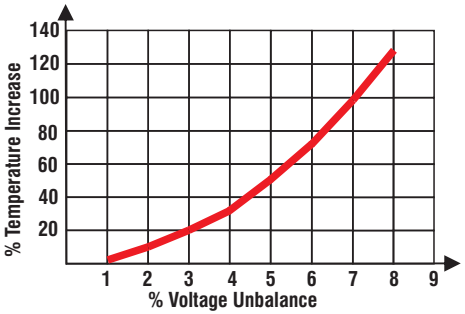
The voltage must decrease by at least 2% below the set threshold to clear the fault.

Voltage Unbalance Protection

Voltage unbalance creates a counter-rotating field that increases motor temperature and can damage the motor. If the fault persists beyond the set trip delay time, the relay disconnects, shutting off the motor. The fault will be displayed on the screen.

234 231 329 VOLTS
VOLTAGE UNBALANCE
FAULT

The graph shows how voltage unbalance increases the temperature in the winding, potentially damaging the magnetic wire insulation and burning the motor.



Definition of Voltage Unbalance (%):

Desb = Dm X 100 / Vp

Where: **Vp**= Average voltage **Dm**= Maximum difference compared to the average voltage

Example: 235 V, 222 V y 208 V

Vp = (235+222+208) / 3 = 221

Vp=221 Dm = 235-221=14 V

% Desb. = 14 X 100 / 221 = 6.3 %

Phase Failure Protection

Phase failure occurs when the voltage is lost on one of the motor's supply lines. This causes an increase in the winding temperature, which can quickly burn out if not properly protected. With the motor turned off, a phase failure prevents it from starting. If the motor tries to operate with only two supply lines, it will have no starting torque, and the current can increase up to 800%, potentially damaging the motor within seconds.

The **Motor Monitor** detects a phase failure when there is no current in one line for more than 5 seconds or if a voltage imbalance greater than 20% occurs. If the failure persists for more than 5 seconds, the internal relay disconnects, shutting off the motor and preventing it from starting until the voltages return to normal.

The failure will be displayed on the screen:

234 0 232 VOLTS
PHASE FAULT

Under Load Protection (Dry run protection)

When a pump operates without water, two issues occur:

- The water does not lubricate the seals, causing damage.
- Submersible pump motors are designed to cool with water; without water, they overheat and can burn out if not quickly disconnected. This is particularly critical for submersible pumps, which are more prone to damage when no water is circulating.

When the pump runs out of water, the line currents decrease, enabling the **Motor Monitor** to detect the fault and disconnect the pump—something overload relays cannot do. The red **FAULT** LED will blink. If the fault persists beyond the set disconnection delay time, the internal relay disconnects, shutting off the motor. The fault will be displayed on the screen:



The **Motor Monitor** is an ideal solution for protecting pumps from dry running, especially those located in wells, as it does not require electrodes to detect low suction levels.

Using electrodes to detect water levels in wells is complicated and requires maintenance to prevent scale buildup.

Rapid Cycling Protection

When a motor starts too frequently, the starting currents generate excessive heating that accumulates. If the starts per hour exceed the motor's design, the motor can burn out. To prevent this, the number of starts per hour must be limited.The start counter has a timer that resets every hour. If the starts exceed the set limit, the **Motor Monitor** disconnects the motor to protect it.

If the starts per hour exceed the configured limit, the **Motor Monitor** immediately disconnects the motor and activates the connection delay to allow the motor to cool down.

Using reduced voltage starters doubles the allowed starts per hour, although acceleration time also plays a role.

Below are suggested starting frequency tables from NEMA. ***For more detailed information, consult the motor manufacturer.***

NEMA TABLE FOR PERMISSIBLE START FREQUENCY IN MOTORS

S- Starts / Hour
T - Cooling Time Between Starts (in seconds)

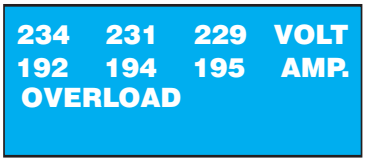
Full Voltage Starter

	2 POLES		4 POLES	
HP	S	T	S	T
1	15	75	30	38
1.5	13	76	26	38
2	12	77	23	39
3	10	80	20	40
5	8	83	16	42
7.5	7	88	14	44
10	6	92	12	46
15	5	100	10	50
20	5	110	10	55
25	4	115	9	58
30	4	120	8	60
40	4	130	7	65
50	3	145	7	72
60	3	170	6	85
75	3	180	6	90
100	3	220	5	110
125	2	275	5	140
150	2	320	5	160
200	2	600	4	300
250	2	1000	4	500

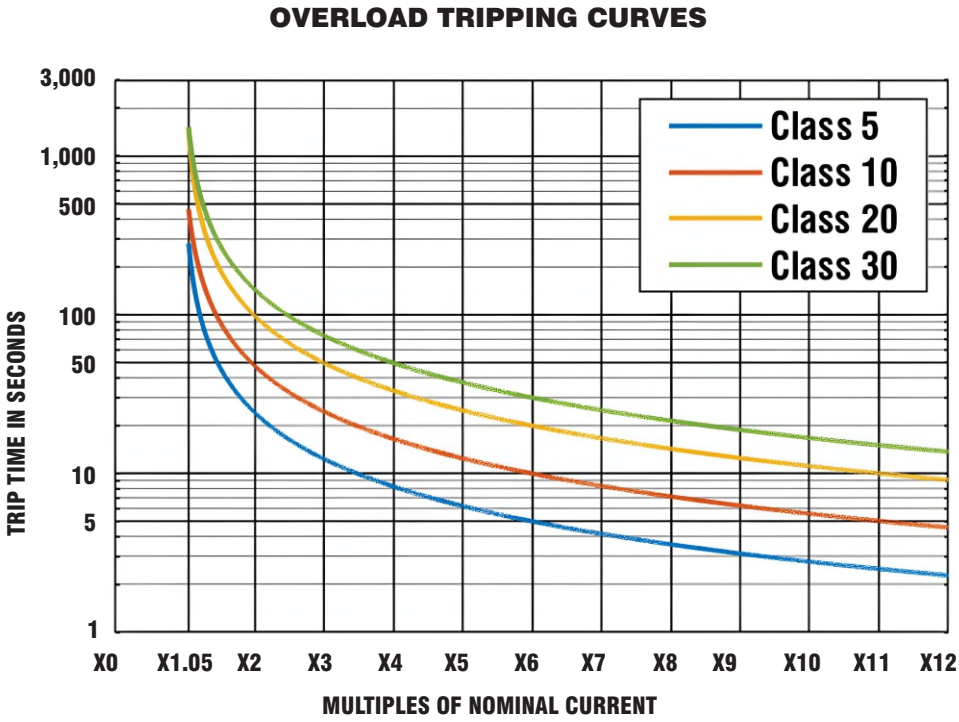
Using soft starters allows for doubling the number of permitted starts per hour.

Overload Protection

When the **Motor Monitor** detects an overload exceeding 5% of the nominal current, it initiates a trip delay. Once the delay ends, the motor shuts down and enters the restart delay.



The delay depends on the level of overload and the class selected in the settings, as shown in the following graph:



The multiple of the nominal current is calculated by dividing the current consumed by the motor by the nominal current. The class indicates the time in seconds it takes for the trip to occur with an overload of 6 times the nominal current.

Class 5: Used to protect motors requiring very fast overload trips.
Class 10: Commonly used for pumps, especially submersible pumps.
Class 20: Used in general applications.
Class 30: Used for motors with high-inertia loads that take a long time to start.

Voltage Logger with USB Memory (Optional Accessory)

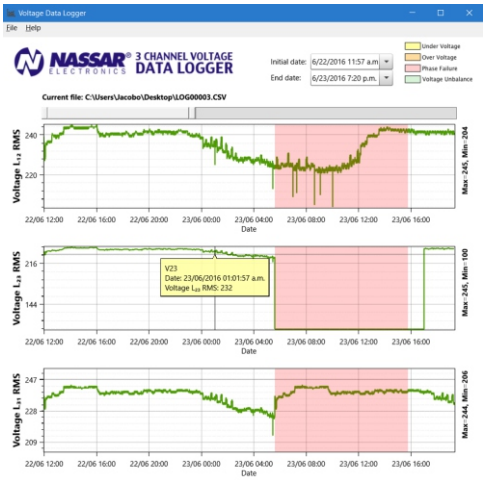
The **DL-100 Datalogger** is an accessory for the **Motor Monitor** that stores voltage information and three-phase voltage power supply faults in memory. This data is transferred to a computer via a USB adapter and analyzed using the **Nassar Data View**, supplied with the device. The **DL-100** retrieves voltage data from the **Motor Monitor**, so both devices are required to record data. It is recommended to consult the **DL-100** manual for more information.



- Records three-phase line voltages and faults on a USB memory.
- Up to 20 days of continuous monitoring.
- Software included for easy visualization of voltages and faults.
- Data can be viewed on any computer, in Excel or in graphs using the **Nassar Data View**, included or available for free download.







Modbus Communication (Optional Accessory)

This accessory enables Modbus TCP/IP communication for remote monitoring of all variables: the three currents, the three voltages, active faults, etc. For more information, consult the manual online.

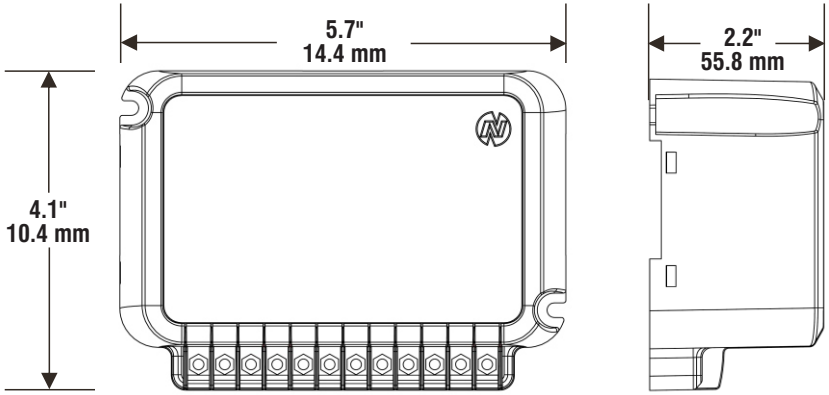
To request this accessory, the **Motor Monitor** must be ordered with Modbus output.

Specifications

	MM-80	MM-400	MM-1000
Current Range	2 a 80 A	40 a 400 A	100 a 1,000 A
Voltage Accuracy	1% at 25 °C (77 °F) with balanced voltages		
Current Accuracy	1% at 25 °C (77 °F)		
Power Supply Voltage	From 180 to 520 VAC 50/60 Hz, on lines L1 and L2		
General Connection Delay	Adjustable from 1 to 60 minutes, automatic		
Low Load Connection Delay	Adjustable from 1 to 600 minutes, automatic		
Reset Type	Adjustable, manual, or automatic		
Disconnection Delay for: -Reverse Sequence Fault -Phase Fault Detected by Current -Frequent Start Fault -High/Low Voltage Fault, Low Load, Voltage Imbalance, and Phase Fault -Overload Fault	 Immediate (non-adjustable) 5 seconds (non-adjustable) 1 second (non-adjustable) Adjustable from 1 to 250 s Depending on the set class and overload (table on page 14)		
Overload Trip	Adjustable for classes 5, 10, 20, and 30		
Low Voltage Trip	Adjustable from 180 to 440 VAC		
High Voltage Trip	Adjustable from 220 to 520 VAC		
Voltage Imbalance Trip	Adjustable from 1% to 10%		
Frequent Start Trip	Adjustable from 1 to 99 starts/hour		
Fault Memory	The last 10 faults are stored in permanent memory.		
Output Contacts	SPDT 10 A @ 240 VAC, 2 A @ 440 VAC (resistive load). Electrical lifespan: 150,000 operations. Mechanical lifespan: 10,000,000 operations.		
Modbus Communication (optional)	Modbus TCP/IP		
Output to DataLogger	DL-100 is used to record voltages and faults		
Storage Temperature	-30 to +65 °C (-22 to +149 °F)		
Operating Temperature	-20 to +60 °C (-4 to +140 °F)		
Operating Relative Humidity	10 - 90% non-condensing		
Mounting Type	3 types: screw-mounted, DIN rail, and front mounting		
Power Consumption	Maximum 3 W		
Enclosure Material and IP Standard	ABS plastic, IP30 classification		
Packaged Weight	Model MM-80: XXX g (XXX lbs.) Model MM-400: XXX g (XXX lbs.) Model MM-1000: XXX g (XXX lbs.)		
The Motor Monitor has been designed according to the following standards:	IEC 61010-1 IEEE C37.112 IEC 60255-6 IEC 60255-8		

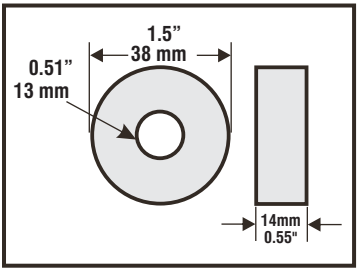
Specifications are subject to change without prior notice.

Motor Monitor Dimensions

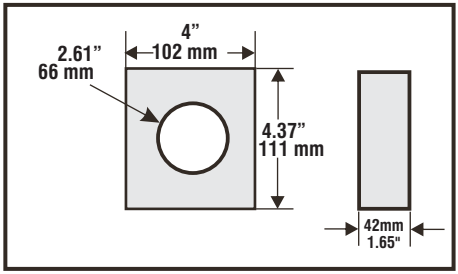


Current Transformer Dimensions

80 Amp.



400 y 1000 Amp.



WARRANTY

This product is warranted against manufacturing defects and component defects for a period of 3 years from the date of purchase. Nassar Electronics reserves the option to repair or replace this product at the manufacturing point F.O.B., provided that Nassar Electronics determines it to be defective. Any repair or replacement required due to inadequate maintenance, normal wear and tear, improper voltage supply, electrical surges, unfavorable environmental conditions, outdoor installation, accidents, misuse, operation outside of specifications, modifications, repairs, use of unauthorized replacement parts, storage and handling, or any other cause not attributable to Nassar Electronics is not covered by this warranty. The buyer will be responsible for covering the necessary repair costs. Disassembly, reinstallation, and transportation expenses shall be borne by the buyer/customer.

LIMITATION OF LIABILITY

NASSAR ELECTRONICS' LIABILITY SHALL BE LIMITED TO BREACH OF CONTRACT, NEGLIGENCE, OR WILLFUL MISCONDUCT. IN ANY CASE, THE LIABILITY ATTRIBUTABLE TO NASSAR ELECTRONICS SHALL NOT EXCEED THE VALUE OF THE PRODUCT PURCHASED BY THE CUSTOMER FROM NASSAR ELECTRONICS. THE BUYER AGREES THAT NASSAR ELECTRONICS SHALL NOT BE LIABLE FOR INCIDENTAL DAMAGES, CONSEQUENTIAL DAMAGES, DAMAGE TO OTHER EQUIPMENT/THIRD PARTIES, OR LOSSES OF ANY KIND NOT COVERED UNDER THE WARRANTY.

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