

Round Robin tests for converter losses (RR'C)

Discussion & next steps

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Discussion, excerpts

1. Test method should be as simple as possible, as good as possible.
2. Input voltage to be considered 400 / 460 V.
3. Dependency on frequency 50 Hz / 60 Hz.
4. Introduce reference current for converter: simplifies things, defined by manufacturers.
5. Converter losses \leftrightarrow total system losses.
6. Torque producing current important.
7. Measuring uncertainty: +/- 5 to 10%.
8. No load has the pulses set at zero: disabled.
9. The beauty of Semi-Analytical-Model (SAM): insights to calculate.
10. CDM definition. There are three different types: compact/standard/premium. Compare simple drives.
11. Different requirement for converter with higher capability. Correction factor necessary depending on functionality.
12. Surprised how little deviation is shown
13. Surprise that losses are so small
14. Test motors IE2 or IE3 only

Summary of report and discussion

- We learn from the discussion
- RR'C phase 1: work to be finished according to plan
- RR'C organization established: second phase much smoother!!
- UTP established, update pending UTP* (how to make it part of a standard)
- Test results have surprisingly high repeatability
- Do we need that high accuracy, can we be more simple?

Next steps

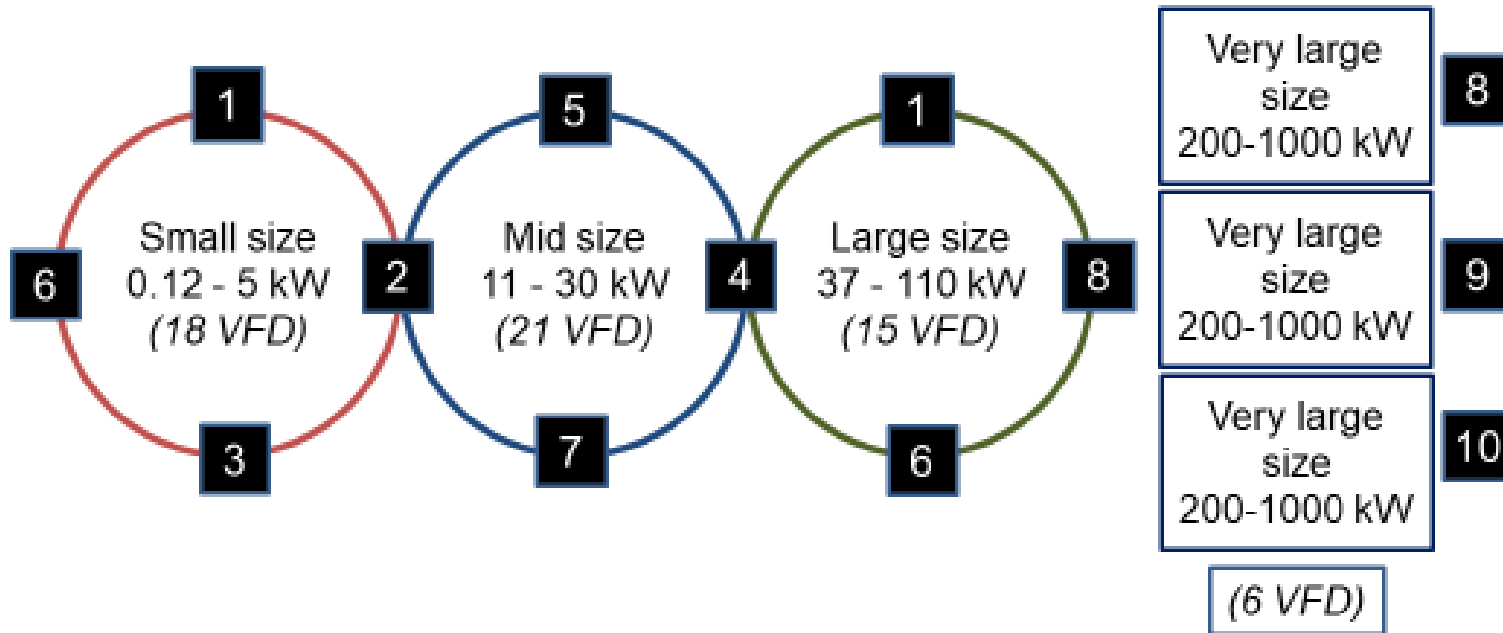
- Final report RR'C phase 1:
WG18 meeting
9 - 21 February 2019, Melbourne AU
PUBLICATION: EMSA report
- Kick-off RR'C phase 2:
9 - 21 February 2019, Melbourne AU
include 0.12 - 1000 kW
train the labs involved to follow the UTP*
premium/standard converters
 - ▶ how much are the losses?

RR'C phase 2: Testing labs and capacity

Available converter testing capacity											
RR'C Phase 2	Round Robin (small and intermediate machines)						Stationary tests (large machines)			All	
Output power (kW)	1	2	3	4	5	6	7	8	9	10	
	TRIED, CN	DTI, DK	BFH, CH	Advanced Energy, USA	Hydro Québec, CA	Fuji Electric, JP	KIT, GE	Danfoss, DK	ABB, FI	Rockwell, USA	
	CHAI Qing	Sandie B. Nielsen	Andrea Vezzini	Emmanuel Agamloh	Pierre Angers	Ikuya Sato	Alexander Stahl	Norbert Hanigovszki	Henri Kinnunen	Jiangang Hu	Total (Labs)
0.12 to <0.18											3
0.18 to <0.25											3
0.25 to <0.37											4
0.37 to <0.56											5
0.56 to <0.75											6
0.75 to <1.1											6
1.1 to <1.5											8
1.5 to <2.2											8
2.2 to <3.7											8
3.7 to <5.5											8
5.5 to <7.5											8
7.5 to <11											8
11 to <15											8
15 to <18.5											8
18.5 to <22											8
22 to <30											7
30 to <37											7
37 to <45											7
45 to <56											5
56 to <75											5
75 to <90											4
90 to <110											4
110 to <150									pending		3
150 to <185											3
185 to <220											1
220 to <250											1
250 to <375											1
375 to 1000											1
Number of products	10	?	20	20	5	17	5	4	?	3	84

RR'C phase 2:

Number of converters to be tested (total 60)



RR'C phase 2: Andrea Vezzini

Data management in : Introducing Trello

A managed single point of information exchange and data storage is required.

- Key information exists only in a single copy (apart from backup!)
- Information is accessible any time and for everybody, but assigned to separate topics (easy to find communication threads)
- The status of each inverter and its geographic position should be easy to trace
- The document reporting the results should be (even more) standardized and easy to use for further data processing

The screenshot shows a Trello board titled "Round Robin Converters Pilot Round" with a Kanban layout. The board is organized into columns representing different organizations, each with a list of inverters and their specifications. The columns are:

- 01 - CalTest (Au)**:
 - Contact Address
 - Shipping Address
 - 01A - ABB ACS355-01E-06A7-2 (1.1kW)
 - 04B - Schneider Altivar ATV212HU30M3X (3kW)
- 02 - Danish Technological Institute (DK)**:
 - Contact Address
 - Shipping Address
 - 04A - Schneider Altivar ATV212HU22N4 (2.2kW)
 - 01B - ABB ACS355 (11kW)
 - 02B - Parker 650-21140010-0F0PR0-A1 (0.75kW)
- 03 - Berner Fachhochschule (CH)**:
 - Contact Address
 - Shipping Address
 - 02A - Schneider Altivar 61 - ATV61HU22N4 (2.2kW)
- 04 - Advanced Energy (USA)**:
 - Contact Address
 - Shipping Address
 - 03A - Lenze I55AE255F10V10000S (5.5kW)

The board also includes a sidebar with sections for "Organization", "Partners", "Project Plan", "Uniform Testing Protocol (UTP)", and "Forum".

Thank you

- to the testers
- to IEC SC 22G WG18
- to EMSA
- to the four supporting countries

Contact

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 - Emmanuel Agamloh, Advanced Energy, USA
 - Andrew Baghurst, CalTest, Australia
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- www.motorsystems.org
 - www.topmotors.ch
 - www.motorsummit.ch