emotron®

# EL-FI M20
# Shaft Power Monitor

# Machine and Process Protection

## Preventative actions eliminate breakdowns – use the motor as a sensor

### PREVENTATIVE ACTIONS

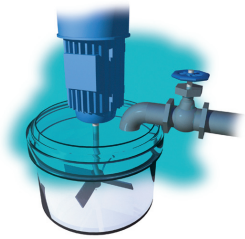
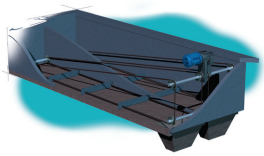
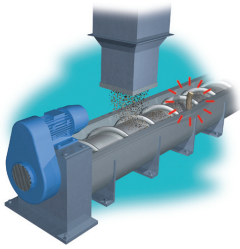
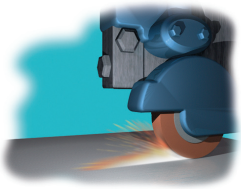
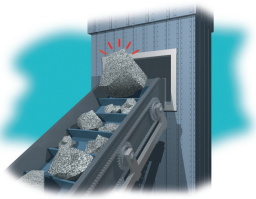
Use the Emotron EL-FI M20 monitor as a proactive measure to protect your machines and processes from serious breakdowns and expensive production downtime. Abnormal process over and under load conditions are accurately and reliably detected using the M20's unique "shaft power" measurement principle.

The M20's Auto Set feature provides quick and easy set up by means of learning the "normal" process load and then automatically setting appropriate alarm functions – all within three seconds and just one push of a key.

### USE THE MOTOR AS A SENSOR

By using the electrical motor as a sensor, the M20 provides a solution that is simple to install and reliable in operation. The need for mechanical safety devices, external transmitters and cabling is eliminated thereby minimizing installation and maintenance cost.

# The easy way to protect

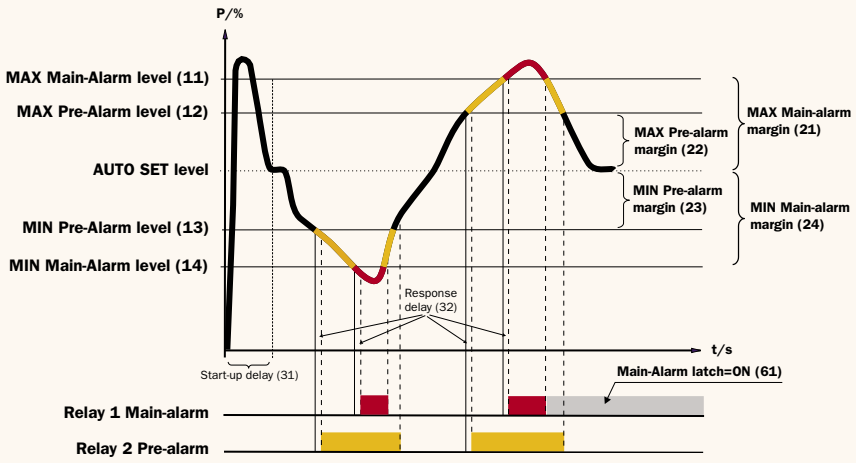
| | APPLICATIONS | PROBLEMS | M20 SOLUTION |
|---|---|---|---|
|  | Magnetic pumps<br>Excentric screw pumps<br>Impeller pumps<br>Centrifugal pumps | Dry running<br>Cavitation<br>Closed valve<br>Flow variation<br>Locked pump wheel | Detects an underload or overload. Activates an alarm and stops the pump before damage occurs. |
|  | Mixers<br>Agitator<br>Blenders | Shaft oscillation<br>Missing or damaged blades<br>Material viscosity | Detection of underload or overload. Activating an alarm that stops the motor. Need to control material viscosity according to motor load using the M20s “analogue output”. |
|  | Scraper system<br>Sludge scraper | Jamming<br>Broken or missing blades<br>Chain breakage | Stops and activates an alarm on overload for jamming or underload in the event of chain breakage. |
|  | Conveyor system<br>Screw Conveyors<br>Paternoster Elevator | Jamming<br>Unnecessary idling<br>Broken chain/axle/belt | Stops and activates an alarm on overload for jamming and underload in the event of chain, axle, belt breakage and unnecessary idling. |
|  | Machine Tools | Tool failure<br>Blunt tool<br>Broken tool<br>Missing tool | Stops the machine and activates an alarm in the event of tool failure or noncompletion of an operation (min alarm) or if a tool becomes blunt (max alarm). |
|  | Stone-crushing | Jamming<br>No more material<br>Unnecessary idling | Stops the machine and activates an alarm on overload for jamming or underload for material run out – thereby avoiding disruptive down-time or unnecessary idling. |
|  | Automatic gates and doors | Jamming<br>End position detection<br>Gates pressure control<br>Broken axle | Stops and activates an alarm on overload for jamming, end position and pressure control. Underload for broken axle. |

# Unique features

### SHAFT POWER MEASUREMENT

The instantaneous shaft power supplied to the driven equipment by the electrical motor, is supervised by measuring the input power and by calculating the motor power losses with an unique algorithm. The value of the real motor shaft power is indicated in the display in % of rated power, kW or HP.

### FOUR ALARM LEVELS




***Digits within brackets are parameters that can be easily configured.***

11. MAX Main Alarm (Overload)
12. MAX Pre-Alarm (Overload warning signal/alarm)
13. MIN Pre-Alarm (Underload warning signal/alarm)
14. MIN Main Alarm (Underload)

(The Pre-Alarm provides a warning signal/alarm before the main alarm is activated)

### INHIBIT PRE-ALARM SIGNAL

By configuring a Digital input to the M20, the Pre-Alarm signal can be inhibited or blocked during a specific period of a machines working sequence.

### AUTO SET

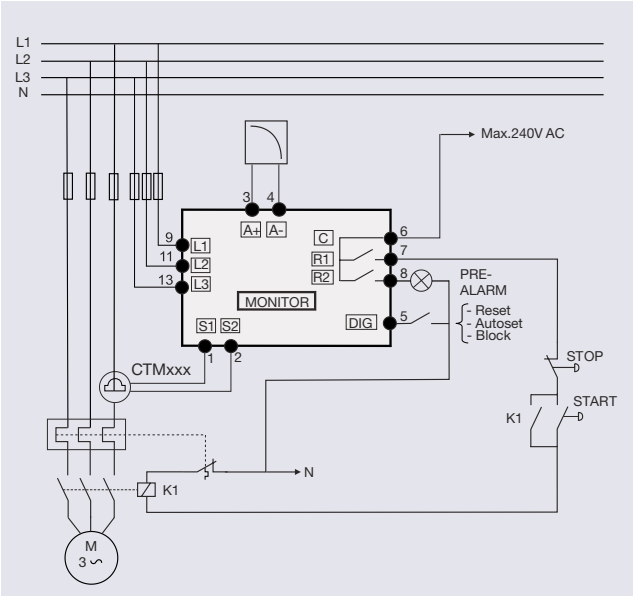
By pressing the Auto Set key during normal load, the alarm levels are calculated and automatically set based on the measured actual motor load. (Auto Set level)

### ANALOGUE OUTPUT

The M20's analog output provides a signal of 0-20mA, 4-20mA, 20-0mA or 20-4mA which represents the real motor shaft power. The analogue signal can be scaled to desired shaft power range by setting of min and max values.

# Connection of the Emotron EL-FI M20

*The Emotron EL-FI M20 is easily installed in the motor contactor cabinet.*




*Connection example.*

## Technical Data

| | |
|---|---|
| **Dimensions/Weight (WxHxD)** | 45x90x115mm (1.77"x3.54"x4.53")/0,3kg (10.5oz) |
| **Protection class/Mounting** | IP20/NEMA 1/35 mm DIN-rail 46277 |
| **Power consumption/Fuse** | Max 6VA/max 10Amp |
| **Supply Voltage** | 1x100-240 or 3x100-240 (optional)<br>3x380-500, 525-600, 600-690 VAC +/-10% |
| **Frequency** | 50 or 60Hz |
| **Relay output** | Main Alarm Relay R1, Pre-Alarm Relay R2<br>5A/240VAC Resistive, 1,5A/240VAC Pilot duty/AC12 |
| **Analogue Output** | 0-20, 4-20, 20-0 or 20-4 mA, Scalable analogue signal<br>Max load 500 ohm |
| **Current Input** | Up to 100Amp with current transformer CTM010, CTM025, CTM050 or CTM100 (over 100Amp CTM010 + additional standard current transformer) |
| **Digital input** | External Auto Set, Reset or Blocking Alarm (optional)<br>Max 240VAC or 48VDC, High: >24VAC/DC, Low<1VAC/DC |
| **Approved** | CE (up to 690VAC) and cUL (up to 600VAC) |

**Emotron is developing and supplying equipment for control and protection of industrial processes and machines driven by electrical motors, featuring the following product groups:**

- **Shaft power monitors**
- **Softstarters**
- **Frequency inverters**
- **Custom designed drives and power electronics**

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