Circuit Breaker Testing

Application Note

Spring charge motor current measurement with TM1700/1800

Spring charge motor is employed when springs for Close and Open operations need to be compressed or expanded to store potential energy for next operation. The motor is usually fed from the station internal power supply.

Malfunctions in spring charge mechanism may cause deviations in motor operation. These deviations may be detected if motor current is monitored during its operation. Easiest method to perform the current monitoring is by using a current sensor around the motor power supply connection and record the current changes in time.

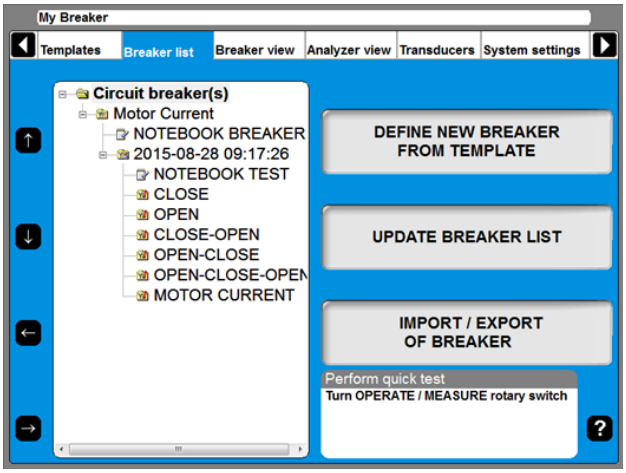
TM1700/1800 is capable of making measurement of the motor current if the following conditions are met:

- TM1700/1800 has at least one analog channel available.
- There is a test plan where motor current measurement is included.
- A current sensor is available.

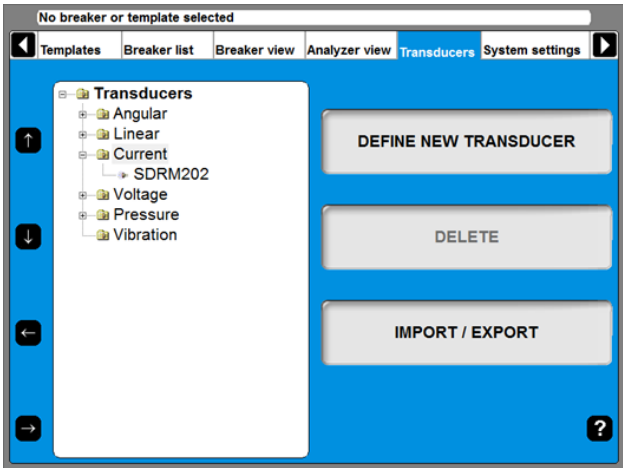
Preparing TM1700/1800

TM1700/1800 can measure different input signals and motor current can be one of them. However, a test plan or template where one analog channel is configured for current measurement is required.

Motor normally starts to operate after a close maneuver to charge the close springs again, therefore current measurement should be performed during the close operation. Often it is more convenient to dedicate a separate operation for motor current measurement because of the longer time it takes to charge the springs (10-30 s).

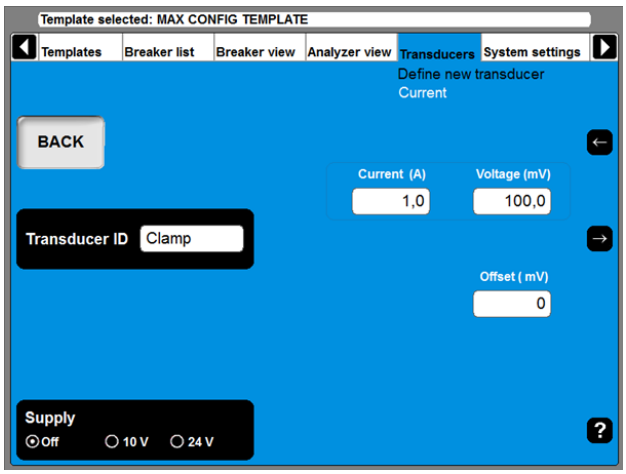


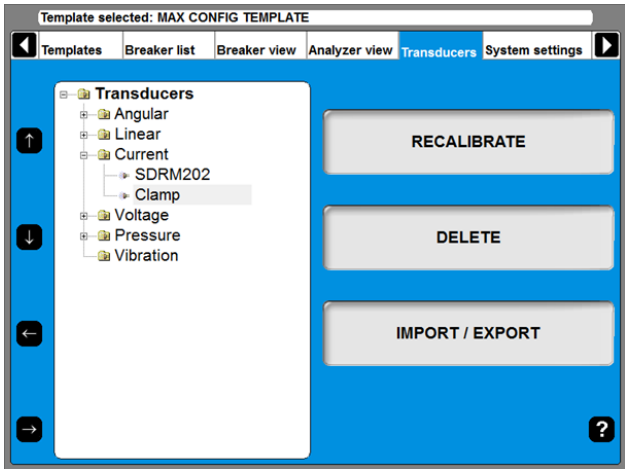
Depending on available current sensor a corresponding current transducer must be defined in the Transducers section of CABA Local.



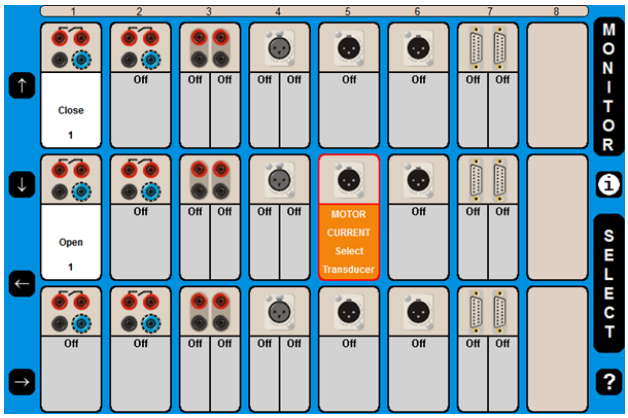
Megger

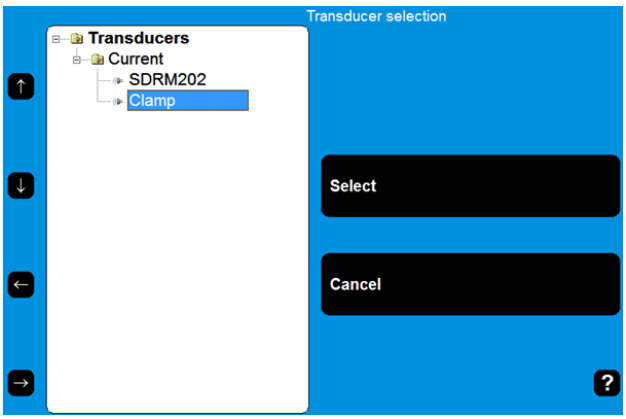
Subject to change without notice. Printed matter No. ZR-BL03E	Doc. BL033491AE	V01a	2016

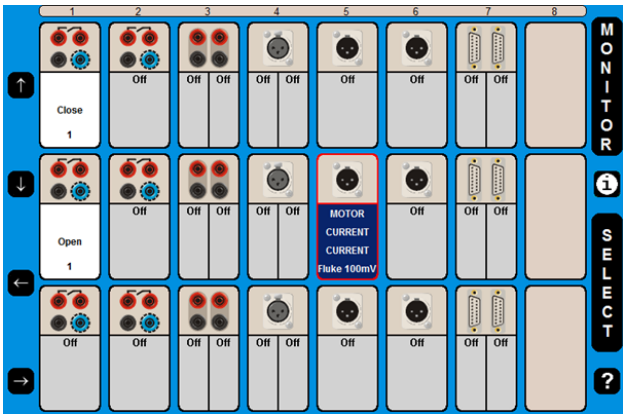




When selecting operation "Motor current" the analog channel allocated for current measurement in Analyzer view starts blinking and one must select transducer.







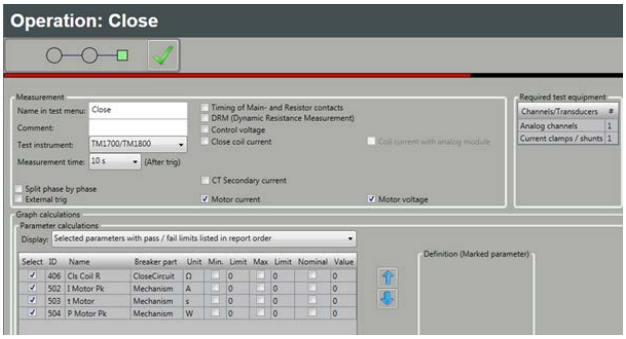
Now TM1700/1800 is ready for motor current measurement. If all necessary connections for breaker operation are in place, the measurement can be initiated now by turning the Operate/Measure knob.

Test plan creation using TPE

In a situation when premade test plan is not available, it is possible to create a new plan using Test Plan Editor (TPE) available in CABA Win (ver. R05A and later). The test plan in TPE is created from scratch, thus all breaker settings as well as desired operations must be created.

Using TPE it is also possible to add an extra operation for motor current measurement in older test plans.

If only motor current is of interest, then the test plan can be created with only one operation where motor current is measured, which is "Close" operation. It is imperative that the motor current measurement is enabled by checking "Motor current" checkbox.



The measurement time must be changed from default 1 s to 10 s or longer if needed.

Parameters characterizing motor current behavior such as motor running time and peak current need to be selected in table “Parameter calculations” as well if they are not preset already in User preferences of Test Plan Editor. Calculation of motor power requires that "Motor voltage" is selected.

Connection of current sensor

Breaker cabinets and voltage supply for both coils and motor may differ greatly from one to another. The main principle for motor current measurement is to locate the wire where station voltage is supplied (usually plus side of DC supply) and clamp the sensor around this wire.

Other TM1700/1800 connections to coils and contacts are exactly as for normal measurement of a Close operation.

Results of measurement

The purpose of motor current measurement is to observe current shape and ensure that maximal current and time for charging springs are not exceeded.

If motor peak current is too high and/or motor charge time is too long it could be an indication of that the charging mechanism requires more force than normal e.g. due to lack of lubrication.

In case the peak current is lower and/or motor charge time is shorter it could be an indication of a broken/ fatigued spring.

In CABA Local/Win it is possible to examine a graph of the current as well as read three parameters which describe condition of charging mechanism and motor itself. These parameters are:

- 502 Spring charge motor peak current (I Motor Pk)
- 503 Spring charge motor run time (t Motor)
- 504 Spring charge motor peak power (P Motor Pk)

An example of three phase measurement of motor current.

Postal address:
Megger Sweden AB
Box 724
SE-182 17 DANDERYD
SWEDEN

Visiting address:
Megger Sweden AB
Rinkebyvägen 19
SE-182 36 DANDERYD
SWEDEN

T +46 8 510 195 00
F +46 8 510 195 95

seinfo@megger.com
www.megger.com