

# Emotron M20

## Reverse function



Addendum  
English

# Emotron M20 Shaft Power Monitor

## Special functions (windows 35, 36 and 65) "Reverse function"

This instruction is valid for Emotron M20, 01-2551-01, (from software version R3B).

The reverse function can be used to reverse (drive backwards) motor driven equipment such as e.g. a screw conveyor when a "jam" occurs. With this function the M20 can be used to prevent expensive stops and breakdowns in machinery for example; blocked chip feeder, jammed lime feeder, blocked slurry pump or in other similar applications.

In the case of a screw conveyor or chip feeder, for instance, when an overload or jam-up occurs, the Emotron M20 reverses the "conveyor" automatically. Normally this would clear the jammed material and then enable the conveyor to feed forward again.

Should one reverse cycle (drive backwards) not be enough to release the material, the monitor will repeat this operation up to a maximum of five start attempts. If the conveyor is still jammed, the monitor stops the conveyor motor/machine from any further operation and an alarm is given. The conveyor would then have to be cleaned manually and the monitor reset. The number of start attempts and the reverse time can be set. If set number of start attempts is enough to release the material the conveyor will feed forward again, and reset the previous number of start attempts, but only after the conveyor has fed forward for least 60 seconds and if the selected start and response delay time has elapsed.

### Wiring, Programming and Operation

---

**CAUTION: Study thoroughly section 2 Safety in the Emotron M20 Instruction manual before installing and using the monitor. Please note that the machine starts and stops automatically during set-up and running when the reverse function is used!**

---

For wiring, programming and operation see the corresponding sections in the Installation manual for the M20. See also under 9 Advanced Features and the headline Special functions (windows 35, 36 and 65) as well as the special connection example in Figure 1 (this example can also be found at the end of this instruction).

---

**NOTE:**

To implement the above Reverse function, it will be necessary for a forward and reversing motor starter (contactors) to be installed.

Relay R1 and R2 (K1 and K2) must not be energized/on at the same time as this will generate a short circuit. Therefore it is important that window 65 = "2" before the relays are connected to the contactors and it is also recommended that the Forward and Reverse contactors are also electrically interlocked.

---

The output relay contacts, terminals 6, 7 and 8 connect to the motor control circuit and to the respective contactor; i.e. terminal 7 to K1 (R1) = Forward and terminal 8 to K2 (R2) = Reverse (see fig. 1). Terminal 5 can be used for external reset and has the same function as the reset button on the front of the monitor.

### Analogue output

In this Reverse function application the analogue output will go to its maximum 20 mA when the number of allowed start attempts has elapsed. The output signal can for example be used as an input to PLC's or similar equipment to handle the alarm etc. If a potential free relay contact is required, the following external relay is recommended as an accessory:

- Schrack / Tyco RT174012 12 VDC (10A 250VAC)
- Camden DIN-rail relay socket C 250 3P

---

**Please note that an external alarm relay connected to the analogue output must be specified as the above relay coil voltage, resistance, power etc to ensure correct operation and life time.**

---

### Set the monitor as follows

(First perform settings according to the applicable parts of the M20 Monitor installation manual):

1. In this application it is unusual that both overload and underload monitoring is used and unless the underload is required in some other function window 5 should be set to monitor overload only (✓).
2. Start the motor/machine and let it run at normal load until the start delay has elapsed - the machine load is shown in the monitor display.
3. Press the "Auto set" button for 3 seconds.
4. Adjust start attempts (window 36), start delay (window 31), response delay (window 32, alt 34 at min), reverse time (window 35) etc. as required.

It is also possible to set the alarm level manually, see the manual and chapter 4 Getting Started.

## Operation – Alarm

When an overload occurs for longer than the selected response delay (window 32), the following sequence takes place if there are still some start attempts available:

1. Motor is switched-off and stands for 3 seconds.
2. Motor is reversed during chosen reversal time, window 35 (If the monitor senses an overload during reversal the motor will stop).
3. Once again, the motor is switched-off and stands for 3 seconds.
4. Motor re-starts automatically in forward mode.

For a prolonged jam-up, the monitor will carry out the maximum of reverse cycles set in window 36. If this does not clear the blockage, the motor is switched-off and the analogue output will go to its maximum 20 mA "permanent" stop and alarm. When this occurs, the conveyor/machine must be cleaned manually and the monitor reset, either by

the reset button or by the digital input. When reset, the monitor can once again perform the number of reverse cycles set in window 36.

**Reset of the monitor can be done in three ways:**

- Reset button
- Digital input, set for “rES”, window 81
- Switch-off the supply voltage, 3-phase.

Important! If the monitor senses an overload during reversal, after start and response delay has elapsed, the motor will be stopped immediately even if the reversal time is set for a longer time. The monitor will then try to run in the forward direction again. If the load returns to a normal running level before the start delay has elapsed (i.e. the jammed material

clears), the monitor will reverse the motor/feeder until the selected time has concluded.

If the reversal time is set to a shorter time period than the start and response delay together, the reverse mode will be completed after the selected reverse time has concluded, independently of the set response delay. In this case the response delay only has an effect on forward running.

When the conveyor has fed forward for at least 60 seconds with normal conditions and no alarm, the previous number of start attempts (reverse cycles) are reset automatically although only if selected start and response delay time has concluded.

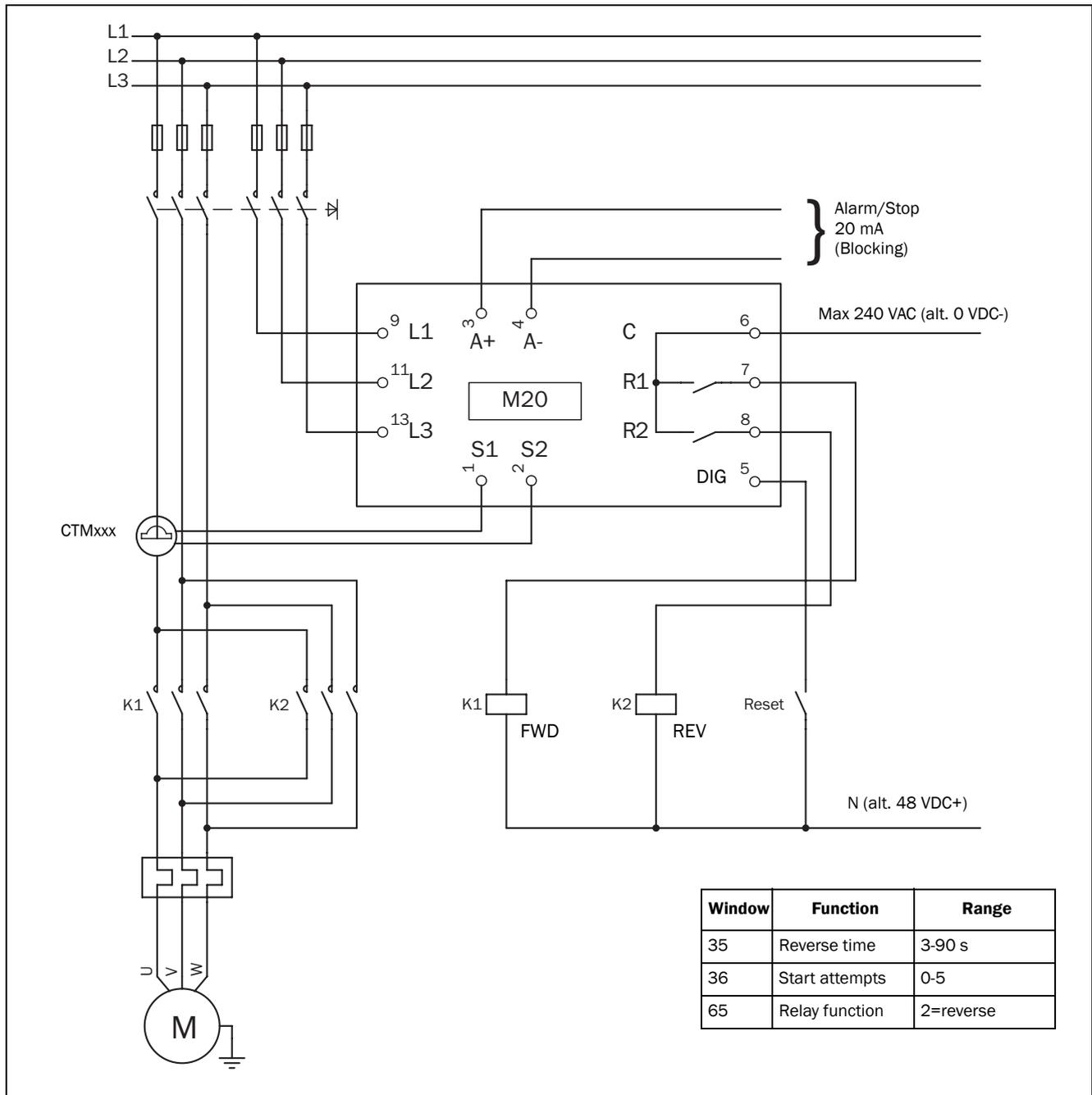


Fig. 1 Example of connection with a forward and reversing motor starter (contactor).

**e m o t r o n<sup>®</sup>**

***DEDICATED DRIVE***

**Emotron AB, Mörsaregatan 12, SE-250 24 Helsingborg, Sweden**

**Tel: +46 42 16 99 00, Fax: +46 42 16 99 49**

**E-mail: [info@emotron.se](mailto:info@emotron.se)**

**Internet: [www.emotron.com](http://www.emotron.com)**